

Contributions to Management Science

Rim El Khoury  
Nohade Nasrallah *Editors*

# Emerging Trends and Innovation in Business and Finance

 Springer

# **Contributions to Management Science**

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Rim El Khoury · Nohade Nasrallah  
Editors

# Emerging Trends and Innovation in Business and Finance

 Springer



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# **Technology and Marketing**

# Determining the Dimensions of Electronic Customers' Relationship Management in Jordanian Insurance Companies



**Faraj Mazyed Faraj Aldaihani, Safa'a Talhah Abu-Romman, Anber Abraheem Shlash Mohammad, Atallah Fahed Alserhan, Sameer Moh'd Tawfiq Khodeer, Mohammad Motasem Alrfai, Doa'a Ahmad Odeh Al-Husban, and Sulieman Ibraheem Shelash Al-Hawary**

**Abstract** The study aims to determine the dimensions of electronic customers' relationship management E-CRM in Jordanian insurance companies. Three major determinants were detected, customer-related, e-service and website-focused, those three determinants were refined out of 128 determinants which again filtered to 28 determinants. The sample size of 60 customers was selected for a pilot test to ensure that the initial scale is reliable. The second questionnaires, based on 28 determinants, were distributed for 300 respondents, these customers are randomly selected; 283 questionnaires were returned with a response rate of 94%. SPSSAMOS® and

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G\*power software's were conducted to measure the generation, refinement and validation of determinant. The results indicated that E-CRM could be determined using three key constructs related to customers, electronic service, and website focused.

**Keywords** Electronic customers' relationship management · Insurance companies · Jordan

## 1 Introduction

Globalization of business, aggressive competition, customer's expectation, maintaining loyalty among customers, and increasing the profit, customer retention and strategic customer care have developed were the reasons for developing the customer relationship management (CRM) and relationship marketing in the business institute (Alqahtani et al. 2023; Dwijendra et al. 2023; Shamaileh et al. 2023). Nowadays, the companies have to move from managing a market, to managing specific customers (AlBrakat et al. 2023a; Alhalalmeh et al. 2020; Attiany et al. 2023; Zahran et al. 2023). However, in an increasingly competitive marketplace, managing customers and maintaining them for an extended period of time is a difficult challenge (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019). Dealing with evolving psychology, interests, and desires of customers is also growing difficult. Organizations are considering a database management system for maintaining customers for that firm, and E-CRM is the result of such a system (Eldahamsheh et al. 2021; Mohammad 2020; Tariq et al. 2022).

The new increasing generation customers are facing the economic, social, political, personal and psychological challenges of the country especially in urban areas; where the customers well educated, the increased marriage age, career-oriented, new lifestyle toward coping the European style, and lower capita rate per family, the need for sophisticated, convenience and valuable products will increase (Aityassine et al. 2022; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-Khawaldah et al. 2022; AlTaweel and Al-Hawary 2021). This study aims to determine the dimensions of customer relationship management in the Jordanian insurance sectors.

## 2 Theoretical Framework and Hypotheses Building

### 2.1 *Electronic Customer Relationship Management*

CRM is a constantly evolving idea. CRM has transformed into E-CRM, or web-based CRM, according to the modern Internet era. E-CRM evolved from CRM, which was considered sales-force-automation-centric, and the rush to deploy E-CRM systems has begun! Organizations seeking a high return on investment (ROI)

based on building relationships with customers via the successful adoption of E-CRM (Alhalalmeh et al. 2020; Al-Hawary 2013a, 2013b). CRM-performing organizations should recognize that the most challenging aspect is transforming the 'E' into CRM. It is plausible to claim that E-CRM is the CRM manner of the future (Alhalalmeh et al. 2020; Al-Hawary and Al-Smeran 2017; Al-Nawafah et al. 2022; Metabis and Al-Hawary 2013). Al-Hawary and Alhajri (2020) stated that it decreases the cost of customer communication and assists to improve customer interaction, individualization, and relationship opportunities. Therefore, the goal of E-CRM is to improve customer service, maintain key customers, and increase an organization's analytical skills (Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2022).

A definition for E-CRM proposed by Al-Hawary and Alhajri (2020) as they defined E-CRM as "a business and marketing strategy that analyzes about consumer's needs and behavior in order to create an effective relationship between an organization and its consumers. While Aldaihani et al. (2023a) defined E-CRM as "The process of targeting, acquiring, transacting, servicing, retaining and building long-term relationships with customers is grounded in customer data and facilitated by technology". Also Al-Adamat et al. (2023a) defined E-CRM as "a management approach that is widely used in today's business world. It refers to marketing activities, tools and techniques delivered through the Internet, using technologies such as email, the worldwide Web, chat rooms, forums, social media, etc., with the goal of locating, building, and improving long-term customer relationships".

## 2.2 *Electronic Customer Relationship Management Determinants*

Dimensions of E-CRM were determined from different perspectives depending on previous studies.

**Customer-Related Determinates:** Customer is a personal, cluster of people or an institution that receives or could receive goods, services, products or ideas from another person or a company in return of value which can be money or anything of equivalent value (Al-Adamat et al. 2023a; Shaqrah et al. 2023). Typically, the higher the number of customers, the more successful the organization is, and vice versa. Customers must shop for an organization's products (Aldaihani et al. 2023b; Mohammad et al. 2023).

**Electronic Service Determinates:** Since the beginning of the year 2000, researchers and experts have been progressively utilizing the notion of e-service. E-service is the electronic method of providing services to customers (Al-Hawary and Abu-Laimon 2013). E-service is a Web-based service carried through the Internet (Al-Hawary and Aldaihani 2016). According to Al-Hawary and Al-Khazaleh (2020), an e-service process is one where all or part of the interaction between the service provider and

the customer is conducted through the Internet. An e-service has a ‘front-end’ Web-based systems and ‘back-end’ information systems. It also includes the interface between them, which has a significant role in the e-service (Al-Alwan et al. 2022b; Al-Hamad et al. 2022). There are several significant distinctions between traditional and e-services. The following are the distinctions between traditional and e-services (Al-Alwan et al. 2022a).

**Website-Focused Determinants:** According to articles in information systems, consumer behaviour, and marketing, how the internet site’s image is seen by non-organization individuals may impact both brand image and brand perception (Alolayyan et al. 2022; Alshwabkeh et al. 2022; Al-Shormana et al. 2021) and consumer behavior (Alolayyan et al. 2018). As a result, the appearance of an organization’s website emphasizes its identity while remaining unique and may even “distort, fragment, or obscure” the identity of the organization (Al-Zyadat et al. 2022; Kurdi et al. 2023; Rahamneh et al. 2023). The website enables companies to promote a specific image or identity that customers might perceive as affirming, abhorring, or just insignificant to their notion of self and societal definition, and thus, internet identification is comparable to CCI (Al-Hawary and Al-Smeran 2017; Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017).

### 3 Research Methodology

#### 3.1 Data Analysis

This research followed two key stages that include three phases, which were item generation using exploratory factor analysis (EFA) and validation using confirmatory factor analysis (CFA). Zhou et al. (2019) proposed a measure to assess the observed difficulty in organizational crises. The aim of Pradhan and Jena’s (2017) work was to propose a scale for employee performance. Following prior works (Muda et al. 2022), the current study was carried out on the ground of three phases: item generation, refinement, and validation phases. Before carrying out these phases, an extensive review of the literature was taken place in order to specify E-CRM determinants.

#### 3.2 Item Generation Phase

The results of literature review pointed out a total of 128 determinants were used to determine E-CRM. For the purpose of statistical analysis, they were categorized, as shown in Appendix 1, under three major constructs, which were customer-related determinants, e-service determinants and website-focused determinants. Filtering these determinants resulted in 28 determinants as depicted in Table 1. As followed:

**Table 1** Determinants of E-CRM found in the literature (see Appendix 1; Akhlagh et al. 2014)

Determinants	Question number (number of dimensions)	Examples
Customer-related determinants	1–28 (10)	Customer behavior, customer acquisition, customer empowerment, privacy, loyalty programs, customer problem solving, as well as customer promotions and rewards
E-service determinants	29–42 (7)	Transaction free of errors, e-service feedback, value-added services, and e-service quality
Website-focused determinants	43–64 (11)	Website design, flexibility, reliability, search capability, up-to-date content, and website content quality

Fourteen determinants were related to customers, seven determinants for e-service and eleven determinants for website.

In order to measure study constructs, an initial pool of 70 questions were generated. These questions were judged by a panel of 5 academicians. They were asked to evaluate these preliminary questions in terms of appearance validity, suitability and redundancy. It was revealed that 6 questions were irrelevant; hence, 64 questions were used in the initial analysis. Customer-related determinants were measured using questions from 1 to 28, e-service determinants were assessed using item from 29 to 42. Finally, questions from 43 to 64 were used to evaluate website-focused determinants.

The next step is to ensure that this initial scale is reliable. Therefore, a pilot test was carried out using data collected from a pilot sample consisted of 60 customers. They were identified using SPSS and G\*Power Software.

IBM SPSS® is a software package used for statistical analysis.

G\*Power was designed as a general stand-alone power analysis program for statistical tests (Akour et al. 2023).

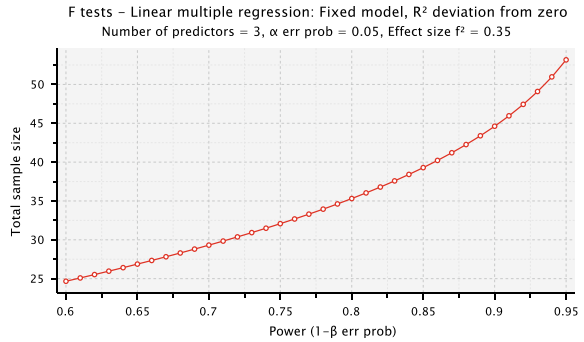
G\*Power has a built-in tool for determining effect size if it cannot be estimated from prior literature or is not easily calculable.

**Pilot Sample Size**

Power, significance level and size effect, were used to compute the pilot sample size in G\*Power software environment. Analysis power (1-β) was set at 0.80 with a significance level of 0.50 and an effect size of 0.35. The results shown in Fig. 1 indicated that the required sample size equals 54 subjects. Therefore, a sample size of 60 customers was selected for the pilot study.

In order to conduct pilot testing; the initial analysis was distributed to 60 respondents, which is a sub-phase in scale development phase as suggested by Agrawal and Rahman (2017). Table 2 shows Cronbach's alpha coefficients of customer-related determinants, e-service determinants, and website-focused determinants.

**Fig. 1** Pilot sample estimated



**Table 2** Cronbach’s alpha coefficient of study constructs (Pilot study)

Constructs	Questions	Cronbach’s alpha
Customer-related determinants	1–28	0.928
E-service determinants	29–42	0.963
Website-focused determinants	43–64	0.923
Scale	1–64	0.916

Based on the results in Table 2, it was concluded that the initial scale of E-CRM determinants had an acceptable reliability ( $\alpha = 0.916$ ). Separately, alpha coefficient for customer-related determinants was 0.928, and 0.96 for e-service determinants as well as 0.923 for website-focused determinants, respectively. Therefore, the scale can be used to collect data from the original sample of respondents (Al-Hawary et al. 2023; Majdy et al. 2023; Pallathadka et al. 2023).

### Intended Sample Size

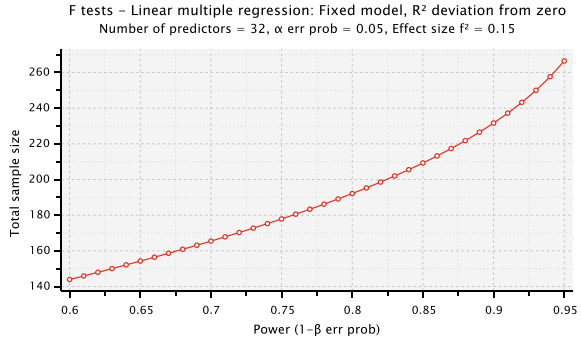
The new sample size for data collection from the intended sample was computed based on the analysis power of 0.8 with a significance level of 0.5 an effect size of 0.15. The number of dimensions employed here was 32 which constitute the determinants of E-CRM. The results shown in Fig. 2 pointed out the total sample size is 300 members. Therefore, 300 questionnaires were distributed to a sample of 300 customers. A total of 283 questionnaires were returned with a response rate of 94%.

### 3.3 Refinement Phase

In the second phase of data analysis Exploratory factor analysis (EFA) was used to reduce the data; was used as (AlBrakat et al. 2023a; Mukhlis et al. 2022). But the



**Fig. 2** Pilot sample estimated



EFA cannot be applied for the pilot study (Pradhan and Jena 2017), as it requires adequate sample size, more than 150 respondents, to obtain accurate results.

**Results of EFA**

The results of the rotated component matrix illustrated in Table 3, which displayed the results of EFA conducted on 64 questions using data gathered from 283 customers, indicate that the factor loadings of customer-related determinants indicators were acceptable since all values were greater than 0.50 (Al-Khasswneh et al. 2023; Alshuqairat et al. 2023; Boudlaie et al. 2022). Factor loadings of the indicators of customer-related determinants ranged from 0.584 to 0.842. Due to cross-loadings higher than 0.3, 6 questions of customer-related determinants measure were removed; Q11, Q12, Q15, Q17, Q21, and Q25. Therefore, the construct can be measured using 22 questions.

For e-service determinants, factor loadings were accepted in terms of the intended cut-off as their range 0.602 - 0.829. Three questions with cross-loadings greater than 0.3 were eliminated; Q30, Q36 and Q39. Hence, e-service determinants can be measured via 11 questions. On the other hand, factor loadings of website-focused determinants were also accepted since their values were greater than 0.5. Their loadings ranged between 0.580 and 0.894. Due to cross-loadings higher than 0.3, two questions were removed, which were Q43 and Q64.

It can be concluded that, out of the original 64 questions, 53 questions were retained, i.e., customer-related determinants (22 questions), e-service determinants (11 questions) and website-focused determinants (20 questions).

**3.4 Validation Phase**

Scale reliability and variability are the main focus of this phase. Referring to the results in Table 3, it can be concluded that there is a good reliability as indicated by

**Table 3** Rotated component matrix of E-CRM determinants

	Questions	Loadings	AVE	CR	$\alpha$
Customer-related determinants	Q1	0.842	0.554	0.949	0.962
	Q2	0.787			
	Q3	0.621			
	Q4	0.770			
	Q5	0.724			
	Q6	0.785			
	Q7	0.701			
	Q8	0.733			
	Q9	0.647			
	Q10	0.690			
	Q13	0.725			
	Q14	0.781			
	Q16	0.788			
	Q18	0.791			
	Q19	0.772			
	Q20	0.771			
	Q22	0.821			
	Q23	0.584			
	Q24	0.815			
	Q26	0.712			
Q27	0.759				
Q28	0.694				
E-service determinants	Q29	0.781	0.511	0.826	0.931
	Q31	0.676			
	Q32	0.694			
	Q33	0.829			
	Q34	0.804			
	Q35	0.665			
	Q37	0.760			
	Q38	0.781			
	Q40	0.799			
	Q41	0.602			
	Q42	0.738			
	Website-focused determinants	Q44			
Q45		0.858			
Q46		0.864			
Q47		0.828			

(continued)

**Table 3** (continued)

	Questions	Loadings	AVE	CR	$\alpha$
	Q48	0.849			
	Q49	0.580			
	Q50	0.840			
	Q51	0.831			
	Q52	0.795			
	Q53	0.861			
	Q54	0.852			
	Q55	0.837			
	Q56	0.802			
	Q57	0.841			
	Q58	0.822			
	Q59	0.856			
	Q60	0.830			
	Q61	0.818			
	Q62	0.814			
	Q63	0.894			

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

Cronbach's alpha, which was higher than 0.70 (Alshura et al. 2023), the coefficient value ( $\alpha$ ) for customer-related determinants was 0.962, for e-service determinants was 0.931 and 0.972 for website-focused determinants. Moreover, composite reliability (CR) values were also greater than 0.70 (Al-Quran et al. 2023), which indicated a good internal consistency (Sampaio et al. 2020). On the other hand, validity was tested using average variance extracted (AVE), which resulted a good results, greater than 0.50 (Al-hawajreh et al. 2023),customer-related determinants (AVE = 0.554), e-service determinants (AVE = 0.511) and website-focused determinants (AVE = 0.680) for that they considered reliable, valid and can be used to evaluate E-CRM determinants.

### First Order Measurement Model

In general; confirmatory factor analysis (CFA), which was used to establish relationships between latent variables and their related observed variables (Heilporn and Lakhali 2020),had to conducted after the EFA (Al-Husban et al. 2023), for that the SPSS AMOS® was used to construct the measurement model by which the results of EFA can be confirmed. The results of CFA are shown in Fig. 3.

In terms of factor loadings emerged by the measurement model, it was found that none of those loadings were below 0.5, which confirms that CFA results were along

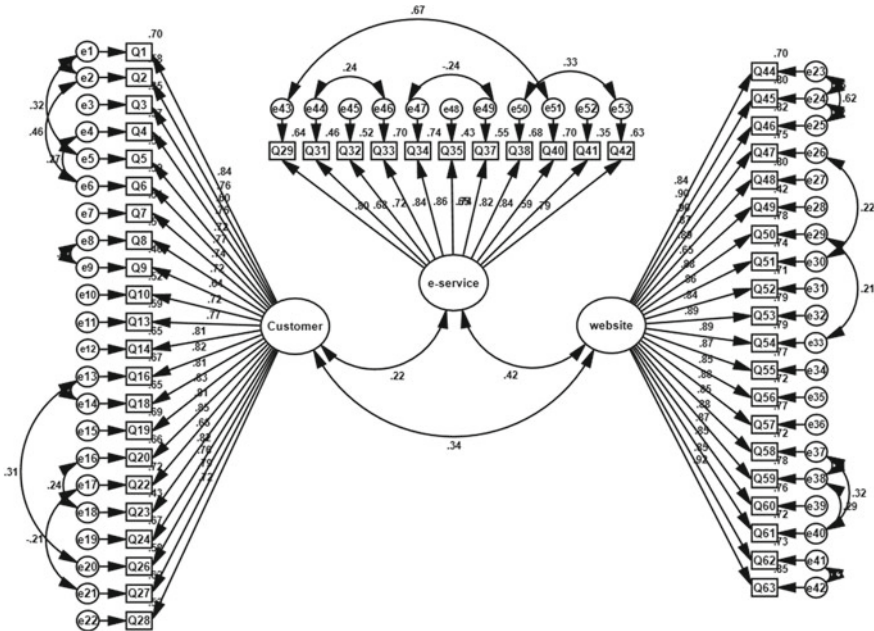


Fig. 3 Research measurement model (First order)

Table 4 Results of goodness-of-fit indices (1st order model)

Index type	Index name	Value	Cut-off
Absolute fit indices	CMIN/DF	2.186	< 5.0
	RMSEA	0.065	< 0.08
Incremental fit indices	CFI	0.89	> 0.90
	NFI	0.88	> 0.90

with the previous EFA results. Furthermore, two types of fit indices were used to test model goodness-of-fit: (1)CMIN/DF and root mean square error of approximation (RMSEA) as absolute fit indices, (2) Normed-fit index (NFI) and comparative fit index (CFI) as Incremental fit indices,. Results of model goodness-of-fit shown in Table 4 indicated that the measurement of model fit is accepted. CMIN/DF value is 2.186, which is less than 5, RMSEA value is 0.065, which is less than 0.08, CFI and NFI values are 0.89 and 0.88, which are close to 0.90 (Al-Armeti et al. 2023).

**Second Order Measurement Model**

Linking customer-related determinants, e-service determinants and website-focused determinants to a single factor, as the E-CRM resulted in the second order measurement model, as can be seen in Fig. 4.

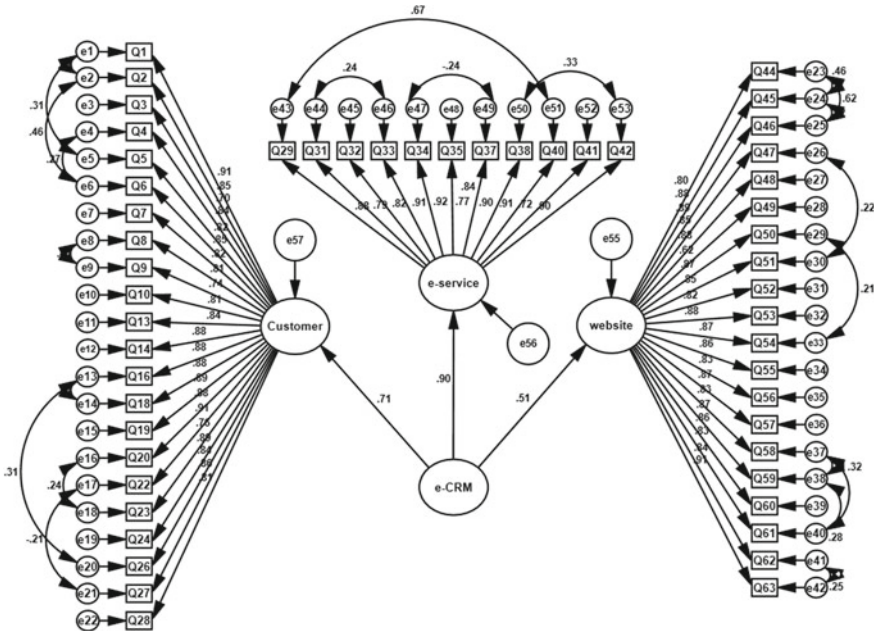


Fig. 4 Research measurement model (Second order)

Model goodness-of-fit indices were used, as in the first order model, to check the second order model, in which customer-related, e-service and website-focused determinants were linked to a single factor, which is E-CRM. The results displayed in Table 5 show that the second order model had an acceptable degree of fit.

Based on the results in Table 5, it was noted that the second-order measurement model had an acceptable degree of fit since cut-off criteria were met. That is, CMIN/DF (2.000) is less than 5, RMSEA (0.061) is less than 0.08, CFI (0.902) is greater than 0.90 and NFI (0.897) is close to 0.90.

Table 5 Results of goodness-of-fit indices (2nd order model)

Index type	Index name	Value	Cut-off
Absolute fit indices	CMIN/DF	2.000	< 5.0
	RMSEA	0.061	< 0.08
Incremental fit indices	CFI	0.902	> 0.90
	NFI	0.895	> 0.90

**Table 6** Summary of results

Customer-related determinants	E-service determinants	Website-focused determinants
1. Electronic direct mailing	11. After-sale services	18. Website attractiveness
2. Customer behavior	12. Online feedback	19. Website content quality
3. Customer complaints	13. Online service quality	20. Website dynamic pricing
4. Customer education	14. Value-added services	21. Website design
5. Customer empowerment	15. Leadership vision	22. Website flexibility
6. Online community	16. Information technology	23. Website FAQs
7. Customer privacy	17. Employee skills	24. Website ordering process
8. Customer promotions and rewards		25. Website use of social media
9. Customer satisfaction		26. Website payment method
10. Customer problem solving		27. Website reliability and trust
		28. Website search capability

## 4 Summary

The results emphasized that E-CRM can be determined using three key constructs related to customers, e-service, and website determinants illustrated in Table 6.

## 5 Conclusions and Discussion

This study aims to build a model to verify the dimensions of E-CRM for the Jordanian insurance companies. The study results indicated that the dimensions of E-CRM were customer-related, e-service, and website-focused determinant, therefore, we can conclude that these determinant are the main key factors for the E-CRM in Jordanian insurance companies. Customer-related determinant considered a major factor of E-CRM in Jordanian insurance companies. The result was similar to the science of marketing results which indicated that the customers were the main focused, marketing starts with customer and ends with customer. Also it was concluded that marketing starts when the consumer becomes aware of a need or desire for a product, and enhance consumers' positive behavioral intentions to buy, use, recommend goods and services promoted on social networking sites such as Facebook, e-DM. The results of this study showed that e-service determinant can be also considers as factor of E-CRM in Jordanian insurance companies which were found affected by: (after sale service, online service quality, online feedback, value-added service, information technology, employee skills and leadership vision).The results also prove that website-focused determinant is a factor of E-CRM in Jordanian insurance companies..

## 6 Recommendations

This study aims to determine the dimensions of E-CRM in Jordanian insurance companies, the results reveal that different dimensions can be grouped into three major determinants which are customer-related, e-service, and website focused determinants. Based on the study results, managers and decision makers have to adopt the E-CRM to increase their customers and customers loyalty for these companies which will increase the benefits for these insurance companies. It is also recommended that insurance companies have to formulate new ideas in managing their customers' relationships to enhance customer value. These ideas have to be represented in managing customer relations electronically. The vision and mission from the leader or top management level of the insurance companies are impacted to the firm's structure and employees working characters.

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# Does Social Media Marketing Affect Marketing Performance



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**Abstract** The study investigated the impact of social media marketing (SMM) on marketing performance (MP). The population of the study consistst of customers of auto lubricants companies in Amman, the capital city of Jordan. A convenient sample consisted of 384 customers were selected. IBM SPSS 24.0 have used to check the study hypotheses. The results found that social media has an impact on marketing performance (MP). Based on the study results a set of recommendations were set.

**Keywords** SMM · MP · ALTC · Amman · Jordan

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# 1 Introduction

Since the last decade the fast revolution in the internet technology (IT) sector was enormous, especially when we talk about the development of social media and its impact on the marketing processes, and how social media interact with the customers' demands and need by reducing the traditional marketing methods and concepts, At the present time, social media platforms play an important role in the use of marketing strategies for companies, noting that most social media users may become new customers and potential buyers for companies on social media platforms, which will be a great opportunity for companies to get closer to their customers and provide them with services in an efficient manner more efficient and effective (Dwijendra et al. 2023; Shamaileh et al. 2023). The phrase "social media" refers to new kinds of media that allow for interactive participation. Every social media platform comprises a digital platform (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019). Social media is seen as a significant aspect of daily life, and it is widely utilized for marketing in terms of business transactions and advertising in various regions of the world. It is regarded as a great means of exchanging information and ideas, and it primarily facilitates communication between people (AlBrakat et al. 2023a, 2023b; Al-Rwaidan et al. 2023; Attiany et al. 2023; Harahap et al. 2022). Today, two of the most famous social media platform for marketing any product and maintaining existing customer or exchange numerous information and experience with other users in social media are Facebook and Instagram (Eldahamsheh et al. 2021; Mohammad et al. 2020).

With the advent of social media, people's lifestyles and, by extension, company operations have changed dramatically. It has an impact on practically every area of a company's operations, including financial and non-financial performance. online platforms that enable businesses to maintain and build good relationships with customers in order to improve marketing performance and raise awareness of existing product and service offerings in order to expand into international markets, notably for exports (Aityassine et al. 2022; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-khawaldah et al. 2022; AlTaweel and Al-Hawary 2021).

Because of the growing popularity of social media, such as social networking sites, many businesses have begun to utilize social media to sell their products and services, a practice known as social media marketing (Alhalalmeh et al. 2022; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Metabis and Al-Hawary 2013). Everyone has the ability to effortlessly generate and disseminate content thanks to social media. Customers utilize social media regardless of whether a company is small, medium, or huge, so there is no need for business owners to ignore it. Social media marketing is nearly free, simple to implement, and results in fewer expenses and more brand exposure. It can also have a significant financial impact on enterprises (Alhalalmeh et al. 2022; Al-Hawary 2013a, 2013b; Al-Hawary and Obiadat 2021).

Most Jordanian businesses regard social media to be a fantastic electronic channel because it offers them with a significant return when they're used correctly. Companies in Jordan are embracing social media in their daily operations to increase

customer interaction as well as business activities, which may aid in projecting over attacking for more clients in order to increase sales (Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2022). Marketing performance is a construct that may be used to assess the influence of business strategy since it is a measure of the company's attainment of advertised items (Mohammad et al. 2023; Shaqrah et al. 2023). The goal of measuring MP is to emphasize the importance of the primary marketing operations inside the business in terms of production, price, marketing promotion, and communications, as well as customer interactions and other activities (Al-Adamat et al. 2023).

## 2 Literature Review and Hypotheses Development

### 2.1 Social Media Marketing

The Internet greatly affects modern society, especially in social media platforms, which are widely used to communicate with individuals all over the world. It is possible for people on the Internet to communicate with anyone in the world through various social media such as social networking, social networking, and a variety of other methods. This wonderful opportunity enables people to exchange useful information and experiences (Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016). Social media is an important aspect of digital marketing. Customers may communicate messages in a variety of ways with the help of social media platform kits (Al-Alwan et al. 2022b; AlHamad et al. 2022; Al-Hawary et al. 2020). The use of SMM is an easy way for consumers to access information about the company's products (Al-Alwan et al. 2022b). Social media marketing is a new marketing technique that is used by almost all businesses in practical networking to connect customers (Alolayyan et al. 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021). SMM is a very cost-effective option; However, the quality of the social media channels used determines how much they cost (Alolayyan et al. 2018). As a result, social media has become a major new concept, and businesses are more interested in investing resources to make the most of it in achieving their goals (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017). Table 1 shows different definitions of social media marketing from various writers.

**Table 1** SMM definitions

Study	SMM
Manzoor et al. (2020)	Social media marketing is a modern marketing technique that is practiced by almost every company in virtual networks to reach out to customers
Štreimikienė et al. (2021)	Social media marketing is the smallest unit of the processes: a part of electronic marketing, electronic commerce, e-business

According to Table 2, the researcher adopted these dimensions' under the **SMM**, **SMSP**, **SMA**, **SMIM** and **SMWM**.

**SMA:** Social media advertising is a marketing tool differs from traditional advertising with more fixable way especially when the company suffer financially (Al-Hawary and Al-Smeran 2017) promotional campaigns and online advertising are an important part of social media marketing activities (Al-Hawary and Hussien 2017; Alshawabkeh et al. 2022). Social Media sales Promotion: is one of the most important components of marketing campaigns and consists of a group of incentive techniques, most of which are short-term, and aim to encourage customers more quickly to obtain specific items or services more frequently. (Al-Hawary and Al-Smeran 2017). **Social Media Interaction:** It is the direct communication and excellent contribution between users and the system. **SMWM:** In general, WM is a communication tool about services and products between customers and organization.

## 2.2 Marketing Performance

Performance can be measured by determining how closely actual performance matches planned performance or pre-established standards (Shaqrah et al. 2023). Marketing performance encompasses goals such as customer happiness, perceived quality, customer loyalty, and company reputation (Al-Adamat et al. 2023). The marketing performance of a company relates to its level of success or failure in achieving its objectives and adapting to changing environmental factors. According to a current definition, marketing performance indicates the organization's degree of success or failure in achieving its objectives and adapting to environmental circumstances (Shaqrah et al. 2023).

Marketing performance measures are used to analyze the efficacy of marketing programs in terms of implementing the preferred marketing strategy, achieving marketing goals, meeting organizational expectations, and achieving the requisite degree of customer satisfaction and brand strength. The degree, to which a new product satisfies consumer expectations, creates customer happiness, and the organization's capacity to adapt to market is referred to as marketing performance (Štreimikienė et al. 2021). MP is qualified as the extent to an organization accomplishes its marketing objectives within the marketing strategy, in accordance with environmental factors, and in compliance with suitable criteria that match to its capabilities, material, and human resources from the perspective of the company (Al-Adamat et al. 2023). Marketing performance is described as: comparing an organization's performance to that of its rivals in order to discover and improve the organization's strengths while also identifying and eliminating its deficiencies in order to obtain competitive advantages (Alhalalmeh et al. 2022; Al-Hawary 2013b).

Multidimensional measurements may be used to assess marketing performance, and the dimensions separated to two kinds: marketing efficiency (ME) and marketing effectiveness (ME). ME is the ratio of marketing costs to gross income, while marketing effectiveness is the degree to which intended market-based goals are

**Table 2** Social media marketing Dimensions

Authors	Advertising	Marketing interaction	Word of Mouth	Promotion	purchase intention	Entertainment	Trendiness
Cheung et al. (2021)	*		*			*	*
Syaifullah et al. (2021)							
Patma et al. (2021)							
Authors	Customization	Perceived ease of use	Facilitating condition	Brand loyalty	Customer engagement	Compatibility	Perceive usefulness
Cheung et al. (2021)	*						
Syaifullah et al. (2021)		*	*			*	*
Patma et al. (2021)		*					*



met (Al-Hawary and Obiadat 2021). When it comes to evaluating marketing performance, different experts employ different metrics (Al-Hawary 2013a; Al-Hawary and Obiadat 2021). The following title gives insights into the concepts of customer satisfaction and customer loyalty that researchers have addressed concerning marketing performance measurements and the benefits it may provide to businesses.

Customer Satisfaction (CS): is an essential feature in the business since it is a good measure of marketing performance. CS is defined like a consequence of a comparison between the product's perceived performance and its intended performance (Al-Hawary and Obiadat 2021). Customer Loyalty: Customer loyalty and retention are the most important goals for service firms' performance, hence the core purpose of the relationship marketing method is to earn and develop customer loyalty (Alhalalmeh et al. 2022).

### ***2.3 Social Media Marketing and Marketing Performance***

Many scholars study the effect and advantages of SM on MP, customer engagement, consumer satisfaction, customer loyalty, brand loyalty and organizational performance. Based on what Kimani said (Kimani 2015), SMM offers many benefits to all humans since it provides staff to interact with customers, especially those in various geographic places, and social media allows enterprises to participate at a relatively cheap cost and greater degree of efficiency than can be done with more traditional communication methods. Furthermore According to others social media is not only about writing inane comments on Facebook or like photographs; it has far-reaching ramifications for enterprises' internal usage, for example sales and marketing. Some specialists mentioned that there is a strong positive relationship between SMM and brand loyalty. Agnihotri et al. (2016) mentioned that if a salesperson uses social media with customers, this affects informational communication behaviors, which increases the salesperson's response and customer satisfaction. According to the previous information, the study hypotheses may be as:

H1: There is an impact of Social Media marketing on marketing Performance.

## **3 Conceptual Framework**

See Fig. 1.

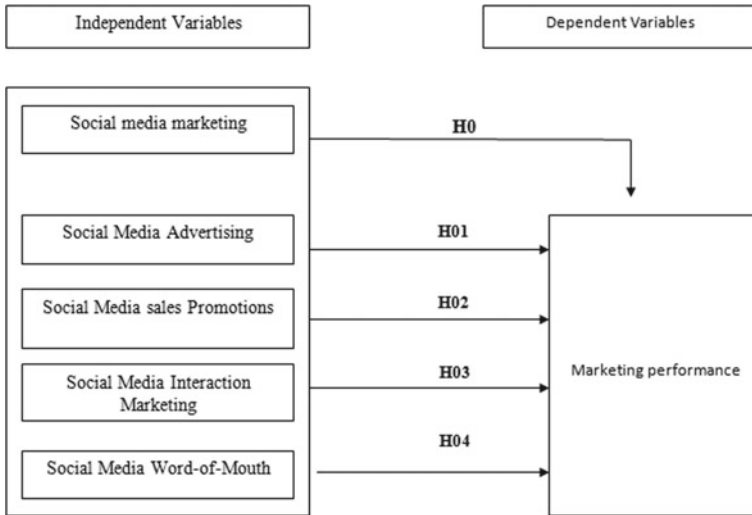


Fig. 1 The study model

## 4 Study Methodology

### 4.1 Population and Sample

The study population was determined, which consisted of customers of auto lubricants companies in Jordan. Hence, the study instrument was disseminated simultaneously to a convenience sample via electronic means. At the end of the data collection process, 348 responses were obtained that fit the requirements of the statistical analysis. These responses accounted for 88.5% of the response rate, which indicates a fair representation of the target population and achieves the criteria for adequacy of sampling (Akour et al. 2023; Al-Hawary et al. 2023).

### 4.2 Research Instrument

The questionnaire contained a section for collecting demographic data of the respondents, along with two sections for its major variables. A section was allocated to the independent variable, i.e., social media marketing, which contained (22) items taken from Alkhlifat et al. (2023); Al-Nawafah et al. (2022). These items formed two dimensions for the social media marketing: 7 items for social media advertising (SMAD1-SMAD7), 5 items for social media sales promotion (SMSP1- SMSP5), 5 items for social media interaction (SMIM1-SMIM5), and 5 items for social media word of mouth (SMWM1-SMWM5). On the other hand, the last section of the study

instrument contained the measures of the dependent variable, i.e., marketing performance, which were evaluated using 8 items (MP1-MP8) drawn from Khalayleh and Al-Hawary (2022).

## 5 Data Analysis

### 5.1 Reliability and Validity

To evaluate the impact of SMM on MP, structural equation modeling (SEM) was relied upon as a modern approach to examine the interaction between latent constructs measured by observing variables (Al-Rwaidan et al. 2023; Pallathadka et al. 2023). The application of this statistical method requires subjecting the study instrument to a test of validity and reliability before conducting an evaluation of the effect size. Accordingly, confirmatory factor analysis (CFA), which is one of the SEM procedures using the AMOS software, was applied to extract the validity and reliability of a measurement model, which were reported in Table 3.

The loadings of SMM on MP items were between 0.671 and 0.911, indicating that they were all retained as they were above the lower threshold of 0.50 (AlBrakat et al. 2023a, 2023b; Pallathadka et al. 2023). The average variance extracted (AVE) values for the research latent constructs were greater than 0.50, which means that they met the convergent validity condition (Alshawabkeh et al. 2022; AL-Zyadat et al. 2022; Dwijendra et al. 2023). Moreover, the comparison results confirmed that the values of AVE were greater than the maximum shared variance (MSV), also, it indicated that the values of the square root of AVE were superior to the correlation coefficients

**Table 3** Results of validity and reliability tests

Constructs	SMAD	SMSP	SMIM	SMWM	MP
SMAD	<b>0.775</b>				
SMSP	0.415	<b>0.779</b>			
SMIM	0.448	0.495	<b>0.777</b>		
SMWM	0.405	0.411	0.409	<b>0.791</b>	
MP	0.574	0.552	0.567	0.538	<b>0.840</b>
VIF	1.552	1.284	1.644	1.107	–
Loadings range	0.736–0.824	0.725–0.825	0.755–0.799	0.733–0.861	0.671–0.911
AVE	0.602	0.607	0.604	0.626	0.706
MSV	0.415	0.447	0.435	0.405	0.502
Internal consistency	0.879	0.834	0.866	0.884	0.953
Composite reliability	0.884	0.835	0.867	0.885	0.954

Bold numbers defines less than or equal 0.01

between the other constructs in the model. These results are evidence of achieving discriminant validity according to the Fornell-Larcker criteria (Boudlaie et al. 2022; Mohammad et al. 2020).

### 5.2 Structural Model

Based on the results of Table 3, it became clear that there was no multicollinearity between the dimensions of social media marketing, where the values of variance inflation factor (VIF) for those constructs were less than 5 (Attiany et al. 2023; Hasan and Sohail 2021). In this context, it is possible to continue testing the hypotheses through SEM shown in Fig. 2.

The results of Fig. 2 confirm that the structural model for examining the impact of SMM on MP gained appropriate values of the goodness of fit. CMIN/DF was less than 3, the values of CFI and TLI were greater than 0.90, along with the value of RMSEA which was smaller than 0.08 (Al-Hawary 2013b; Al-Hawary and Hussien 2017). Accordingly, the standardized and unstandardized effect parameters were extracted and listed in Table 4.

The results of hypotheses testing (H1-1 to H1-4) in Table 4 showed that social media advertising is related to MP significantly and positively ( $\beta$ -standardized =

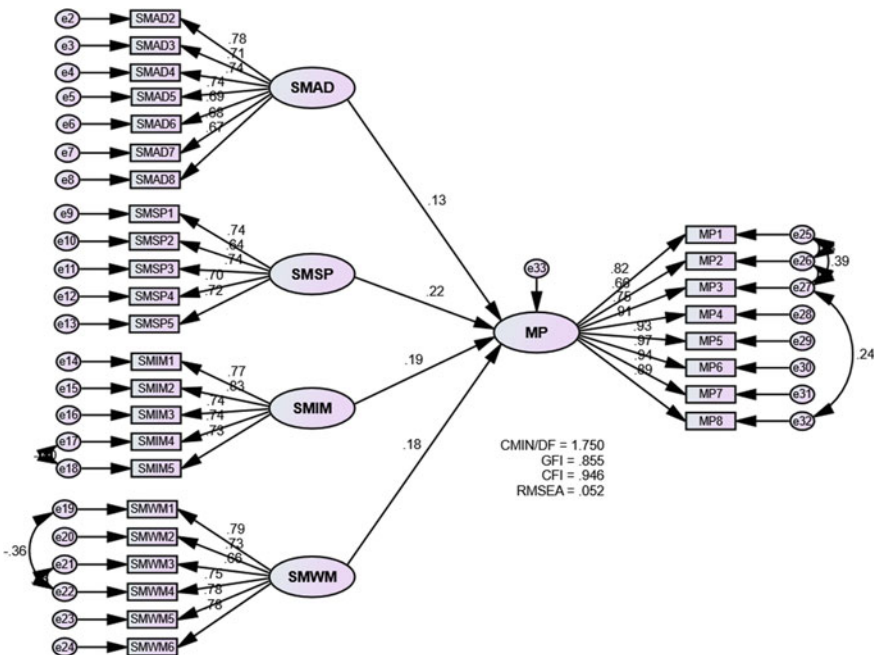


Fig. 2 A structural model for H0-1 to H0-4 testing

**Table 4** Results of H0-1 to H0-4 testing

Variables			$\beta$ -standardized	$\beta$ -unstandardized	t-value	P	Results
SMAD	→	MP	0.134	0.114	2.182	0.029	Accepted
SMSP	→	MP	0.220	0.204	3.421	***	Accepted
SMIM	→	MP	0.194	0.173	3.147	0.002	Accepted
SMWM	→	MP	0.177	0.147	2.896	0.004	Accepted

0.134,  $\beta$ -unstandardized = 0.114,  $t = 2.182$ ,  $P = 0.029$ ). Social media sales promotion has effect on MP ( $\beta$ -standardized = 0.220,  $\beta$ unstandardized = 0.204,  $t = 3.421$ ,  $P = 0.000$ ). Social media interaction marketing has effect on MP ( $\beta$ standardized = 0.194,  $\beta$ -unstandardized = 0.173,  $t = 3.147$ ,  $P = 0.002$ ), and social media word of mouth has effect on MP ( $\beta$ -standardized = 0.134,  $\beta$ -unstandardized = 0.114,  $t = 2.182$ ,  $P = 0.029$ ). These results mean that SMM had significant and positive effects on MP.

## 6 Discussion

This paper aims to study the impact of SMM as a whole construct on MP and to study the impact of SMM on MP. The results found a significant positive impact SMM on MP. As fact, SM is regarded as a new way to develop marketing strategies, to maintain existing customer and to reach new customers (Al-Hawary and Aldaihani 2016). A marketing strategy combines the use of SM to develop a two-way interaction between customers and firms (AlHamad et al. 2022) and gain information about a company's products. The current result is supported by the benefits of SM as reported in the literature such as its positive influence on organizational performance (Dodokh 2017). As well as the positive impact of SMM on purchase intention and brand loyalty, brand loyalty (Al-Hawary et al. 2020), repurchase intention, long-term viability of companies (Patma et al. 2021), improving sales, customer relationships, productivity, and innovation, brand loyalty.

The results of this study also showed an impact of social media advertising on MP. This result can be explained through the significance of SM advertising such as the ability to reach multi geographical territories at the same time with a cost effective manner. SMM also helps achieve a variety of marketing goals for companies, including increasing awareness among customers, increasing their knowledge, changing their perception, and increasing their motivation to buy again. (Alalwan 2018). There is an impact of social media sales promotion on MP. Sales promotion is one of the most essential elements in the marketing campaigns of organizations and consists of a wide range of incentive techniques. Some examples are gifts, samples, fairs, and trade promotions are all examples of sales promotions. The

current result is in line with previous results revealed in earlier studies such as Martinus and Anggraini (2018) who found a considerable effect of SM sales promotion on customers' purchase intention.

There is a positive impact of SMIM on MP. In this regard, interaction is referring to the communication and influence directly between the users of SM and the system interface. Openness and the ability to measure communication capabilities anywhere in the world allow social media to change the way different organizations, communities and people communicate as well. Social media users believe and trust organizations when there is a high level of engagement in social media; For this reason, the credibility of dealing in social media is very important in enhancing interaction between users and organizations.

## 7 Conclusions

The study aims to investigate the impact of SMM on MP and the impact of the dimensions of SMM on MP and showed that SMM had a significant positive effect on MP. Moreover, SMA, SMSM, SMIM, and WM on SM had a significant effect on MP. These results indicate the importance of marketing through SM in improving MP, and this calls for promoting the use of SMM because of this importance as confirmed by the results of the current study. However, it ought to be noted here that the levels of influence are not at the desired level, so work must be done to improve SMM so that it is better, which means a greater impact on MP.

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# Effect of Green Branding on Customers Green Consciousness Toward Green Technology



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**Abstract** The study aims to test the impact of green branding on customers green consciousness toward green technology. The study population involves buyers who purchased green technology products in Amman. A convenience sample was selected through distributing our questionnaire face to face approach at different companies and places in Amman. The study hypothesis was tested using structural equation modeling (AMOS). The results show an impact of GB on customers green consciousness. Based on the study results, managers and decision makers recommended enhancing communication about their green and ecofriendly products attributes in order to gain the trust of their customers, and increase their customer purchase intentions.

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**Keywords** Green branding · Customers' green consciousness · Green technology · Jordan

## 1 Introduction

As people started to take note of all the problems facing the environment, businesses and corporates began changing and adopting new strategies in an attempt to address market new concerns, for instance customers started to show interest in technologies that are more efficient in consuming electricity, especially when it comes to home appliances. Electronics manufacturing companies like Apple, Samsung and LG electronics started to become more innovative in creating appliances that help the customers use electricity at the best time and allow them to make wise decisions on how to use energy. Businesses began to pay greater attention to environmental concerns and alter their strategy in order to implement environmentally friendly practices. In the marketing sector, the term “green marketing” is well-known. Green marketing is used to achieve two broad goals: improved environmental conditions and increased consumer happiness (Alkhlifat et al. 2023; Alqahtani et al. 2023; Dwijendra et al. 2023; Shamaileh et al. 2023). Sustainability has become recognized as a critical corporate aim (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019), and it is driving companies' green innovation (Eldahamsheh et al. 2021; Mohammad et al. 2020; Tariq et al. 2022). Numerous companies are increasingly communicating explicitly how they incorporate sustainability into their company procedures and marketing functions (AlBrakat et al. 2023a; Walters 2006). Sustainability refers to a broader idea of interconnected environmental, social, and economic domains in which progress should be harmonious, however, it is difficult to attain. As it is critical for corporations to examine the potential green market of customers, as well as strategies to distinguish their products from competitors' offerings (Al-Rwaidan et al. 2023; Attiany et al. 2023).

Despite the fact that the problems of green brands appear to be significant, there may be few research in terms of green brand, for example, Walters (2006) defined the concept of green brand. Further, Rios et al. (2006) discovered that environmental institutions had a beneficial influence on brand sentiment. However, for businesses, strong brand positioning is a critical differentiating strategy that improves customers' desire to consume what is supplied (Aityassine et al. 2022; Al-Awamleh et al. 2022; AlTaweel and Al-Hawary 2021).

## 2 Theoretical Framework and Hypotheses Development

### 2.1 Green Brand (GB)

Corporates with Green Brand present their products and services as environmentally friendly and organic (Al-Hawary and Alhajri 2020; Al-khawaldah et al. 2022). Hartmann et al. (2005) define green as a set of characteristics and functions of a brand which can be tied up to minimizing the harmful environmental effects by the using other brands and which is perceived as environmental sustainability. Over the last couple of years, environmental issues has become a public issues in a noticeable way, moreover it become a research issues (Alhalalmeh et al. 2020; Al-Hawary 2013b). Metabis and Al-Hawary (2013) and Al-Hawary et al. (2017) defined a GB as “the brand that offers product or services with a considerable eco-advantage and which can improve the brand appeals to whoever is willing to making green a high priority.” Taking the note that when we say “eco” we refer to an ecological advantage and as known ecology is eventually concerned a mutual relation between all living creatures and their environment. Prices of environmentally friendly products may be essential to many, although only a small percentage of the market converts it into a purchasing behavior (Alhalalmeh et al. 2022b; Al-Nawafah et al. 2022). Nevertheless, as environmental knowledge spreads among consumers, researchers have observed an analogous increase in favourable sentiments toward environmentally friendly firms (Al-Hawary and Obiadat 2021; Al-Hawary 2013a).

The most successful green brands are the brands that are associated with different technologies or associated with green company philosophy and culture. Examining the effect of “environmental attributes” in the creation of brand attitudes. The findings demonstrated that consumers most likely use functional environmental associations (i.e., those related to a product’s environmental performance) to distinguish between brands and that customers derive a “functional benefit” from green brands as a result of the “environmental care” experience gained through product usage. Customers experience “experiential benefits” from the satisfaction of contributing to societal welfare, as well as “symbolic benefits” from social acceptability and personal expression through the usage and presentation of a brand (Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2022).

**Green Brand Positioning:** Al-Adamat et al. (2023a, 2023b) define brand positioning as an “act of designing the company’s offering and image to occupy a distinct place in the mind of the target market.” (Aldaihani et al. 2023). **Green brand Trust:** It is defined as the “consumer’s willingness to depend on a product or a service of a brand as a result of his belief in its environmental credibility, benevolence and ability” (Al-Adamat et al. 2023a; Rios et al. 2006). Credibility can be considered as one of the primary elements for green marketing strategy (Aldaihani et al. 2023; Majdy et al. 2023). Brand trust indicated the reliability of the brand in customers’ mind (Al-Adamat et al. 2023b; Al-Hawary and Abu-Laimon 2013; Alkhawaldeh et al. 2023). **Green Brand Image:** Brand image is defined as the connotations associated with brands. (Al-Hawary and Aldaihani 2016; Al-Hawary et al. 2020). Parallel

to this description, Friedmann and Lessig (1987) explained brand image as “the consumer’s understanding and evaluation of the product”. Brand image isn’t something you have or you don’t have. **Green Brand Awareness:** Brand associations are separated into three noteworthy classifications, these being attributes, benefits, and attitudes (AlHamad et al. 2022; Alolayyan et al. 2018). Benefits allude to apparent quality, converting into the general assessment of the services buyer get; and attitudes allude to the buyer’s loyalty towards the brand (Al-Alwan et al. 2022a, 2022b).

## 2.2 *Customers Green Consciousness*

Customers considered being different in how they react to green marketing communications. (Al-Hawary et al. 2020) distinguish among high environmental engaged consumers, or those who have been impacted by environmental issues and take them into account in their purchasing decisions, and low environmentally involved customers, or those whose purchasing decisions are only marginally driven by environmental concerns (Alshawabkeh et al. 2022; Al-Shormana et al. 2021). According to Hartmann et al. (2005), the more involved customers are with an important issue for them, the more likely they are to modify their mindset and modify it to be helpful to this issue or case, which may easily cause a higher amount of cognitive elaboration. Therefore, customers with an elevated degree of involvement are more strongly impacted by the attitude object (Alolayyan et al. 2022). A low level of involvement, on the contrary, leads to a secondary route to attitude modification (Al-Hawary and Al-Smeran 2017; Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Al-Zyadat et al. 2022; Majdy et al. 2023; Remar 2015). These customers will buy if their opinion of the connected product is positive based on these more tangential signals. Customers who cared about the environment were more cognizant of green product marketing and thought it was more interesting and relevant (Al-Hawary and Harahsheh 2014; Kalafatis et al. 1999). D’Souza and Taghian (2005) investigated views about green advertising and discovered that customers with a high degree of EI had an improved view toward such commercials than those with a low level of worry.

## 2.3 *Customers Green Consciousness and Green Branding*

The social effect of Greek customers was insignificant. Customers’ comprehension of green products and their care for the environment influenced their ecological behaviour. According to Kaiser et al. (1999), environmental knowledge, environmental values, and ecological behavior all have an impact on the theory of planned behavior. Eco-literacy, interpersonal influence, and value orientation, according to Cheah and Phau (2011), impact Australian buyers’ views toward ecologically friendly

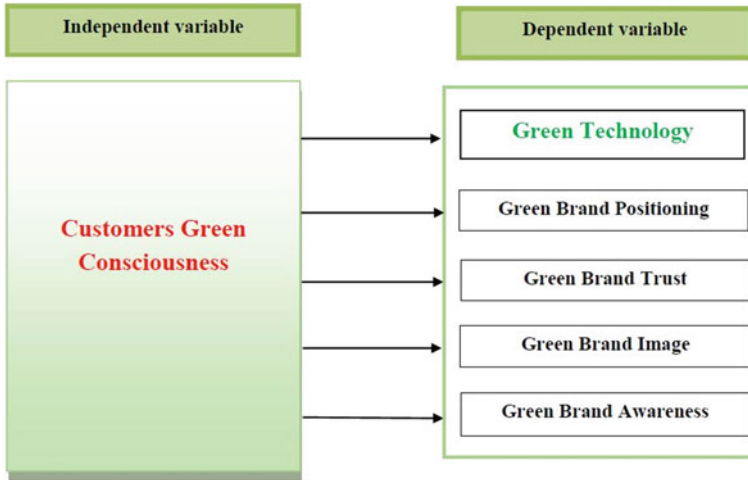


Fig. 1 Study model

products. Customers that have a positive mindset are more inclined to buy ecologically friendly items. Because customers are unaware of green initiatives, communication regarding green products might aid in the development of favourable perspectives. Companies that sell green products must begin stressing the importance of environmental initiatives, as well as begin educating clients about green features or green products. The study hypotheses may be developed:

H1: There is an Effect of green branding on Customers Green Consciousness toward green technology.

### 3 Study Model

See Fig. 1.

### 4 Research Methodology

#### 4.1 Population, Sample

The Population of the study consisted of all buyers who purchased green technology products in Amman, A convenience sample was selected through distributing our questionnaire face to face approach at different companies and places in Amman, where the sample consisted of (550) buyers who participated in the study, of which

(36) didn't return the questionnaire, and (18) were not valid for statistical analysis, and (496) valid one were analyzed.

## ***4.2 Study Instruments***

The paper questionnaire contained four main sections, the first section was about demographics, the second section was about GB and its sub variables (Green Brand Positioning, Green Brand Trust, Green Brand Image, Green Brand Awareness) adopted by Hartmann et al. (2005), the third section was about CGC adopted by Remar (2015) and was covered by (36 item).

## ***4.3 Reliability and Factor Analysis of the Instrument (GB)***

All of the study sample responses applied on (GB) variable were subjected to analysis in order to detect the reliability of the questionnaire by using the Cronbach alpha equation to measure the internal consistency of the items. Also the responses were subjected to the (Exploratory Factor Analysis) using (Principal Component Analysis) to explore the factors, using the vertical rotation (Varimax) (Al-Hawary et al. 2023; Metabis and Al-Hawary 2013; Rahamneh et al. 2023), and Table 1 shows the results of these two analyzes.

As shown in Table 1 all of the internal consistency values (Cronbach's Alpha) for the dimensions are acceptable for the purposes of this study, ranging between (0.75) and (0.86) (AlBrakat et al. 2023a, 2023b; Mukhlis et al. 2022). Table 1 also shows that all the values of the variance ratio (% of variance) and all the dimensions are high, ranging between (56.45%) and (69.44%). And that all the values of the loading are high, ranging between (0.42) and (0.92).

## ***4.4 Reliability and Factor Analysis of the Instrument (CGC)***

The sample responses on (CGC) variable were subjected to analysis in order to detect the reliability of the questionnaire by using the Cronbach alpha equation to measure the internal consistency of the items (Al-Husban et al. 2023; Al-Khasswneh et al. 2023; Alshuqairat et al. 2023; Boudlaie et al. 2022). Table 2 shows the results of these two analysis.

As shown in Table 2 all of the internal consistency values (Cronbach's Alpha) for the dimensions (CGC) are acceptable for the purposes of this study, which reached (0.83). Table 2 also shows that all the values of the variance ratio (% of variance) and all the dimensions are high reaching (69.87%). And that all the values of the loading are high, ranging between (0.65) and (0.92).

**Table 1** Reliability and factor analysis of the instrument

No.	Item	Loading
<i>GB, Cronbach's Alpha = 0.76, % of Variance = 62.86</i>		
Q1	Green brand represents comfort	0.73
Q2	Green brands provide high quality products	0.60
Q3	Green brands are safe	0.91
Q4	Green brands provide high technology products	0.77
Q5	Creativity can be found in products that green brands provide	0.86
Q6	Green brands are well known	0.79
Q7	Green brands provide friendly user products	0.42
<i>Green Brand Trust, Cronbach's Alpha = 0.86,% of Variance = 56.45</i>		
W1	I rely on technologies that green brands provide	0.76
W2	Green brands product performance can replace the consumer's ideal non Ecofriendly product	0.77
W3	I trust the quality of green brand products	0.88
W4	Green brand meet the level of consumer expectations	0.87
W5	Green branded companies are honest with their customers	0.75
W6	Green branded companies express an interest in their potential customers	0.48
W7	Green branded companies are always looking to improve its response to consumer needs	0.69
<i>Green Brand Image, Cronbach's Alpha = 0.80,% of Variance = 69.44</i>		
U1	The quality of the green branded products is good	0.89
U2	The green branded products has a fully guarantees & warranties	0.92
U3	The design of the green branded products is impressive	0.79
U4	The function of green branded products fits my needs	0.63
U5	The green branded products align with protecting the environment	0.83
U6	The Green brand has a good reputation	0.69
<i>Green Brand Awareness, Cronbach's Alpha = 0.75,% of Variance = 57.39</i>		
R1	I have heard about brands that provide green technology products	0.76
R2	The Green brands provide information regarding the benefits of their Ecofriendly products	0.83
R3	Green brands are the first to come to mind when talking about Ecofriendly products	0.71
R4	Green branded products are highly available in markets	0.72



**Table 2** Reliability and factor analysis of the instrument

No.	Item	Loading
<i>CGC, Cronbach's Alpha = 0.83, % of Variance = 69.87</i>		
CGC1	customers behavior affects the environment	0.83
CGC2	Sustainability of natural resources important	0.81
CGC3	Climate change is a global environmental problem	0.72
CGC4	I buy some products because of the environmental claims	0.65
CGC5	I purchase brands packaged in recyclable or reusable materials	0.78
CGC6	Environmental pollution is a problem in Jordan today	0.85
CGC7	Individuals should encourage their friends, families and acquaintances NOT to use products that pollute the environment	0.92

## 5 Data Analysis

### 5.1 Multi-collinearity Test

The Multi-collinearity test was used to ensure that there is no high correlation (0.90) between the independent variables, variance inflation factor (VIF) test and Tolerance test were used on each independent variable, where the independent variables in the model should be independent from each other, and that why we used this test, where this test consider to be one of the methods were we can handle the problem of Multi-collinearity, as the inflation rate shouldn't be higher than (10), and the value of tolerance test should be greater than (0.05), and after conducting the previous tests on each independent variable, the results were obtained Are listed in the Table 3.

Table 3 shows that the values of the variance inflation test for all variables are less than (10) and the results ranged from 2.106 to 3.644. Which indicates that there is no problem in statistical relationship between the independent variables in the correlation table, which support the possibility of using them in the model.

**Table 3** Testing VIF and Tolerance factors for the study variables

Variables	Collinearity Statistics for (CGC)	
	Tolerance	VIF
Positioning	0.365	2.739
Trust	0.271	3.694
Image	0.304	3.287
Awareness	0.475	2.106

**Table 4** Constructional Equations Modeling Analysis Results by Determining Weights of Standard regression coefficient

Hypothesis	Path			Estimate	S.E	C.R	P
H <sub>0.2.2</sub>	CGC	←	Trust	-0.006	0.011	-0.489	0.625
H <sub>0.2.3</sub>	CGC	←	Image	0.473	0.011	41.257	***
H <sub>0.2.4</sub>	CGC	←	Awareness	0.156	0.007	21.652	***
H <sub>0.2.1</sub>	CGC	←	Positioning	-0.037	0.011	-3.359	***

\*\*\*  $p < 0.01$

## 6 Testing Hypothesis

After determining the analysis target sample in the AMOS, as well as the method of estimating the weights of the standardized and non-standardized regression of the three variables that require the use of the Bootstrapping method as to determine the statistical significance of the estimation coefficients. Table 4 shows the results of the structural equations analysis by specifying the standardized regression Weights and (C.R) values to test the second main hypothesis.

Table 4 shows that there is a significant impact of (GB) on (CGC). Were the value of C.R were (-3.359) and statistically less than the statistical significance level of ( $\alpha \leq 0.01$ ). There is no statistically significant relationship between (Green brand Trust) and (customers Green Consciousness). Were the value of C.R was (-0.489) and statistically higher than the statistical significance level of ( $\alpha \leq 0.01$ ). There is a significant statistical relationship between (GBI) and (CGC). Were the value of C.R were (41.257) and statistically less than the statistical significance level of ( $\alpha \leq 0.01$ ). There is a statistically significant relationship between (GBA) and (CGC), Were the value of C.R were (21.652), and statistically less than the statistical significance level of ( $\alpha \leq 0.01$ ).

## 7 Discussion

The main aim of the research is to test the effect of customers green consciousness toward green technology products in Amman, as per this study, its first evident from questionnaire results that there is an impact of GB on CGC. On other words, customers green consciousness, if enhanced effectively, it will definitely be an influential factor that will positively affect green brands toward green technology products now and in the near future specially in the electronics domain. The researcher studied the most efficient and applicable variables of green brand in the green technology product markets in Amman from his perspective and according to previous studies. The study GB variables were (GBT, GPB, GBA and GBI) by using the required analytical test mentioned previously in chapter four to analyze the questionnaire results. The results of the analysis show that there is an effect of GB on CGC, which

also match the result of You et al. (2013), Hartmann et al. (2005) and Farida and Ardyan (2015) and most of the others too, this result is attributed to the acknowledged reality that GB and its sub variables (GBT, GPB, GBI and GBA), if utilized effectively can be a competitive edge on its own. Finally, the researcher studied the influential effect of CGC on GB and its sub-variable and CPI toward green technologies product (home appliances) in Amman markets.

## 8 Recommendations

The researchers recommend managers to enhance communication about their green and ecofriendly products attributes in order to gain the trust of their customers, and increase their customer purchase intentions, whereby, and to enhance their training programs in order to well train to increase green brand positioning, awareness, trust and image in order to raise green purchase intentions., by increasing the consumer green Consciousness, additional effective approaches to increase green brand trust with methods that might include guarantees for green products. If companies can adopt the above green marketing strategies, they can raise their green brand and further enhance their green purchase intentions. Finally they have to know the green profile of customers in Amman allows marketers to develop strategies specifically targeted at this segment.

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# Impact of Artificial Intelligence Technologies on Marketing Performance



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**Abstract** This research aims to test the impact of artificial intelligence technologies on marketing performance. Customers of commercial banks in Jordan are the study population. A convenience samples was used to collect the study data.. The final sample of the study consisted of (401) answers. Statistical package (SPSS), moreover to the (AMOS) program used to test hypotheses. The results showed an impact of artificial intelligence on the marketing performance. The study recommended managers to promote the use of artificial intelligence technologies, which helps and facilitates the completion of services provided to customers, as the use of these technologies increases customer satisfaction with the performance of banks.

**Keywords** Artificial intelligence marketing performance · Commercial banks · Jordan

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# 1 Introduction

Recently, scientific developments and advanced uses of communications have led to major transformations that have led to an increase in the speed of communication processes and the quality of performance (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019). Recently, many large-scale changes have occurred in the business environment, the most important of which is the expansion of artificial intelligence technologies in most fields, especially commercial fields, with the aim of achieving higher efficiency and developing capabilities in this field, in addition to enhancing opportunities to gain marketing advantages through the selection and support of competitive marketing strategies (Eldahamsheh et al. 2021; Mohammad et al. 2020; Tariq et al. 2022). In line with these changes, artificial intelligence applications may focus on the use of the web and e-mail to encourage the community to continue using online services, which provide an opportunity for institutions and organizations to study their efficiency and effectiveness towards the use of artificial intelligence tools (Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016; Attiany et al. 2023; Zahran et al. 2023).

Marketing performance is the basis of any work environment that seeks profitability and production efficiency, specifically in light of modern technological development and openness to global markets (Aityassine et al. 2022; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-Khawaldah et al. 2022; AlTaweel and Al-Hawary 2021). It is important to focus and pay attention to marketing performance to stay in the market and continue to achieve goals and profits.

## 2 Theoretical Framework and Hypotheses Development

### 2.1 Artificial Intelligence

The world is experiencing a major revolution of major changes in various fields in the lives of people and societies, both negatively and positively (Alhalalmeh et al. 2022; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Metabis and Al-Hawary 2013). The development of the scientific industrial revolution helped in the development of the science of artificial intelligence, which has become a major part of our lives, and life has evolved in all its fields, not only scientific but also in many fields, including human, social and economic sciences (Alhalalmeh et al. 2022; Al-Hawary and Obiadat 2021; Al-Hawary 2013a, 2013b).

The concept of artificial intelligence (AI) has developed today and has become very popular and has entered all technical fields, including the humanities (Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2022). The science of machine intelligence is a new concept, which increased the use of digital devices connected to data, as people started talking about it, even if they were not specialized in informatics and artificial intelligence (Al-Adamat et al. 2023; Shaqrah et al. 2023). Kenji (2013)

defined AI as “the ability of a system to correctly interpret data, learn from this data and use this data to achieve specific goals and tasks through flexible adaptation”. There are many studies that have used different variables of artificial intelligence based on the type of study and the field in which the study is being researched, including: Sambre et al. (2022) used the following dimensions to measure the artificial intelligence “customer experience, automate procedures, and simplify risk management”, the aim of using these variables is to reduce costs and provide better customer service. Chen et al. (2022) also used in their study the following dimensions to measure the artificial intelligence “Machine Learning Algorithm, Deep Learning and Big Data”, the researcher concluded that the best variables that are compatible with the current study and correctly measure the problem of the study are the following variables:(expert systems, neural networks and Machine vision).

**Expert Systems:** The researchers have provided many definitions of expert systems, including “the term intelligent computer program based on the use of knowledge and inference steps to provide a solution to difficult problems that need expert advice in solving them. **Neural Networks:** It is also called artificial networks, and it is one of the oldest artificial intelligence techniques that were used in computer science and software, which operates in the way the human brain works. **Machine Vision:** Machine vision is a term used in banking to describe the technology and methodologies used to deliver independent, imaging-based inspection and analysis of banking applications.

## 2.2 Marketing Performance (MP)

MP is the main indicator that contributes to the continuity of the organization’s work and its survival in a changing and complex environment characterized by growing competition (Aldaihani et al. 2023; Mohammad et al. 2023). It indicates to the management whether the organization’s goals are progressing as planned, such as reducing costs, improving reputation, enhancing competitive advantage, or increasing market share, or developing product quality, or raising customer loyalty, or increasing profits and other indicators of marketing performance (Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016). Therefore, marketing performance has attracted increasing attention among academic researchers and practitioners in business administration (Al-Hawary and Al-Khazaleh 2020).

Marketing performance is the sum of the marketing efforts made by the organization through the available resources (human, material, technological...), and these efforts reflect the achievement of the organization’s goals (profitability, market share...)(Al-Alwan et al. 2022; AlHamad et al. 2022). Sukardi et al. (2021) measured the marketing performance by using “customer satisfaction, customer loyalty, and product excellence.” Khalayleh and Al-Hawary (2022) also used these dimensions “customer satisfaction, customer loyalty, and attracting new customers” to measured the marketing performance.

**Customer Satisfaction:** Customer satisfaction is the extent to which services or products meet the customer’s needs and desires with his expectations (Alolayyan et al. 2022; Alshawabkeh et al. 2022; Al-Shormanana et al. 2021). **Customer Loyalty:** Customer loyalty is a cornerstone for the success of companies and integration with the rest of the other elements in the strategies of those companies (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Alolayyan et al. 2018). **Customer Retention:** Customer retention as the extent to which customers’ preferences and desires are preserved, present and in the future, which leads to repeat business over time (Al-Hawary and Al-Smeran 2017).

### 2.3 Artificial Intelligence Technologies and Marketing Performance

Powelson’s study (Powelson 2022) found a positive relationship between artificial intelligence technologies in E-marketing, based on the above information, study and analysis, the researcher concluded that artificial intelligence technologies have a positive effect on in E-marketing. According to the above, the hypothesis can as:

**H1: There is an impact of Artificial intelligence on the performance of marketing in commercial banks in Jordan.**

## 3 Study Model

See Fig. 1.

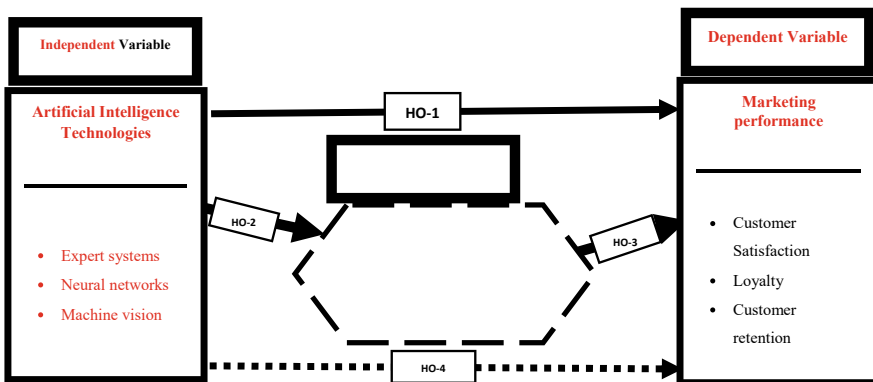


Fig. 1 Study model

## **4 Study Methodology**

### **4.1 Study Population and Sample**

The study population was determined, which consisted of customers in the seven commercial banks in the Jordanian market. Hence, the study instrument was disseminated simultaneously to a convenience sample via electronic means. At the end of the data collection process, 401 responses were obtained that fit the requirements of the statistical analysis. These responses accounted for 88.7% of the response rate, which indicates a fair representation of the target population and achieves the criteria for adequacy of sampling (Pallathadka et al. 2023).

### **4.2 Study Instrument**

This instrument consisted of an introduction that confirms the following research ethics and demonstrates the core objectives of the study. Besides, it contained a section for collecting demographic data of the respondents, along with two sections for its major variables. In the sections related to major variables. A section was allocated to the independent variable, i.e., artificial intelligence, which contained (12) items taken from AlHamad et al. (2022). These items formed three dimensions for the artificial intelligence: four items for machine vision, four items for neural networks, and four items for expert systems. On the other hand, the last section of the study instrument contained the measures of the dependent variable, i.e., marketing performance, which were evaluated using (14) items drawn from Al-Hawary et al. (2023). The items of marketing performance formed three dimensions: 5 items for customer satisfaction, 5 items for customer loyalty, and 4 items for customer retention.

### **4.3 Validity and Reliability**

To evaluate the impact of artificial intelligence technologies on marketing performance, structural equation modeling (SEM) was relied upon as a modern approach to examine the interaction between latent constructs measured by observing variables (Akour et al. 2023; Majdy Amiruddin et al. 2023; Pallathadka et al. 2023). The application of this statistical method requires subjecting the study instrument to a test of validity and reliability before conducting an evaluation of the effect size. Accordingly, confirmatory factor analysis (CFA), which is one of the SEM procedures using the AMOS software, was applied to extract the validity and reliability of a measurement model, which were reported in Table 1.

The loadings of artificial intelligence technologies on marketing performance items were between 0.697 to 0.808, indicating that they were all retained as they

**Table 1** Measurement model evaluation

Constructs	Items	Loadings	VIF	AVE	MSV	$\sqrt{\text{AVE}}$	$\alpha$	$\omega$
Machine vision (MV)	Q1	0.721	1.552	0.521	0.391	0.722	0.813	0.813
	Q2	0.718						
	Q3	0.706						
	Q4	0.741						
Neural networks (NN)	Q5	0.785	1.385	0.585	0.323	0.765	0.850	0.849
	Q6	0.756						
	Q7	0.742						
	Q8	0.775						
Expert systems (ES)	Q9	0.748	1.649	0.545	0.350	0.738	0.828	0.827
	Q10	0.739						
	Q11	0.717						
	Q12	0.750						
Customer satisfaction (CS)	Q22	0.728	–	0.534	0.321	0.731	0.853	0.852
	Q23	0.737						
	Q24	0.697						
	Q25	0.770						
	Q26	0.721						
Customer loyalty (CL)	Q27	0.725	–	0.545	0.355	0.738	0.858	0.857
	Q28	0.740						
	Q29	0.733						
	Q30	0.767						
	Q31	0.730						
Customer retention (CR)	Q32	0.727	–	0.568	0.359	0.754	0.842	0.840
	Q33	0.768						
	Q34	0.734						
	Q35	0.785						

were above the lower threshold of 0.50 (Mukhlis et al. 2022). The average variance extracted (AVE) values for the research latent constructs were greater than 0.50, which means that they met the convergent validity condition (Al-Khasswneh et al. 2023; Alshuqairat et al. 2023; Alshura et al. 2023; Boudlaie et al. 2022). Moreover, the comparison results confirmed that the values of AVE were greater than the maximum shared variance (MSV), also, it indicated that the values of the square root of AVE were superior to the correlation coefficients between the other constructs in the model. These results are evidence of achieving discriminant validity according to the Fornell-Larcker criteria (Al-Hawajreh et al. 2023). According to the results in Table 1, the values of Cronbach's alpha coefficients (0.813–0.858) and McDonald's

omega coefficients (0.813–0.857) were greater than 0.70, which indicates that the model constructs were reliable (Al-Armeti et al. 2023; Al-Husban et al. 2023).

### 5 Hypotheses Testing Results

Table 1 showed that there was no multicollinearity between the dimensions of artificial intelligence technologies, where the values of variance inflation factor (VIF) for those constructs were less than 5 (Al-Armeti et al. 2023; Al-Husban et al. 2023; Boudlaie et al. 2022). In this context, it is possible to continue testing the hypotheses through SEM shown in Fig. 2.

The results of Fig. 2 confirm that the structural model for examining the impact of artificial intelligence technologies on marketing performance of commercial banks in Jordan gained appropriate values of the goodness of fit. CMIN/DF was less than 3, the values of CFI and TLI were greater than 0.90, along with the value of RMSEA which was smaller than 0.08 (AlHamad et al. 2022; Mukhlis et al. 2022; Pallathadka et al. 2023). Accordingly, the standardized and unstandardized effect parameters were extracted and listed in Table 2.

Table 2 presents the path coefficients related to testing the impact of AI on MP. The results point out that the unstandardized path coefficient for artificial intelligence on marketing performance is 0.823, with a standard error of 0.028. The standardized path coefficient is 0.826, which indicates a strong relationship between artificial

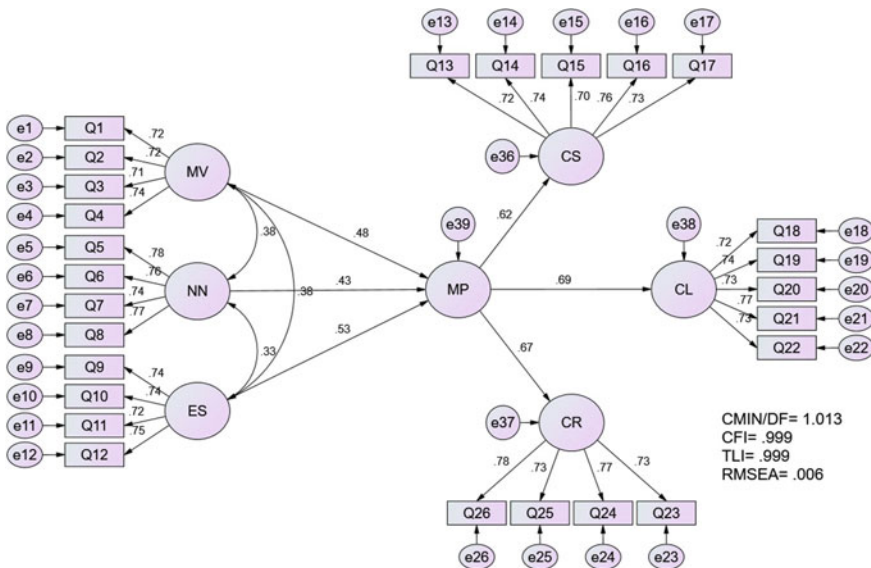


Fig. 2 SEM results of artificial intelligence technologies impact marketing performance

**Table 2** Relationship between artificial intelligence dimensions and marketing performance

Path			B	S.E	$\beta$	t	P
MV	→	MP	0.283	0.038	0.479	7.519	0.000
NN	→	MP	0.211	0.028	0.430	7.569	0.000
ES	→	MP	0.297	0.036	0.534	8.176	0.000

intelligence and marketing performance. A t-value of 29.318 associated with a p-value of 0.000 indicates that this relationship is significant at a level of 0.05 or less.

## 6 Conclusion

It was found that there is a statistically significant impact for AI on MP in commercial banks in Jordan, as that the highest dimensions in terms of impact were expert systems, followed by machine vision, and finally neural network. The researcher attributes this result to the interest of administrations in banks of using artificial intelligence technologies that help in satisfying bank customers, as banks deal seriously with customer proposals and try to implement them. As well as banks provide accurate information to their customers, and the use of artificial intelligence technologies helps increase customer loyalty, as customers advise their relatives to deal with the bank and convey a good image of the bank, as a result of the distinguished service provided to customers through artificial intelligence technologies, it also turns out that customer retention rate increases because customers trust the services provided by the bank. Based on the above, it is clear to us the positive impact of artificial intelligence technologies in all its dimensions on the marketing performance in all its dimensions.

## 7 Recommendations

The researchers is recommending to managers to enhance the use of artificial intelligence technologies with customers, which makes it easier for them to do their transactions faster and easier, and Work on developing software using artificial intelligence technologies to simulate the mind of customers, identify their personalities, ways of thinking, and how to deal with them, which helps banks know their customers more accurately, and thus banks know how to deal with customers, and as a result, increase customer satisfaction and loyalty.

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# Impact of Digital Marketing Tools on Customer Interactions in Jordanian Telecommunications Companies



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**Abstract** The objective of the study is to test the impact of digital marketing tools on customer interaction. The study population consisted of customers of Jordanian Telecommunications Companies. A convenience sample of (258) customers were chosen. The results of the study showed an impact of digital marketing tools on customer interaction. The study recommended following up with the latest methods and technologies that appear in digital marketing, especially in communication networks and Internet advertisements, to continue to achieve more interaction with customers.

**Keywords** Digital marketing tools · Customers interaction · Telecommunications companies · Jordan

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# 1 Introduction

The world is experiencing a massive upheaval in the realm of communication technology, and the notion of digital marketing has emerged as one of the most cutting-edge methods of promoting products and services. Many businesses have embraced online marketing in order to save both money and time (Al-Hawary and Alhajri 2020; Eldahamsheh et al. 2021; Mohammad et al. 2022; Tariq et al. 2022). There is certainly evidence that digital marketing tools have become crucial for marketing services and products, and have just surpassed traditional marketing methods in terms of achieving a high level of sales, as numerous studies have demonstrated that digital marketing tools are no longer a luxury, but instead an essential part of any marketing strategy within an organization (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019).

The role of marketing and its place in contemporary organizations has been associated with the concept of customers and the process of interacting with them, by focusing on building value for customers and extracting it from them as the basis of the competitive strength of the organization (AlBrakat et al. 2023a; Al-Rwaidan et al. 2023; Attiany et al. 2023; Dwijendra et al. 2023; Zahran et al. 2023). As the customer represents a strategic pillar in the organization for the concept of digital marketing and its ability to survive and grow, ensuring success for the company depends on building Strong interactive relationships with its clients, which as an outcome contributes to the organization's total client's retention (Alkhlifat et al. 2023; Alqahtani et al. 2023; Shamaileh et al. 2023).

And in light of the relentless pursuit of companies in general and telecommunications companies in particular to seize every opportunity in the world of technology and informatics in the world, especially telecommunications companies (Alhalalmeh et al. 2020; Al-Hawary 2013a, b; Al-Hawary and Obiadat 2021). Digital marketing effect tools is evident as it works to create value and new markets that were impossible to find under traditional trade (Aityassine et al. 2022; Al-Awamleh et al. 2022; Alhalalmeh et al. 2020; Al-Nawafah et al. 2022; AlTaweel and Al-Hawary 2021).

## 2 Theoretical Framework and Hypothesis

### 2.1 Digital Marketing

Al-Hawary and Obiadat (2021) suggest that without a strategy within the organization to reap the benefits of digital marketing, this organization will miss great opportunities for growth and may even lose its business. The digital marketing (DM) focuses on making informed decisions on how to enter the digital marketing arena and make the best use of the elements of digital marketing, understanding how these elements impact the organization's business, the brand as well as customers and their expectations (Al-Hawary et al. 2017; Metabis and Al-Hawary 2013). Through DM,

customers can easily and quickly access products (Al-Armeti et al. 2023; Harahap et al. 2022; Mohammad et al. 2023, 2022; Shaqrah et al. 2023). Aldaihani et al. (2023) considered digital marketing as creating demand using the interactive power of the internet and adding value to the company and customers, as there are services on the internet that can increase in value with time through increasing the attraction of customers to them by adding value to customers such as interest and entertainment. DM includes direct interactive marketing and digital technology applications to support marketing objectives of retaining existing customers and attracting new ones within the multiple channels and stages in the purchasing process and the product life cycle (Al-Adamat et al. 2023a; Shamaileh et al. 2023).

Organizations resort to digital marketing tools in order to get closer to customers to present their most important and latest services and products in addition to the advantage of saving costs, time and effort without the need to move, therefore it is possible to know the advantages and characteristics of the company and all the detailed information about it (Alkhlifat et al. 2023). DM as follows:

**E-mail:** email plays a big role in digital marketing (Shamaileh et al. 2023). Alkhalwaldeh et al. (2023) point out that email marketing is an internet marketing technique. Email marketing is considered to be one of the most powerful digital marketing tools, as it allows easy communication with customers on a personal level through a globally accepted digital medium (Al-Adamat et al. 2023b; Alkhalwaldeh et al. 2023; Tariq et al. 2022). **Social Networks:** Social media has changed the way consumers participate in marketing offers as anyone can comment, share, and create information about brands or people (Al-Abbadi et al. 2022; Aldaihani et al. 2023). **Mobile Applications:** mobile marketing can be defined as all activities related to communicating with customers using a mobile phone with the aim of promoting sales of services and products and providing information (Aldaihani et al. 2023; Mohammad et al. 2023, 2022; Qurah et al. 2023). **Internet Ads:** internet marketing has created a suitable place in the organization's aimed at increasing sales, gaining a competitive advantage (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017).

## 2.2 *Customer Interaction*

The concept of customer interaction appeared in 2006 as a subset of the term engagement that sought to study customer behaviour and feelings towards interactions or engagement with brands. In the hope that direct interaction with customers can elevate customer relationships to a higher level, many companies have created pages for brands on social media platforms (Al-Rwaidan et al. 2023; Kurdi et al. 2023; Rahamneh et al. 2023).

According to Al-Adamat et al. (2023b) there are many human interactions during the process of acquiring a product or service. Muda et al. (2022) add that the results of these interactions depend on the nature of the procedures and their consistency among all participants where the quality of these results cannot be predicted by knowing the

behaviour of only one party. Mohammad (Miluska et al. 2020) defines interaction as different forms of interactions between individuals and groups either directly or through platforms and digital media, moreover the magnitude of interaction is determined by the degree, direction and synchronization of the active communication of the participants. Khalayleh and Al-Hawary (2022) and Alshawabkeh et al. (2022) view that customer interaction should be a direct, contact-based interaction, and define it as a “brand-related, motivational state of mind characterized by specific levels of cognitive, emotional, and behavioral activity (Alolayyan et al. 2022; Al-Shormana et al. 2021).”

### ***2.3 Digital Marketing and Customer Interaction***

Al-Hakim and Al-Hamamy (2017) indicated that there is an effect of DM on customer happiness. In the study of Kharabsheh and Ensour (2017), they concluded that there is an effect of social media marketing on the purchase intent. Al-Sharif and Nasser-aldeen (2017) pointed out in their study an average level of importance of brand identity development in Jordanian institutions in all dimensions. So, the study hypotheses can be formulated as:

**H1: There is an impact of DM on customer interaction (CI) in Jordanian telecommunications companies.**

## **3 Study Model**

See Fig. 1.

## **4 Methodology**

### ***4.1 Sample and Population***

The target population was the customers of telecommunications companies in Jordan, a final sample consisting of (258) valid responses for analysis, whereby they had obtained appropriate indicators after preliminary tests were conducted on it. structural equation modeling (PLS-SEM) was applied via the software SMART-PLS.

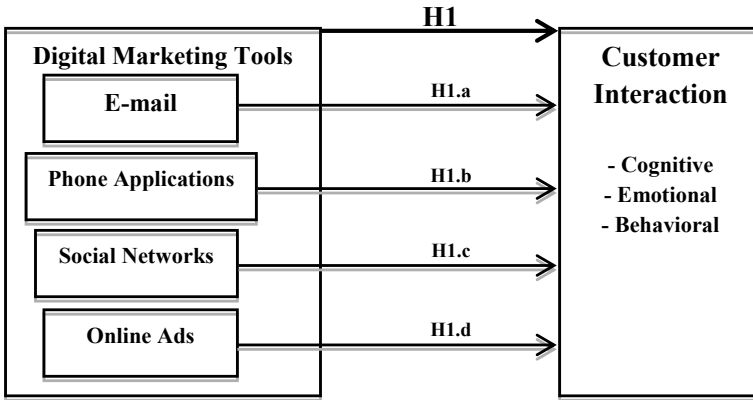


Fig. 1 Proposed model

## 4.2 Measurement

The questionnaire contained 29 items formed the measurement model to test the impact of digital marketing tools on customer interactions, which was borrowed from relevant literature. DM formed the first part of the questionnaire with 17 items that were taken from the study of Al-Hawary and Al-Fassed (2022). Items for digital marketing tools deployed on four dimensions as follows: four items for e-mail €, five items for phone applications (PA), four items for social networks (SN), and four items for online advertising (OA). On the other hand, the second section included 12 items for measuring customers interaction (CI), which correspond to Al-Hawary and Obiadat (2021).

## 5 Results

### 5.1 Measurement Model Analysis

The constructs of the measurement model were ascertained by indicators of validity and reliability (Akour et al. 2023; Hair et al. 2011). To retain items within the measurement model, loadings values must exceed 0.60 (Al-Hawary et al. 2023; Hair et al. 2017; Majdy Amiruddin et al. 2023; Pallathadka et al. 2023; Tan et al. 2017). The composite reliability (CR) was used to evaluate the reliability of the combinations with a minimum score of 0.70 (AlBrakat et al. 2023a; Hair et al. 2017). Convergent validity is applied to determine whether a given item expects a latent variable other than the one to which it belongs (Tan et al. 2017; Urbach and Ahlemann 2010). On the other hand, it evaluates the measure of change achieved by the constructs as a result of the variance of the determinant related to the estimation error (Fornell and



Larcker 1981; Henseler et al. 2015; Tan et al. 2017). The convergent validity of this measurement model was assessed by the average variance extracted (AVE) with a minimum threshold of 0.50 (AlBrakat et al. 2023a, b; Hair et al. 2021, 2017).

Table 1 results show that the items (CI5, CI6, CI7, and CI9) were cancelled from the measurement model as a result their loadings values did not meet the required condition, whilst the rest items were retained as their loadings exceed 0.60, which is the minimum required limit. The composite reliability values were within the range of (0.864–0.937), which means that they were higher than 0.70 and confirm the reliability of the current study's measurement model (Al-Hawajreh et al. 2023; Al-Quran et al. 2023; Hair et al. 2017). On the other hand, the results showed that the values of AVE ranged from 0.616 to 0.760. This result indicates support for instrument convergent validity as a result of its superiority over the lower threshold of 0.50 (Al-Khasswneh et al. 2023; Alshuqairat et al. 2023; Boudlaie et al. 2022; Henseler et al. 2015). The researchers also implemented a discriminant validity analysis based on comparing the square root of the AVE value for each variable with the correlation coefficients between others (Al-Armeti et al. 2023; Al-Husban et al. 2023; Fornell and Larcker 1981).

The results in Table 2 demonstrated that the values of the square root of AVE were greater than 0.70, and they exceeded all correlation coefficients between the rest of the variables. This result fulfills the Fornell-Larcker criteria. Indeed, evaluating the discriminant validity of the measurement model using the PLS-SEM approach in addition to the previous technique entails extracting a matrix Heterotrait-Monotrait Ratio (HTMT). The results of HTMT analysis were shown in Table 3.

The results of Table 3 indicated that the values of HTMT for all measurement model constructs were between 0.109 to 0.846, therefore, they were less than the threshold value of 0.85, which necessitates considering the measurement model to have appropriate discriminant validity (Franke and Sarstedt 2019; Henseler et al. 2015).

## 5.2 Structural Model Analysis

The structural model of the studies consists of latent constructs, i.e., variables, and the paths that link them, which indicate the size of the effect between those constructs (Hair et al. 2017). Figure 2 reveals the standard estimation of the structural model of the study. It presents the effect between digital marketing tools and customer interaction, along with an explanation of the impact of each dimension of DM on customer interaction within the limits of path coefficient values ranging from -1 to + 1 in order to express the relationship depth between any two constructs.

Ramayah et al. (2016) established the crucial values for significance in 2-tailed tests as follows: p 10% (1.64), p 5% (1.96), and p 1 (2.58). Similarly, marketing researchers used the p 5% significant threshold. The structural model outcomes for this study are shown in Table 4.

**Table 1** Reflective measurements model—a summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	(AVE)	Composite reliability (CR)	Cronbach's alpha (CA)
		> 0.60	> 0.50	> 0.50	0.70–0.90	0.60–0.90
<i>Digital marketing tools (DMT)</i>						
E-mail (E)	E1	0.871	0.840	0.678	0.893	0.839
	E2	0.860				
	E3	0.837				
	E4	0.717				
Phone applications (PA)	PA1	0.826	0.906	0.722	0.929	0.904
	PA2	0.808				
	PA3	0.870				
	PA4	0.871				
	PA5	0.873				
Social networks (SN)	SN1	0.923	0.909	0.760	0.927	0.895
	SN2	0.877				
	SN3	0.863				
	SN4	0.822				
Online Ads (OA)	OA1	0.759	0.890	0.616	0.864	0.867
	OA2	0.724				
	OA3	0.708				
	OA4	0.930				
Customer interaction (CI)	CI1	0.812	0.924	0.652	0.937	0.924
	CI2	0.762				
	CI3	0.809				
	CI4	0.816				
	CI8	0.814				
	CI10	0.833				
	CI11	0.784				
	CI12	0.829				

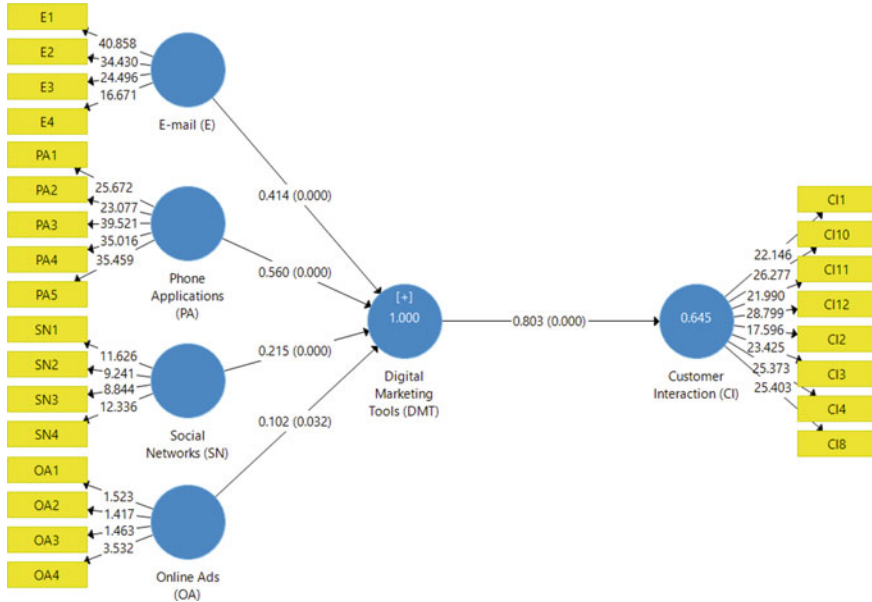
**Table 2** Fornell-Larcker criterion

Construct	CI	E	OA	PA	SN
Customer interaction	<b>0.808</b>				
E-mail	0.750	<b>0.823</b>			
Online Ads	0.292	0.252	<b>0.785</b>		
Phone applications	0.715	0.651	0.226	<b>0.850</b>	
Social networks	0.273	0.346	0.126	0.171	<b>0.872</b>

Bold values indicates Less than or equal 0.01

**Table 3** The HTMT criterion

Construct	CI	E	OA	PA	SN
Customer Interaction					
E-mail	0.846				
Online Ads	0.192	0.192			
Phone Applications	0.780	0.741	0.166		
Social Networks	0.292	0.389	0.109	0.182	



**Fig. 2** Structural model results

As can be observed in Table 4, the path coefficients of DMT were found to have a significant relationship with CI; the result indicated that (DMT → CI,  $\beta = 0.803$ ;  $t$ -value of 6.550), which H1 was supported. In addition, the first sub-hypothesis (H1.a) results showed that this effect was found statistically significant at  $p < 0.05$ , which indicated support for H1.a. Consequently, the results showed that the effect of PA on CI was found statistically significant at  $p < 0.05$  which means H1.b was supported also. Thereby, the bootstrap results of the H1.c for this study, indicated that the direct effect (SN → CI,  $\beta = 0.173$ ,  $t$ -value of 3.758) was significant at  $p < 0.05$ . The results also confirmed that there was a direct effect of H1.d on CI at a 5% confidence interval (LL = 0.031, UL = 0.169), which means an estimated path coefficient does not include zero in between and that indicated support for this hypothesis.

**Table 4** Summary of the Structural Model Results

Hypothesis	Relationship	Indirect effect (β)	S. error	t-statistic	P values	Confidence interval (BC)		Decision
						LL	UL	
H1	Relationship of DMT → CI	0.803	0.030	6.550	0.000	0.732	0.855	Supported**
H1.a	Relationship of E → CI	0.333	0.023	4.690	0.000	0.293	0.382	Supported**
H1.b	Relationship of PA → CI	0.450	0.034	3.171	0.000	0.388	0.524	Supported**
H1.c	Relationship of SN → CI	0.173	0.046	3.758	0.000	0.066	0.248	Supported**
H1.d	Relationship of OA → CI	0.082	0.038	2.130	0.033	0.031	0.169	Supported*

*Note:* Significance level at \*\*  $p < 0.01$ , \*  $p < 0.05$  (two-tailed). LL, lower limit at 5%; UL, upper limit at 95% confidence interval; BC, bias corrected

## 6 Discussion

The findings demonstrated that digital marketing tools have an impact on consumer contact. This finding might be attributed to the fact that digital marketing tools assist businesses in selling their products and services, in addition to offering a suitable platform for client contact with telecommunication firms. As some of these tools provide immediate reactions and feedback to telecommunication companies to correct and address errors, these companies benefit from the opinions and suggestions of their customers and corporate clients. This result is consistent with studies Al-Sharif and Nasseraldeen (2017) and Mohammed (2020). The results also revealed that there is an effect of e-mail on customer interaction. This result may be due to the fact that telecommunication companies use e-mail to communicate with a small segment of their customers; this is due to some large customers, large companies and institutions having confidential information that they cannot use on other marketing tools, and they prefer interacting and communicating through e-mail as it is a tool that carries some privacy. This result agrees with Merisavo and Raulas’s (2004) study. Moreover mobile phone applications have an effect on clients interaction. The study of Miluska et al. (2020) agrees with this finding.

Results showed that there is an effect of social networking on customer interaction in Jordanian telecommunication companies. This result may be due to the fact that this tool allows free browsing and interaction with companies, which provides the interaction of a very large number of customers as this tool is available to everyone, and anyone can interact through this tool with telecommunication companies. This tool is characterized by providing immediate comments and feedback from customers and companies about the service or product. This result agrees with Zhu and Chang’s study (2014). Results revealed an effect of Internet ads on client’s interaction. This

result may be due to the fact that interaction with Internet advertisements requires that you be a subscriber to one of the Internet service providers, i.e. it is paid, and this justifies that it comes in a medium rank in terms of the strength of the effect.

## 7 Recommendations

The researchers recommend managers in companies to follow up with the latest methods and technologies that emerge in DM in order to continue to achieve increased interaction with customers. This is because when the company or the owner of the project does not update their work methods in line with the progress and development in the field of digital marketing, the company's existence will end or the project will be completely shut down as a result of lack of interaction and engagement by customers, which leads to a lack of sales that any company relies on for continuity and progression towards what's best. For effective use of digital marketing, the company should interact with its customers through social media, for example, asking their opinion on the services provided or that they have purchased. Communication with customers via social media requires time, follow-up and incentives, so it is recommended to have these three elements.

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# Impact of Social Media Marketing on Electronic Word of Mouth: A Study of Jordanian Private Universities



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**Abstract** The objective of this research aims is to identify impact of social media marketing on EWOM. The study population consisted of students at Jordanian private universities. Smart PLS software was used to test the study hypotheses. The results of the study showed an impact of Social Media Marketing on E-WOM. The researchers recommend managers to activate marketing via social media and the electronic spoken word by enhancing interaction and effective communication between the online store and the customer and listening to their suggestions and opinions.

**Keywords** Social media marketing · Electronic word of mouth · Private universities · Jordan

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# 1 Introduction

In light of the technological developments of the Internet, consumers have been exposed to strong influences on how to build their behavior and purchasing decisions, and among those influences is the spoken word (people's talk) or the word transmitted electronically (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019). It has become the most important and most credible personal communication tool, and it is considered a very important factor in this last stage of a consumer's purchasing decision and sometimes the most influential of all promotional methods. Despite its strong influence, it is the most neglected tool by many organizations (AlBrakat et al. 2023; Al-Rwaidan et al. 2023; Attiany et al. 2023; Zahran et al. 2023). Electronic stores seek to enhance the mental image of their customers with the different products and services they offer, they can continue to do business, retain customers, and thus survive and grow in this highly competitive environment (Alkhlifat et al. 2023; Alqahtani et al. 2023; Dwijendra et al. 2023; Shamaileh et al. 2023). Marketing through social media is linked to another variable of importance, which is the electronic spoken word (people's talk), which expresses any positive or negative remarks that the customer conveys to another person through electronic media, especially in light of the great expansion in the use of social media, which has become a virtual community where everyone exchanges their opinions and experiences easily and from anywhere in the world (Aityassine et al. 2022; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-Khawaldah et al. 2022; AlTaweel and Al-Hawary 2021).

## 2 Literature Review and Building Hypotheses

### 2.1 Social Media Marketing (SMM)

In recent years, interest in employing social media in marketing strategies has increased, as has investment in advertising through social media. These ads were considered complementary tools to marketing efforts to maintain existing customers and try to attract more customers (Dwijendra et al. 2023; Metabis and Al-Hawary 2013; Tan et al. 2017). The entire world witnessed an increase in the use of these methods very quickly by companies of all kinds, as they are the fastest, cheapest, most widespread, and most effective in online purchases (Alhalalmeh et al. 2022; Al-Hawary 2013a, 2013b; Al-Hawary and Obiadat 2021). SMM is one of the modern types of marketing on the internet today (Alhalalmeh et al. 2020; Al-Hawary 2013a, 2013b; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Metabis and Al-Hawary 2013). Through social media, you can make real connections with your prospects and existing customers rather than just sending direct marketing messages (Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2022). The use of social media

by companies, organizations, and brands to spread information, develop connections, make friends, and gain followers is the new engagement strategy in marketing (Al-Adamat et al. 2023b; Alkhawaldeh et al. 2023). SMM has the advantage of a platform for communication that makes it easier for customers and the store to have a two-way conversation. Businesses can thus be promoted through a variety of social media platforms (Aldaihani et al. 2023a, 2023b; Mohammad et al. 2023). The term “social media” refers to a collection of tools, platforms, and online publications that promote communication, teamwork, and the sharing of content. It also refers to an environment where people can openly debate one another’s viewpoints (Al-Adamat et al. 2023a; Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016; Al-Hawary et al. 2020; Shaqrah et al. 2023). Table 1 reviews the most prominent definitions that researchers and experts have dealt with of the concept of SMM.

SMM also allows interaction, content sharing, and information dissemination. It also includes users’ responses to a brand or social networking site that range from beliefs or perceptions to behavioral responses (Al-Alwan et al. 2022; Alhalalmeh et al. 2022) (Table 2).

While the current study adopted the following dimensions of marketing through social media:

**Attraction:** Attraction is the main factor influencing participants’ views and continued pursuit, which produces favorable brand perceptions (Alolayyan et al. 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021). **Interaction** refers to the degree to which customers can exchange information with the business and other customers as well as share material (Alolayyan et al. 2018; Kurdi et al. 2023; Rahamneh et al. 2023). **Freshness of Information:** offers the most recent information about the brand or product, opinions, and new ideas, which increase consumer knowledge of the brand or product and consumer confidence in the brand (Al-Hawary and Hussien 2017; Al-Hawary and Al-Fassed 2022). **Detailing Information:** It enables stores to deal with individual client issues and direct marketing and services, as well

**Table 1** Definitions of SMM

Author	Definition
Al-Adamat et al. (2023a)	The method by which social media is used to reach target markets, produce content with contact information, and exchange and convey information about a brand that benefits stakeholders

**Table 2** Dimensions of SMM

Author	Dimensions
Aldaihani et al. (2023a)	Clarity and modernity of the site, site security, modernity and effectiveness, interaction, cooperation
Al-Hawary and Al-Fassed (2022)	Customer feedback, communication, content sharing, customer relations
AlHamad et al. (2022)	Entertainment, interaction, novelty of information, elaboration of information, spoken word electronically

as messaging aimed at creating value for a specific group of products (Al-Hawary and Al-Smeran 2017). **Perceived Importance:** This dimension expresses the level of individuals' awareness and feeling of the importance of marketing through social media and the level of importance of the content provided by stores through these means (Al-Hawary and Hussien 2017).

## 2.2 *Electronic Word of Mouth (EWOM)*

The EWOM expresses the process of exchanging evaluations, opinions, or experiences by former customers about specific services or products through websites, including social media, as the customer's behavior and positive talk about the institution, its products, or services reflect his commitment and positive feelings towards the institution and its products (Al-Hawary and Al-Fassed 2022; Alshwabkeh et al. 2022). Katz and Lazarsfeld (1955) define EWOM as "the exchange of marketing information between consumers in such a way that it has an essential part in affecting their buying habits and changing their views toward products.", while Arndt (1967) characterized it as a person-to-person communication tool, that is, from the communicator to the recipient, who considers the information obtained regarding a brand, product (Al-Adamat et al. 2023a, 2023b; Alhalalmeh et al. 2022; Al-Hawary 2013a, 2013b; Al-Hawary and Obiadat 2021; Shaqrah et al. 2023). It is also described as present or potential consumers' positive or negative comments about the firm or its services or goods expressed via the Internet (Al-Adamat et al. 2023b; Al-Hawary and Obiadat 2021).

## 2.3 *Social Media Marketing on Electronic Word of Mouth*

The Baseet study (2020), which attempted to determine the influence of SMM on purchase intention, found that SMM has a favorable effect on brand awareness, the word spoken electronically, and purchase intention. The study of Shabah and Saadawi (2019) indicated that SMM positively affects customer purchase behavior, with the largest impact on the stage of considering alternatives. The findings also demonstrated the significance of the spoken word on social networking sites as a significant aspect of influence. The results of a study Mada (2020) showed that both SMM and EWOM affect customer interaction, and the study of Oktafani et al. (2020) concluded that both SMM and EWOM have positive effects. Based on the foregoing, the study hypothesis could be as follows:

**H1: There is a positive impact of marketing social media (MSM) on electronic word of mouth (E-WOM) in Jordanian private universities.**

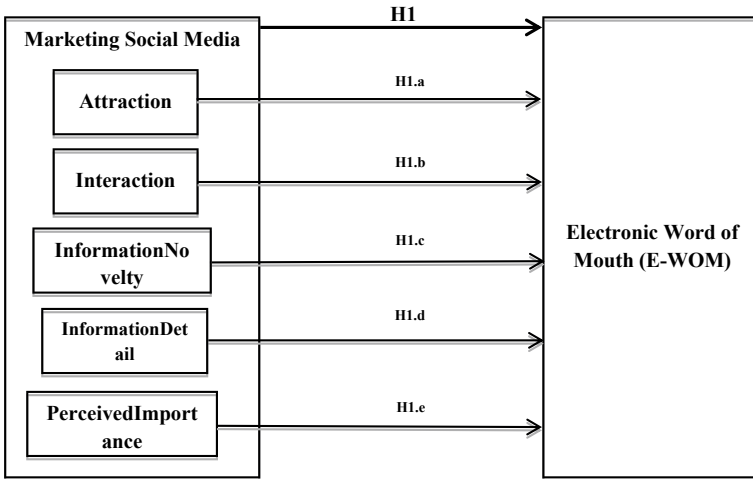


Fig. 1 Proposed model

### 3 Study Model

See Fig. 1.

## 4 Methodology

### 4.1 Sample and Data Collection

The primary data were collected to examine the impact of social media marketing on electronic word of mouth through a quantitative approach applying a simple random method (Sekaran and Bougie 2016). The target population was the students of Jordanian private universities, where an electronic questionnaire was designed and published on social media platforms for them, e.g., Facebook and WhatsApp. Accordingly, a final sample consisting of (450) valid responses for analysis. Structural equation modeling (PLS-SEM) was applied via the software SMART-PLS.

### 4.2 Measurement

The electronic questionnaire contained 30 items formed the measurement model to test the impact of marketing social media on electronic word of mouth, which was borrowed from relevant literature. Marketing social media (SMM) formed the first

part of the questionnaire with 18 items that were taken from the study of Al-Hawary and Obiadat (2021). Items for marketing social media deployed on five dimensions as follows: four items for attraction (AT), three items for interaction (INT), four items for information novelty (INFN), three items for information detail (ID), and four items for perceived importance (PI). On the other hand, the second section included 12 items for measuring electronic word of mouth (E-WOM), which correspond to Al-Adamat et al. (2023b).

## 5 Results

### 5.1 Measurement Model Analysis

The constructs of the measurement model were ascertained by indicators of validity and reliability (Al-Rwaidan et al. 2023; Hair et al. 2011; Muda et al. 2022; Rahamneh et al. 2023). To retain items within the measurement model, loading values must exceed 0.60 (Al-Zyadat et al. 2022; Boudlaie et al. 2022; Hair et al. 2017; Majdy Amiruddin et al. 2023; Tan et al. 2017; Zahran et al. 2023). Composite reliability (CR) was used to evaluate the reliability of the combinations with a minimum score of 0.70 (Hair et al. 2010, 2011). Convergent validity is applied to determine whether a given item expects a latent variable other than the one to which it belongs (Hair et al. 2017; Mukhlis et al. 2022; Shaqrah et al. 2023; Tariq et al. 2022). On the other hand, it evaluates the measure of change achieved by the constructs as a result of the variance of the determinant related to the estimation error (Fornell and Larcker 1981; Henseler et al. 2015; Shaqrah et al. 2023).

Table 3 results show that the items (E-WOM10, E-WOM11 and E-WOM12) were cancelled from the measurement model as a result their loadings values did not meet the required condition, whilst the rest items were retained as their loadings exceed 0.60, which is the minimum required limit. The composite reliability values were within the range of (0.884–0.939), which means that they were higher than 0.70 and confirm the reliability of the current study's measurement model (Hair et al. 2017). On the other hand, the results showed that the values of AVE ranged from 0.580 to 0.838. This result indicates support for instrument convergent validity as a result of its superiority over the lower threshold of 0.50 (Hair et al. 2017). The researchers also implemented a discriminant validity analysis based on comparing the square root of the AVE value for each variable with the correlation coefficients between others (Barclay and Lloyd 1996; Fornell and Larcker 1981) (Table 4).

The values of HTMT should be greater than the required threshold value.85. Nevertheless, the confidence interval for the HTMT analysis must not take a count value of 1 on any of the constructs (Kline 2015). The results of HTMT analysis were shown in Table 5.

The results of Table 5 indicated that the values of HTMT for all measurement model constructs were between 0.109 to 0.846, therefore, they were less than the

**Table 3** Reflective measurements model—a summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	(AVE)	Composite reliability (CR)	Cronbach's alpha (CA)
		> 0.60	> 0.50	> 0.50	0.70–0.90	0.60–0.90
<i>Marketing social media (MSM)</i>						
Attraction (AT)	AT1	0.862	0.900	0.767	0.930	0.899
	AT2	0.888				
	AT3	0.890				
	AT4	0.863				
Interaction (INT)	INT1	0.938	0.931	0.838	0.939	0.904
	INT2	0.915				
	INT3	0.892				
Information novelty (INFN)	INFN1	0.905	0.913	0.792	0.938	0.912
	INFN2	0.891				
	INFN3	0.880				
	INFN4	0.883				
Information detail (ID)	ID1	0.831	0.843	0.759	0.904	0.841
	ID2	0.896				
	ID3	0.886				
Perceived importance (PI)	PI1	0.807	0.832	0.656	0.884	0.867
	PI2	0.778				
	PI3	0.760				
	PI4	0.890				
Electronic word of mouth (E-WOM)	E-WOM1	0.743	0.914	0.580	0.925	0.909
	E-WOM2	0.726				
	E-WOM3	0.657				
	E-WOM4	0.764				
	E-WOM5	0.749				
	E-WOM6	0.738				
	E-WOM7	0.825				
	E-WOM8	0.842				
	E-WOM9	0.794				

threshold value of 0.85 (Franke and Sarstedt 2019), which necessitates considering the measurement model to have appropriate discriminate validity (Hair et al. 2017; Henseler et al. 2015).



**Table 4** Fornell-Larcker criterion

Construct	AT	E-WOM	ID	INFN	INT	PI
Attraction	<b>0.876</b>					
Electronic word of mouth	0.761	<b>0.762</b>				
Information detail	0.239	0.255	<b>0.871</b>			
Information novelty	0.676	0.722	0.163	<b>0.890</b>		
Interaction	0.224	0.236	0.135	0.250	<b>0.915</b>	
Perceived importance	0.190	0.228	0.143	0.288	0.125	<b>0.810</b>

Bold indicates less than or equal 0.01

**Table 5** The HTMT criterion

Construct	AT	E-WOM	ID	INFN	INT	PI
Attraction						
Electronic Word Of Mouth	0.828					
Information Detail	0.275	0.299				
Information Novelty	0.743	0.784	0.186			
Interaction	0.237	0.252	0.147	0.270		
Perceived Importance	0.166	0.192	0.187	0.189	0.120	

## 5.2 Structural Model Analysis

Figure 2 reveals the standard estimation of the structural model of the study. It presents the effect between social media marketing on electronic word of mouth, along with an explanation of the impact of each dimension of SMM on EWOM within the limits of path coefficient values ranging from  $-1$  to  $+1$  in order to express the relationship depth between any two constructs.

Ramayah et al. (2016) established the crucial values for significance in 2-tailed tests as follows:  $p$  10% (1.64),  $p$  5% (1.96), and  $p$  1 (2.58). Similarly, marketing researchers used the  $p$  5% significant threshold. According to Hair et al. (2017), bias-corrected bootstrap confidence intervals (lower limit, upper limit) may be utilized to determine if a route coefficient is statistically different from zero. If the confidence interval for a calculated route coefficient does not contain zero, it indicates that this path has a substantial influence (Hair et al. 2017). The structural model outcomes for this study are shown in Table 6.

As can be observed in Table 6, the path coefficients of MSM were found to have a significant impact on E-WOM; the result indicated that (MSM  $\rightarrow$  E-WOM,  $\beta = 0.0804$ ;  $t$ -value of 27.180), which H1 was supported. In addition, the first sub-hypothesis results showed that this impact was found statistically significant at  $p < 0.01$ , which indicated support for H1.a. Consequently, the results showed that the impact of INT on E-WOM was found statistically significant at  $p < 0.01$  which means H1.b was supported. Thereby, the bootstrap results of the H1.c for this study,

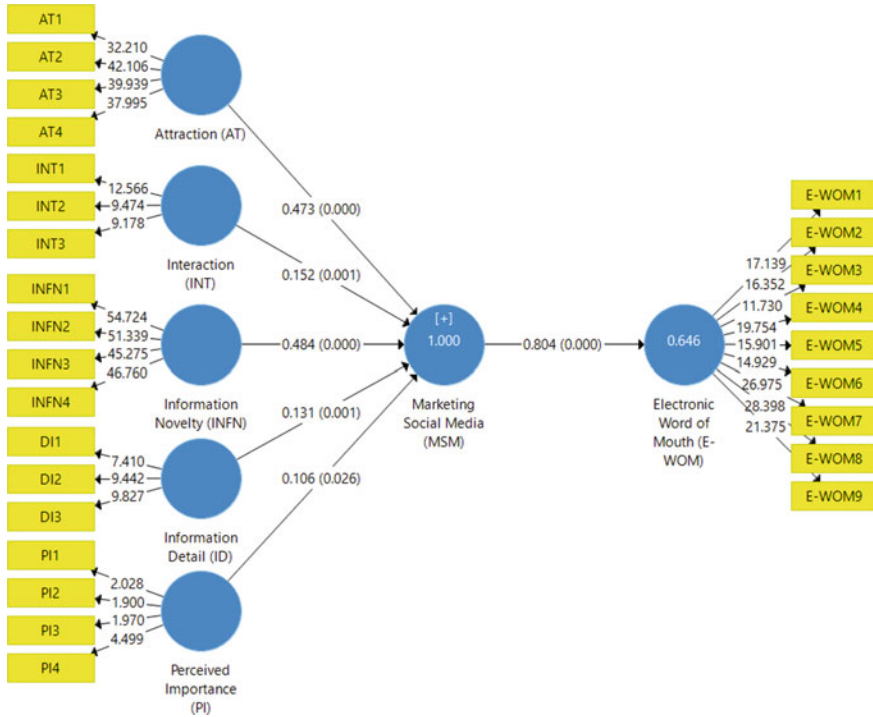


Fig. 2 Structural model results

Table 6 Structural model results

Hypothesis	Relationship	Indirect effect (β)	S. error	t-statistic	P values	Confidence interval (BC)		Decision
						LL	UL	
H1	MSM → E-WOM	0.804	0.030	27.180	0.000	0.733	0.852	Supported**
H1.a	AT → E-WOM	0.380	0.029	13.166	0.000	0.325	0.437	Supported**
H1.b	INT → E-WOM	0.122	0.036	3.396	0.001	0.041	0.181	Supported**
H1.c	INFN → E-WOM	0.389	0.028	13.829	0.000	0.339	0.446	Supported**
H1.d	ID → E-WOM	0.105	0.031	3.443	0.001	0.045	0.162	Supported**
H1.e	PI → E-WOM	0.085	0.038	2.253	0.024	0.031	0.167	Supported*

\*, \*\* indicates less than or equal 0.01

indicated that the direct effect (INFN → E-WOM, β = 0.389, t-value of 13.829) was significant at p < 0.01. The results also confirmed that there was a direct effect of H1.d on E-WOM at a 5% confidence interval (LL = 0.045, UL = 0.162), that does not straddle a 0 in between, which indicated support for these hypothesis. In addition, the results showed that the relationship between PI and E-WOM was found statistically significant at p > 0.05 which means H1.e was supported.

## 6 Discussion

There is an effect of SMM on EWOM, and this result is attributed to the fact that social media is regarded as a primary channel for obtaining the experiences of others, their opinions, and comments about electronic stores easily and for free. This finding is similar with Sergius's research, which found that SMM have an impact on EWOM. And the Baset (2020) study, which found that SMM has a beneficial influence on brand awareness and EWOM. The study's findings also revealed that there is an effect of interaction in EWOM, and as a result, we find that they provide positive opinions about their dealings with these stores. There was also an effect of the novelty in the EWOM, this may be to the fact that the novelty builds consumers' confidence in it and enhances the consumer's positive awareness towards the brand or product, thus contributing to building positive ideas in their minds that they later share with them on the electronic pages of electronic stores. There was also an effect of the novelty in the EWOM, and this may be to the fact that the novelty of information builds consumers' confidence in it and enhances the consumer's positive awareness towards the brand or product, thus contributing to building positive ideas in their minds that they later share with them on the electronic pages of electronic stores. The study showed that there is an effect of the perceived importance of the EWOM, and this result is attributed to the fact that customers' awareness of the importance of SMM greatly contributes to encouraging them to exchange experiences, opinions, and comments with others, as they are aware of the importance of social media and the possibility of using it significantly in the marketing of electronic store products.

## 7 Recommendations

The researchers advise managers to take a number of actions that will activate marketing via social media and the electronic spoken word by improving interaction and effective communication between the online store and the customer, as well as listening to their suggestions and opinions that may improve their mental image of the store. And the interest of electronic stores in anticipating customers' needs and aspirations and directing them to provide extra services and benefits to clients. Finally, paying attention to client comments and recommendations, updating the stores' social media pages with enhanced videos and photographs, developing solid customer relationships, and giving distinguished services and items that generate primarily favorable electronic word of mouth.

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# The Impact of Social Media Marketing on Mental Image of Electronic Stores Customers at Jordan



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**Abstract** The present study tries to test the impact of marketing throughout social media on the mental image of electronic stores. The population of this study consisted of customers of electronic stores in Jordan, which depends on social media in marketing their products. Structural equation modeling (PLS-SEM) was used to test hypotheses. The statistical analysis results found an effect of marketing via social media on mental image. According to the results reached recommends to improve the mental image of electronic stores and activate marketing via social media (SM) to enhance the organizational reputation and improve the mental image.

**Keywords** Marketing through social media · Mental image · Electronic stores · Jordan

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# 1 Introduction

Technological developments and the Internet revolution have had many negative and positive repercussions on various sectors of life in general and the business sector in particular (AlBrakat et al. 2023a, 2023b; Al-Rwaidan et al. 2023; Attiany et al. 2023; Urbach and Ahlemann 2010). The traditional organizational forms and methods are no longer able to take advantage of the opportunities offered by this stage and adapt to the challenges it poses (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019). Among the most prominent of these opportunities is the growth of virtual markets, or what is known as electronic stores, as recent years have witnessed the establishment of large numbers of websites to serve as electronic stores that sell all kinds of products and services, especially those most used by consumers (Al-Husban et al. 2023; Dwijendra et al. 2023).

In conjunction with modern technological developments, social networking sites have emerged, which have become a major influence on various members of society (Aityassine et al. 2022; Akour et al. 2023; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-Hawary et al. 2023; Al-Khawaldah et al. 2022; Alshura et al. 2023). Which directed companies, including online stores, to employ social networking sites within their marketing strategies and plans as a marketing tool (Al-Armeti et al. 2023; Alhalalmeh et al. 2022; Al-Hawary 2013a, 2013b; Al-Hawary and Obiadat 2021; Bilgin 2018; Hair et al. 2011).

Recently, there has been an increase in Jordanians' interest in purchasing from electronic stores due to its role in reducing the cost of traditional shopping, saving time, and the possibility of purchasing what one wants at any time and in any place, in addition to the possibility of purchasing from international markets without the need to travel abroad and incur the costs involved in that.

## 2 Theoretical Framework and Building Development

### 2.1 *Social Media Marketing (SMM)*

The entire world witnessed many transformations in all areas of life which played the greatest role in these transformations as the emergence of Internet networks contributed to the shift from traditional methods of doing business, making deals, and communicating to employing digital methods that are based on the use of tools and digitally managed devices. It should be noted that information technology was not limited to processing information alone but also provided new methods for companies that enabled them to achieve excellence in the services and products they provided (Aldaihani et al. 2023; Alhalalmeh et al. 2020; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Mohammad et al. 2023). The development of the World Wide Web contributed to the emergence of a new revolution in the world of marketing and the creation of opportunities for companies and customers related to doing business and

social relations, especially after the emergence of Web 2 (Web.2) as a technology that allowed sharing data with ease and reusing applications (Mohammad 2020; Mohammad et al. 2020, 2022).

In recent days, companies have been interested in employing their marketing strategies and forming positive trends through SMM that represents a marketing tool and a major source for companies, especially with the inadequacy of traditional marketing methods in satisfying customers and meeting their needs, desires, and cognitive motives (Al-Adamat et al. 2023; Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016; Metabis and Al-Hawary 2013). Customers and build good relationships with them (Al-Hawajreh et al. 2023). Many researchers mentioned that social media is a platform for customers and allows them to express their opinions and share their experiences and information (Al-Hawary et al. 2020; Tariq et al. 2022). Table 1 reviews the most prominent definitions that researchers and experts have dealt with of the concept of social media marketing.

While the current study adopted the following marketing dimensions through SM, as it is one of the most recent dimensions dealt with in previous studies and because it is the most appropriate to the limits of the current study (Table 2):

**Attraction:** It expresses what achieves entertainment for customers by creating content for the company on various SM (Al-Alwan 2018; Al-Alwan et al. 2022a; AlHamad et al. 2022). **Interaction:** Interaction is one of the advantages of marketing through the use of SM, and it is through sharing content, reposting content, comments on content, or following SM accounts, and this expresses the ease of making two-way communications and spreading information (Al-Alwan et al. 2022b). **Information Novelty:** It defined as a way to give followers and users of SM the last information about services that offered to them by stores, as the content is characterized by new ideas published in keeping with the latest trends in fashion or technology in general (Alolayyan et al. 2022; Alshawabkeh et al. 2022; Al-Shorbaji 2022; Al-Shormana et al. 2021). **Detailing Information:** This term has been defined as the process of

**Table 1** The most prominent definitions that researchers and experts have addressed for the concept of marketing via social media

Author	Definition
Aljumah et al. (2021)	Use SM technologies to create, connect, deliver, and share offerings, channels, and programs that create value for your organization's stakeholders
Al-Shorbaji (2022)	A marketing technique that involves using a social media network and a social networking site to market certain products or services

**Table 2** The most prominent dimensions of marketing through social media, as dealt with in previous studies

Author	Dimensions
Beig and Khan (2018)	Content sharing and interaction
Dewedar (2020)	Interactions, entertainment, keeping pace with development, word transmission, personalization

giving interested parties with detailed information that enables customers to make high-value purchase decisions about services and products and their available alternatives. (Alolayyan et al. 2018; Eldahamsheh et al. 2021). **Perceived Importance:** This dimension expresses the level of individuals' awareness and feeling of the importance of SMM and the level of importance of the content provided by stores through these means (Alshuqairat et al. 2023; Majdy Amiruddin et al. 2023; Rahamneh et al. 2023).

## 2.2 *Mental Image*

Increased interest in the concept of the mental image because of its significant role in shaping opinions, impressions, behaviors, and decisions that serve the goals of the organization, as the mental image is considered a key to achieving sustainable competitive advantage, achieving the goals of the organization, and ensuring its growth and continuity (Al-Hawary and Al-Smeran 2017; Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Manzoor et al. 2020). The mental image refers to what the organization offers to obtain a distinguished position in the minds of customers and thus achieve its market objective. Moreover, the term "mental image" is a linguistic concept that expresses a mental simulation of something. A mental image is defined in psychology as the continuation of a sensory impression as a result of the response of the central nervous tissue (Al-Hawary and Hussien 2017). The mental image is defined as the mental image that is formed in the minds of individuals about organizations and establishments, and this image is launched as a consequence of direct and indirect experience, it may be rational or not rational (Alshawabkeh et al. 2022; AlTaweel and Al-Hawary 2021). The mental image also refers to a mental, emotional, and perceptual industry that is related to memory, imagination, and creativity and is translated into behaviors that individuals adopt and deal with towards the formed image. The mental image is characterized by relative stability as it is subject to change and transformation (Al-Hawary 2013a). Al-Adamat et al. (2023) study has identified the main dimensions of the mental image of the organization as: the **general appearance** of the organization, which includes the physical facilities of the organization, buildings, and decorations. **Impression:** It is the creation of new desirable perceptions by others about his orientation or the expression of those ideas taken from him for a specific goal or personal motive. **Advertising** is a public means of communication used by the organization to deliver its message through this medium with the aim of informing customers about the services and persuading them (Ibrahim 2020). **Communication:** It is the administrative process with the aim of creating a place for the organization in their minds. (Alhalalmeh et al. 2022; Al-Hawary 2013b; Al-Hawary and Obiadat 2021).

### 2.3 Social Media Marketing on Mental Image (SMMMI)

Hawari and Saleh (2015) indicated that there is a role for social networks in improving mental image (MI). And in the study of Bilgin (2018), Sekaran and Bougie (2016), which focused to study the relation between marketing via SM and brand image (BI), This study concluded that there is a positive and significant relation between marketing via SM and brand image. As results of this study of Karamang (2021) also showed that marketing via SM and the MI variable influenced the selection decision, as the brand image had a greater contribution than marketing via social media (Babbie 1992; Bilgin 2018) It found that SM marketing activities impact factors in BI and brand loyalty. According to the literature review above, the study hypotheses can be as:

**H1: There is an impact of marketing social media (MSM) on Mental Image (MEI) in electronic stores customers at Jordan.**

## 3 Study Model

See Fig. 1.

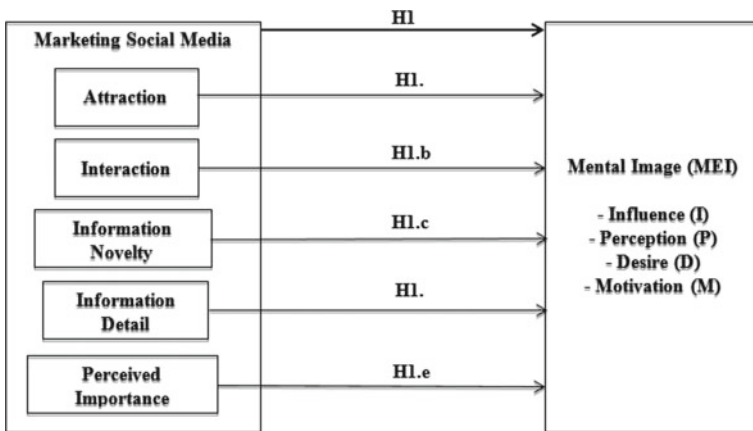


Fig. 1 Proposed model

## 4 Methodology

### 4.1 *Sample and Population*

The study population was the customers of electronic stores in Jordan, e.g., Modanisia, SHEIN, Amazon, Ali Express, JollyChic, where an electronic questionnaire was designed and published on social media platforms for them, e.g., Facebook and WhatsApp. Accordingly, a final sample consisting of (400) valid responses for analysis, whereby they had obtained appropriate indicators after preliminary tests were conducted on it.

### 4.2 *Measurement*

The questionnaire contained 40 items formed the measurement model to test the impact of impact of social media marketing on mental image, which was borrowed from relevant literature. SMM formed the first part of the questionnaire with 18 items that were taken from the study of Al-Hawary and Obiadat (2021). Items for marketing social media deployed on 5 dimensions as follows: four items for attraction (AT), 3 items for interaction (INT), 4 items for information novelty (INFN), 3 items for information detail (ID), and 4 items for perceived importance (PI). On the other hand, the second section included 22 items for measuring mental image (MEI), which correspond to Alhalalmeh et al. (2022); Al-Quran et al. (2023). These items distributed on four dimensions: 4 items for influence (I), 6 items for perception (P), 6 items for desire (D), and 6 items for motivation (M).

## 5 Results

The results of the current study included two main headings. The first is dedicated to the pre-tests applied to the measurement model and aimed at determining the achievement degree of validity and reliability (Hair et al. 2021). The second includes the results of evaluating the structural model and parameter values to test the hypotheses of the impact of SMM on MI through the PLS-SEM approach recommended by Al-Zyadat et al. (2022), Boudlaie et al. (2022), Hair et al. (2017), Mukhlis et al. (2022) and Rahamneh et al. (2023).

## 5.1 Measurement Model Analysis

The constructs of the measurement model were ascertained by indicators of validity and reliability (Al-Rwaidan et al. 2023; Hair et al. 2011; Muda et al. 2022). To retain items within the measurement model, loading values must exceed 0.60 (Hair et al. 2017; Majdy Amiruddin et al. 2023; Tan et al. 2017; Zahran et al. 2023). Composite reliability (CR) was used to evaluate the reliability of the combinations with a minimum score of 0.70 (Hair et al. 2010, 2017). Convergent validity is applied to determine whether a given item expects a latent variable other than the one to which it belongs (Sekaran and Bougie 2016; Tariq et al. 2022). On the other hand, it evaluates the measure of change achieved by the constructs as a result of the variance of the determinant related to the estimation error (Tan et al. 2017; Urbach and Ahlemann 2010). Table 3 lists the results.

Table 3 results show that the items (PI4, P6, D5, D6, M5 and M6) were cancelled from the measurement model as a result their loadings values did not meet the required condition, whilst the rest items were retained as their loadings exceed 0.60, which is the minimum required limit. The composite reliability values were within the range of (0.868–0.938), which means that they were higher than 0.70 and confirm the reliability of the current study's measurement model (Hair et al. 2017). On the other hand, the results showed that the values of AVE ranged from 0.646 to 0.792. This result indicates support for instrument convergent validity as a result of its superiority over the lower threshold of 0.50 (Hair et al. 2010, 2017; Pallathadka et al. 2023).

## 5.2 Structural Model Analysis

The structural model of the studies consists of latent constructs, i.e., variables, and the paths that link them, which indicate the size of the effect between those constructs (Pallathadka et al. 2023). Figure 2 reveals the standard estimation of the structural model of the study. It presents the effect between SMM and MI, along with an explanation of the impact of each dimension of SMM on MI within the limits of path coefficient values ranging from  $-1$  to  $+1$  in order to express the relationship depth between any two constructs.

Ramayah et al. (2016) established the crucial values for significance in 2-tailed tests as follows:  $p$  10% (1.64),  $p$  5% (1.96), and  $p$  1 (2.58). Similarly, marketing researchers used the  $p$  5% significant threshold. According to Boudlaie et al. (2022), bias-corrected bootstrap confidence intervals (lower limit, upper limit) may be utilized to determine if a route coefficient is statistically different from zero. If the confidence interval for a calculated route coefficient does not contain zero, it indicates that this path has a substantial influence (Hair et al. 2017). The structural model outcomes for this study are shown in Table 4.

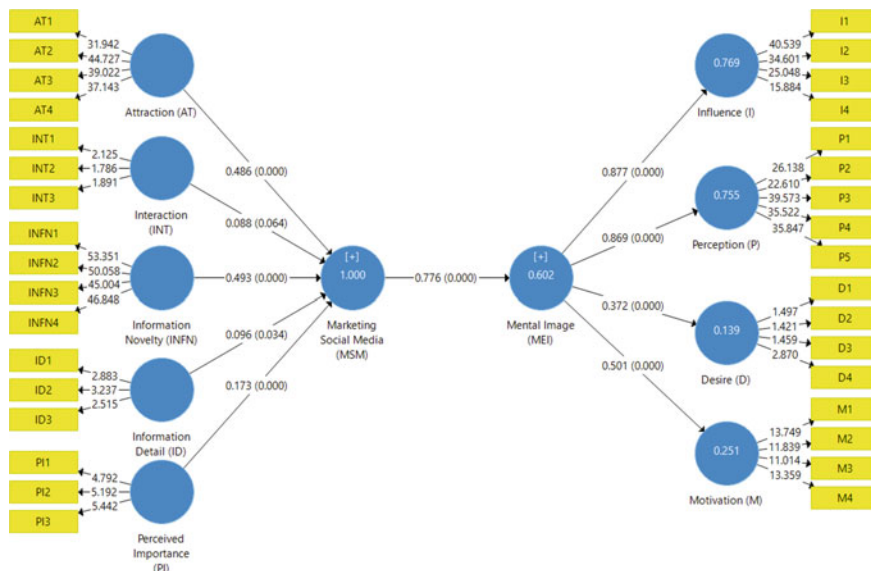
**Table 3** Reflective measurements model—a summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	(AVE)	Composite reliability (CR)	Cronbach's alpha (CA)
		> 0.60	> 0.50	> 0.50	0.70–0.90	0.60–0.90
<i>Marketing social media (MSM)</i>						
Attraction (AT)	AT1	0.863	0.899	0.768	0.930	0.899
	AT2	0.892				
	AT3	0.889				
	AT4	0.861				
Interaction (INT)	INT1	0.820	0.813	0.710	0.880	0.800
	INT2	0.863				
	INT3	0.845				
Information Novelty (INFN)	INFN1	0.905	0.913	0.792	0.938	0.912
	INFN2	0.890				
	INFN3	0.879				
	INFN4	0.885				
Information Detail (ID)	ID1	0.840	0.782	0.688	0.868	0.771
	ID2	0.886				
	ID3	0.757				
Perceived Importance (PI)	PI1	0.828	0.843	0.759	0.904	0.841
	PI2	0.899				
	PI3	0.886				
<i>Mental image (MEI)</i>						
Influence (I)	I1	0.872	0.841	0.678	0.893	0.839
	I2	0.861				
	I3	0.838				
	I4	0.714				
Perception (P)	P1	0.826	0.906	0.722	0.929	0.904
	P2	0.808				
	P3	0.870				
	P4	0.871				
	P5	0.872				
Desire (D)	D1	0.793	0.853	0.646	0.879	0.867
	D2	0.763				
	D3	0.745				
	D4	0.903				
Motivation (M)	M1	0.923	0.906	0.761	0.927	0.895
	M2	0.879				

(continued)

**Table 3** (continued)

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	(AVE)	Composite reliability (CR)	Cronbach's alpha (CA)
		> 0.60	> 0.50	> 0.50		
	M3	0.865				
	M4	0.818				



**Fig. 2** Structural model results

**Table 4** Structural model results

Hypothesis	Relationship	Indirect effect (β)	S. error	t-statistic	P values	Confidence interval (BC)		Decision
						LL	UL	
H1	MSM → MEI	0.776	0.039	19.790	0.000	0.685	0.841	Supported**
H1.a	AT → MEI	0.377	0.042	9.049	0.000	0.292	0.447	Supported**
H1.b	INT → MEI	0.069	0.035	1.737	0.048	0.010	0.127	Supported*
H1.c	INFN → MEI	0.383	0.045	8.598	0.000	0.298	0.460	Supported**
H1.d	ID → MEI	0.075	0.034	2.221	0.026	0.007	0.126	Supported*
H1.e	PI → MEI	0.134	0.035	3.795	0.000	0.048	0.182	Supported**

\* less than or equal 0.05

\*\* less than or equal 0.01



As can be observed in Table 4, the path coefficients of MSM were found to have a significant impact on MEI; the result indicated that ( $MSM \rightarrow MEI$ ,  $\beta = 0.776$ ;  $t$ -value of 19.790). In addition, the first sub-hypothesis results showed that this impact was found statistically significant at  $p < 0.01$ . Consequently, the results showed that the relationship between INT and MEI was found statistically significant at  $p < 0.05$ . Thereby, the bootstrap results of the H1.c for this study, indicated that the direct effect ( $INFN \rightarrow MEI$ ,  $\beta = 0.383$ ,  $t$ -value of 8.598) was significant at  $p < 0.01$ . The results also confirmed that there was a direct effect of H1.d on MEI at a 5% confidence interval (LL = 0.007, UL = 0.126), that does not straddle a 0 in between, which indicated support for these hypothesis. In addition, the results showed that the impact of PI on MEI was found statistically significant at  $p > 0.01$  which means H1.e was supported.

## 6 Discussion

The consequence of the statistical analysis showed that there is an effect of SMM on the MI, and this result is attributed to the importance of SMM in expanding the geographical range of companies' services and products,, and social media allows for two-way communication, social media is also one of the most successful and wonderful tools to influence customers and increase their attraction and engagement efficiently, which enhances its image. The result agrees with the study of Al-Shorbaji (2022), which indicated that there is a positive effect of SMM on the customer experience. Hawari and Saleh study (2015) indicated the existence of a role for social networks in improving MI. And the study of Savitri et al. (2022) showed that there is a significant relation between SMM and brand image. The results found also that there is a statistically insignificant effect of attraction on the MI, and the fact of this result is due to the SM has received great attention from huge numbers of people as a result of its reliance on images and videos that are a factor of attraction to customers. The results also showed that there is an effect of the novelty on the mental image, and this result is attributed to the fact that customers or followers on social media always want to keep up with the latest trends and developments, so we find them interested and following electronic stores that constantly update their content, which contributes to strengthening their affiliation and loyalty to them and thus building an image they have of positivity. As for the effect of detailing the information on the mental image, this result is attributed to the fact that customers always want to deal with electronic stores that provide detailed and clear information, which makes it easier for them to deal with them and get the information they care about with ease, which contributes to building a positive image for them. Finally, the study's results showed an effect of perceived importance on the mental image, and this result is attributed to the fact that customers are considered the most important element in the marketing process, and when they realize the importance of SMM, this will be greatly reflected in their willingness to deal with electronic stores.

## 7 Recommendations

According to the results reached, the study shows that some recommendations will improve the mental image of electronic stores and activate marketing via SM to enhance the organizational reputation and improve the mental image by benefiting from the experiences and viewpoints of customers of other stores to raise the level of services provided by electronic stores and their interest in improving the level of quality of products given to enhance customer confidence in the store and thus enhance interaction between the store and the customer. In addition to the interest of electronic stores in displaying information about the brands they provide and clarifying everything necessary about them.

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# The Impact of Digital Marketing Tools on Customer Loyalty of Jordanian Islamic Banks



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**Abstract** This study examine the impact of digital marketing tools (DMT) on the customer loyalty (CL) of Jordanian Islamic banks. (Google) forms was used by the researchers to distribute a sample of (370) customers of Jordanian Islamic banks. The quantitative approach was used in this study and partial least squares structural equation modeling (PLS-SEM) was used to test hypotheses. The study found an impact of digital marketing (DM) on customer loyalty in Jordanian Islamic banks. In the light of study result, the study recommends to strengthening the social media in Jordanian Islamic banks with interactive and instant chat tools to promote their products and services and communicate with their customers.

**Keywords** Digital marketing · Customer loyalty · Islamic banks · Jordan

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# 1 Introduction

Customer loyalty has become the most important idea for organizations, especially in the banking sector, and banks in order to maintain customers, establish strong relationships with them to meet what they need and desires to gain their satisfaction and encourage them to buy back their products despite the influences and marketing efforts of competitors (Al-Abbadi et al. 2022; Al-Alwan et al. 2022a; Al-Hawary and Alhajri 2020; Al-Khawaldah et al. 2022; Alolayyan et al. 2018; Eldahamsheh et al. 2021; Khalayleh and Al-Hawary 2022; Mohammad 2019).

In light of the tremendous improvement in the world and the world of technology and the huge revolution of information that dominated the business sectors in the entire world, and due to the strong competition, banks have turned to digital marketing, through which they were able to reach global markets, and to identify new markets that are difficult to find through trade and because marketing through the Internet makes services and products available to the biggest possible number of customers, it also contributes to the importance of modern and new products, which increases the diversity of the products offered (AlBrakat et al. 2023a, 2023b; Al-Rwaidan et al. 2023; Alshura et al. 2023; Attiany et al. 2023; Dwijendra et al. 2023; Zahran et al. 2023). Banks (Al-Alwan et al. 2022b), including Jordanian Islamic banks, seek to keep pace with developments in modern technologies in their various fields of work, and seize all available opportunities in order to increase their market share and achieve a competitive advantage, the Jordanian Islamic Bank is one of the Jordanian banks that use digital marketing tools the most. Therefore, this thesis came a try to identify the impact of DMT on CL of Jordanian Islamic banks (Al-Hawary and Al-Smeran 2017).

## 2 Theoretical Background and Hypotheses

### 2.1 *Digital Marketing*

The Internet is one of the most important buying and selling platforms nowadays, and it becomes at this time a modern way for companies to market the business more widely; due to its access to a large number of users, this promotion process has taken many names such as digital or electronic marketing, social media marketing, multimedia marketing and online marketing (Alhalalmeh et al. 2022; Al-Hawary and Obiadat 2021; Al-Hawary 2013a, 2013b; Al-Hawary and Abu-Laimon 2013; Al-Zyadat et al. 2022). The development that has taken place in the use of technology in business has also led to the existence of new mechanisms that support the interactive process that takes place between different business organizations and their current and potential customers (Aityassine et al. 2022; Al-Awamleh et al. 2022; Al-Hawary and Harahsheh 2014; AlTaweel and Al-Hawary 2021).



DM as an activity communication using online ways in various forms, and includes many online technologies (Alhalalmeh et al. 2020; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Metabis and Al-Hawary 2013; Mukhlis et al. 2022). Digital marketing is defined as the process of applying a large range of information technology, like reshaping marketing strategies as a start; In order to maximize the gains and benefits that customers can obtain in effective retail trade in the markets, in addition to the use of targeting strategies and detection of new opportunities in the market, and to increase the efficiency of planning with the aim of implementing ideas, distribution and promotion, pricing of goods, and finally, to create more specific trade exchanges To achieve the greatest amount of consumer needs and company goals at the same time (Al-Hawary and Aldaihani 2016; Harahap et al. 2022; Mohammad 2020, 2019; Mohammad et al. 2022). Digital marketing is also defined as “the use of digital methods to conduct commercial exchange between interested parties instead of direct contact” (Mohammad et al. 2023, 2020).

Digital marketing is also defined as: “a method of trading due to the general need between companies, merchants and clients, to reduce costs and grow the efficiency of goods as quickly as possible (Aldaihani et al. 2023), DM is “the ability of users to use the Internet in the best way to achieve all marketing goals within new advantages and new capabilities.. In light of the above definitions of digital marketing, it becomes clear to the researcher that it is the use of the best technical methods with the aim of studying the desires and needs of consumers and finding the appropriate way to know how to provide these needs for them using many means, including the Internet or any similar means of communication. (Al-Adamat et al. 2023; AlHamad et al. 2022). In this study, we will address the most famous of these tools, which are social media and postal services E-marketing via the website and marketing via mobile applications.

**SM:** is a popular electronic marketing tools, which is represented in a group of electronic pages and applications available on the Internet, and a large number of people use it, and contributes to the expansion of sales. **E-mail Services:** It's considered a kind of the oldest technological tools which were used in e-marketing operations, by sending e-mail messages through mail addresses supported by companies and web pages such as Yahoo, Hotmail and Gmail, targeting a specific category of customers. **Website Marketing:** Successful digital marketing requires the creation of an effective website (Al-Adamat et al. 2023). Websites provide options to reach various consumers quickly and affordably, and content marketing has become one of the most important techniques for banks looking to maximize profits through product, service and marketing advertising in crowded and competitive markets [1064]. **Mobile App Marketing:** There is widespread agreement that adoption and use of mobile apps improves customer engagement and retention (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Shaqrah et al. 2023), creating cost-effective opportunities for businesses to achieve specific marketing objectives such as persuasion (Al-Hawary et al. 2020; Kurdi et al. 2023; Rahamneh et al. 2023; Ramayah et al. 2016).

## 2.2 Customer Loyalty

Mohammad (2020) defines loyalty as “an unwavering commitment to rebuild and re-sponsor a preferred product or service in the future despite situational influences, and marketing efforts that have the potential to effect behavior change.” According to Khan and Islam (2017), customer loyalty can be defined Such as the consumer’s desire to buy back the same product again. Rauyruen and Miller (2007) defined customer loyalty is one of the causes of logical factors or emotional factors, and logical factors can be product characteristics and consumer sentiments, though rationality plays a more important role in CI. A CL is the behavior showing the willingness to buy back from a market, in addition to continue the relationship with the market in the future. CL is a factor that is considered for every company (Alolayyan et al. 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021; Cheng et al. 2018; Khalayleh and Al-Hawary 2022). The dimensions of loyalty in the current study were as follows:

**Behavioral Loyalty (BL):** Behavioral dimension focused on repeated and regular purchasing behavior, so that the customer is considered loyal if he repeats his purchasing behavior three consecutive times towards the same product. producer (Aldaihani et al. 2023; Mohammad et al. 2023; Muda et al. 2022). **Situational Loyalty (SL):** It is the amount of psychological attraction of the customer towards the organization and the degree of its support and defense and the brand in front of the public, especially the competing audience, which is the percentage of positive emotions that the customer feels towards the brand (Al-Abbadi et al. 2022). **Compound Loyalty:** It is the loyalty that combines behavior and attitude, where loyalty is no longer limited to a behavioral dimension only or after my attitude only, but rather it has become embodied in repeated purchasing behavior accompanied by a psychological dimension (Al-Adamat et al. 2023).

## 2.3 Digital Marketing Tools on Loyal Customers

Dilham et al. (2018) said that indicators in Internet marketing show that brand awareness has had an impact with customer relationship. Internet marketing indicators also significantly affect customer loyalty, as it was found by Laksamana (2018) that social media marketing directly leads to purchase intent and brand loyalty. After that, brand loyalty is affected by purchase intent. Al-Hawari and Obeidat (2021) concluded that there is an impact of mobile marketing on CL, and that there is a non-significant effect of location on customer loyalty. And in the study of Khalayleh and Al-Hawary (2022) concluded that “all dimensions of the marketing mix of digital content had a positive impact on the MP of five-star hotels in Jordan.” Al-Hawary and Al-Fassed (2022) concluded that the dimensions of marketing via SM affect BL. According to literature review, the hypotheses of the study were formulated as:

**H1: There is n impact of digital marketing tools (DMT) on customer loyalty (CL) in Jordanian Islamic banks.**

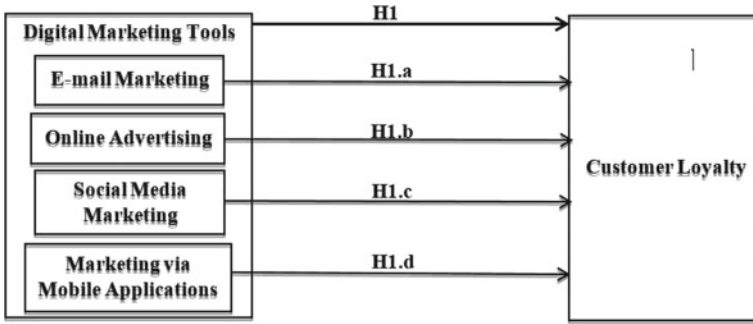


Fig. 1 Proposed model

### 3 Study Model

See Fig. 1.

## 4 Methodology

### 4.1 Sample and Data Collection

The population was the customers of Jordanian Islamic banks, where an electronic questionnaire was designed and published on social media platforms for them, e.g., Facebook and WhatsApp. Accordingly, a final sample consisting of (370) valid responses for analysis, whereby they had obtained appropriate indicators after preliminary tests were conducted on it.

### 4.2 Measurement

The questionnaire contained 29 items formed the measurement model to test the impact of digital marketing tools on customer interactions, which was borrowed from relevant literature. Digital marketing tools (DMT) formed the first part of the questionnaire with 16 items that were taken from the study of Al-Hawary and Al-Fassed (2022). Items for digital marketing tools deployed on 4 dimensions as follows: 4 items for e-mail (EM), 4 items for marketing via mobile applications (MMA), 4 items for social media marketing (SMM), and four items for online advertising (OA). On the other hand, the second section included 13 items for measuring customer loyalty (CL), which correspond to Al-Hawary and Obiadat (2021).

## 5 Results

The results of the current study included two main headings. The first is dedicated to the pre-tests applied to the measurement model and aimed at determining the achievement degree of validity and reliability (Hair et al. 2021, 2010). The second includes the results of evaluating the structural model and parameter values to test the hypotheses of the impact of DMT on CL through the PLS-SEM approach recommended by Hair et al. (2017).

### 5.1 Measurement Model Analysis

The constructs of the measurement model were ascertained by indicators of validity and reliability (Akour et al. 2023; Hair et al. 2011). To retain items within the measurement model, loading values must exceed 0.60 (Al-Hawary et al. 2023; Hair et al. 2017; Majdy Amiruddin et al. 2023; Pallathadka et al. 2023; Tan et al. 2017). Composite reliability (CR) was used to evaluate the reliability of the combinations with a minimum score of 0.70 (Hair et al. 2021). Convergent validity is applied to determine whether a given item expects a latent variable other than the one to which it belongs (Tan et al. 2017; Urbach and Ahlemann 2010). On the other hand, it evaluates the measure of change achieved by the constructs as a result of the variance of the determinant related to the estimation error (AlHamad et al. 2022; Al-Hawary et al. 2023; Al-Khawaldah et al. 2022; Fornell and Larcker 1981; Tan et al. 2017). Table 1 lists the results.

Table 1 results show that the items (MMA4, SMM1 and CL3) were cancelled from the measurement model as a result their loadings values did not meet the required condition, whilst the rest items were retained as their loadings exceed 0.60, which is the minimum required limit. The composite reliability values were within the range of (0.871–0.943), which means that they were higher than 0.70 and confirm the reliability of the current study's measurement model (Hair et al. 2017). On the other hand, the results showed that the values of AVE ranged from 0.583 to 0.792. This result indicates support for instrument convergent validity as a result of its superiority over the lower threshold of 0.50 (AlBrakat et al. 2023b; Hair et al. 2017). The researchers also implemented a discriminant validity analysis based on comparing the square root of the AVE value for each variable with the correlation coefficients between others. The comparison results confirmed that the values of AVE were greater than the maximum shared variance (MSV) (AlHamad et al. 2022; Hair et al. 2021).

**Table 1** Results of reflective measurements model—a summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	(AVE)	(CR)	(CA)
		> 0.60	> 0.50	> 0.50	0.70–0.90	0.60–0.90
<i>Digital marketing tools (DMT)</i>						
E-mail marketing (EM)	EM1	0.718	0.853	0.629	0.871	0.805
	EM2	0.752				
	EM3	0.867				
	EM4	0.884				
Marketing via mobile applications (MMA)	MMA1	0.884	0.846	0.755	0.902	0.838
	MMA2	0.828				
	MMA3	0.894				
Online advertising (OA)	OA1	0.902	0.913	0.792	0.938	0.912
	OA2	0.895				
	OA3	0.879				
	OA4	0.883				
Social media marketing (SMM)	SMM2	0.929	0.868	0.789	0.918	0.865
	SMM3	0.854				
	SMM4	0.879				
Customer loyalty (CL)	CL1	0.698	0.940	0.583	0.943	0.935
	CL2	0.685				
	CL4	0.818				
	CL5	0.796				
	CL6	0.780				
	CL7	0.804				
	CL8	0.798				
	CL9	0.706				
	CL10	0.674				
	CL11	0.819				
	CL12	0.787				
	CL13	0.685				

### 5.2 Structural Model Analysis

The structural model of the studies consists of latent constructs, i.e., variables, and the paths that link them, which indicate the size of the effect between those constructs (Guo et al. 2017; Hair et al. 2017). Figure 2 reveals the standard estimation of the structural model of the study. It presents the effect of DMT on CL, along with an explanation of the impact of each dimension of DMT on CL within the limits of path

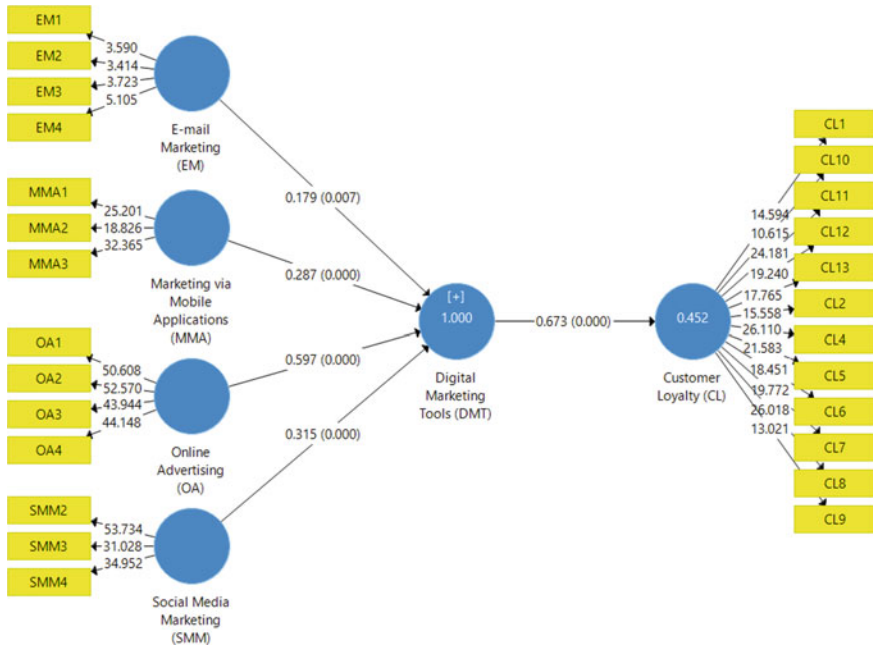


Fig. 2 Structural model results

coefficient values ranging from  $-1$  to  $+1$  in order to express the relationship depth between any two constructs (Al-Husban et al. 2023; Hair et al. 2017).

Ramayah et al. (2016) established the crucial values for significance in 2-tailed tests as follows:  $p$  10% (1.64),  $p$  5% (1.96), and  $p$  1 (2.58). Similarly, marketing researchers used the  $p$  5% significant threshold. According to Hair et al. (2017), bias-corrected bootstrap confidence intervals (lower limit, upper limit) may be utilized to determine if a route coefficient is statistically different from zero. If the confidence interval for a calculated route coefficient does not contain zero, it indicates that this path has a substantial influence (Hair et al. 2017). The structural model outcomes for this study are shown in Table 2.

As can be observed in Table 2, the path coefficients of DMT have a significant impact on CL; the result indicated that (DMT  $\rightarrow$  CL,  $\beta = 0.673$ ;  $t$ -value of 7.425), which H1 was supported. In addition, the first sub-hypothesis results showed a statistically significant at  $p < 0.05$ , which indicated support for H1.a. Consequently, the results showed an impact of MMA on CL at  $p < 0.01$  which means H1.b was supported also. Thereby, the bootstrap results of the H1.c for this study, indicated that the direct effect (OA  $\rightarrow$  CL,  $\beta = 0.402$ ,  $t$ -value of 8.109) was significant at  $p < 0.01$ . The results also confirmed that there was a direct effect of H1.d on CL at a 5% confidence interval (LL = 0.166, UL = 0.255), that does not straddle a 0 in between, which indicated support for these hypothesis.

**Table 2** Structural model results

Hypothesis	Relationship	Indirect effect ( $\beta$ )	S. Error	t	P	Confidence Interval (BC)		Decision
						LL	UL	
H1	DMT $\rightarrow$ CL	0.673	0.039	7.425	0.000	0.568	0.731	Supported**
H1.a	EM $\rightarrow$ CL	0.120	0.047	2.543	0.011	0.024	0.209	Supported*
H1.b	MMA $\rightarrow$ CL	0.193	0.022	8.814	0.000	0.150	0.231	Supported**
H1.c	OA $\rightarrow$ CL	0.402	0.050	8.109	0.000	0.325	0.518	Supported**
H1.d	SMM $\rightarrow$ CL	0.212	0.024	8.808	0.000	0.166	0.255	Supported**

## 6 Discussion

Customers of Jordanian Islamic banks have shown that the more they rely on digital marketing tools, the more customer loyalty will increase. Therefore, Islamic banks should enhance their marketing capabilities and efficiency through the four digital marketing tools mentioned above, if they seek to gain more CL. The researchers attributes this result to the fact that the interests and preferences of customers are concentrated in providing an easier and faster service, and when the offers and interaction of Jordanian Islamic banks are through electronic tools that are in the hands of the customer permanently and anywhere, this saves the customer a lot of time and effort, which agreed with previous studies. This result also indicates that the better the Jordanian Islamic banks improve their marketing and promotion of their services, products and offers through social networking sites, the more loyal their customers will be. The researcher may explain the result to the fact that social networking pages are available to the majority of bank customers, and they are the easiest to deliver data and information related to marketing and promotion in banks. Many papers have agreed the impact that social networking sites on customer loyalty as a study (Laksamana 2018).

The researcher sees that this result is connected to customers are always looking for a service request that saves them time and effort, and the fact that mobile phone applications are always available on their cell phones, and that they are characterized by ease of use and the presence of instructions and guides for how to use them, which will be a factor of attraction for them towards them, and thus will contribute that is in continuing to deal with the bank, recommending it to others, and defending its services. Finally, the study results showed that there's an impact of e-mail that is not statistically significant on CL, and is not positively or negatively related to it. The researcher concluded the result to e-mail service, although it is one of the technological services used by many institutions in promoting their services, however, the nature of some customers that Islamic banks deal with are those who prefer to use mobile applications and social media, and the e-mail marketing process is determined by specific people who have common preferences, and this may benefit institutions that offer physical products rather than banking and financial products.

## 7 Recommendations

The researcher have recommended that Jordanian Islamic banks should enhance marketing via the website by making sure that their website contains a feature that helps customers search for available services. Supporting social media in Jordanian Islamic banks with interactive and instant chat tools to promote their products and services and communicate with their customers. In addition to enhancing the updating of the Jordanian Islamic Banks pages on social media on a regular basis. Work to improve the attractiveness of advertisements and promotions of Jordanian Islamic banks on websites.

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# Impact of Social Customer Relationship Management on Sustainable Competitive Advantage of Commercial Banks in Jordan



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**Abstract** The study aimed to test the impact of social customer relationship management on achieving sustainable competitive advantage. The research population is all customers of Jordanian commercial banks. A Convenience sample was taken. SPSS and AMOS software was used to test hypotheses. The results showed an impact of social customer relationship management on sustainable competitive advantage of the commercial banks in Jordan. The researcher suggested that a unit be established to handle complaints in order to speed up service related to services, identify problems and diagnose them, identify areas of weakness in the bank's operations.

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**Keywords** Social customer relationship management · Sustainable competitive advantage · Commercial banks · Jordan

## 1 Introduction

The economic environment in the third millennium witnessed an essential and fundamental change in many economic and marketing concepts, which pose great challenges including openness to markets, similarity of services provided to customers, and changing customer behavior in light of technological development (Aityassine et al. 2022; Al-Alwan et al. 2022a, 2022b). It is noticeable that electronic means of communication have provided an additional opportunity to offer alternatives by building a base of information about customers and continuous interaction and communication with them as this enables us to identify their interests, desires and needs, and respond to them (Alhalalmeh et al. 2022; Al-Hawary 2013a, 2013b; Alkhlifat et al. 2023; Alqahtani et al. 2023; Dwijendra et al. 2023; Porter 1993; Shared, 2016). CRM is one of the methods employed by businesses, since it is based on the integration of sales, marketing, and customer services in order to create value for both the company and its customers (AlBrakat et al. 2023a, 2023b; Attiany et al. 2023; Tariq et al. 2022). A method that has been established with the goal of precisely detecting consumer data as well as their demands and so building productive interactions with them (Al-Abbadi et al. 2022; Eldahamsheh et al. 2021; Khalayleh and Al-Hawary 2022; Mohammad et al. 2020; Mohammad 2019; Reinartz et al. 2004). Organizations are working hard to establish a communication relationship customers in order to identify the personal data on which basis they desire the product to be manufactured, as continuous production no longer achieves the satisfaction and desires of customers (Aityassine et al. 2022; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-Khawaldah et al. 2022; AlTaweel and Al-Hawary 2021). The rise of social media has had a significant impact on businesses all over the world, prompting them to want to improve their usage of social media in order to gain new clients (Alhalalmeh et al. 2022; Al-Hawary 2013a, 2013b; Al-Hawary and Obiadat 2021). Because these social tools assist the company in determining the social behavior of web users, social media is crucial to the effective deployment of (SCRM). On the other hand, the adoption of (SCRM) necessitates enough assistance in the form of appropriate technology and systems (Alhalalmeh et al. 2022; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Al-Shormana et al. 2021; Metabis and Al-Hawary 2013).

Organizations obtain a competitive advantage by gaining a competitive position that allows them to meet the requirements and wishes of their customers at a higher value than competitors offer in the same industry with enhanced customer awareness (Al-Hawary et al. 2020; Al-Hawary and Al-Syasneh 2020; Al-khawaldah et al. 2022; Al-Nawafah et al. 2022; Alshawabkeh et al. 2022). These networks provide constant contact between them by developing relationships and allowing them to express their thoughts and recommendations in the changes that may occur to the

product (Aldaihani et al. 2023a, 2023b; Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2023, 2022). In addition, social networks can be used to link company with customers through using technologies to facilitate interaction (Al-Adamat et al. 2023a; Al-Alwan et al. 2022b; AlHamad et al. 2022; Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016; Alkhalwaldeh et al. 2023). Therefore, this research sought to determine the impact of SCRM on achieving sustainable competitive advantage.

## 2 Theoretical Framework and Hypothesis Building

### 2.1 Social Customer Relationship Management (S-CRM)

Researchers, scholars, and specialists in marketing and information technology are interested CRM concept. However, researchers cannot agree on a single definition of customer relationship management. According to Paulisse et al. (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Alolayyan et al. 2022; Al-Zyadat et al. 2022; Paulisse et al. 2007), it is a business concept that enables an organization to be aware of behavior of customers, and analyze their desires, using information kept in databases. CRM is defined as a technology-based process that tries to precisely detect customer data and demands, resulting in positive interactions. According to Kotlar and Armstrong (2018), Wongsansukcharoen et al. (2013), Yerpude and Singhal (2018), it is one of the tactics that firms employ to develop value for themselves and their customers by integrating sales, marketing, and customer service. This study assessed SCRM along the following dimensions:

**Customer Value:** As customers employ a very important position within the organization's interest and priorities, the organizations' survival and success at the present time depends on how these organizations increase customer while striving hard to satisfy customers gives a strong reason for distinction and superiority over competitors (Shdaifat 2019). **Long-Term Partnership:** Building a long-term relationship with customers is considered an important steps that organization takes, bonding between the organization and the customer (Reinartz et al. 2004). **Knowing the Customer:** Knowledge about the customer that companies seek to obtain is one of the most important competitive advantages that organizations pursue, through which they aim to achieve standards of their services that suit their customers' needs, desires, and preferences to gain their satisfaction and loyalty (Kim et al. 2003). **Dependence on Technology:** Communication with customers has become increasingly dependent on technology as number of customers increased, information systems and modern information. **Trust:** The concept of trust in general, and between the organization and customers through efficiency is an important factor in providing service and caring for the interests of the company and customers alike. **Social Communication:** Social media enabled customers to communicate, build relationships with each

other, exchange ideas, share content, and then exchange experiences about the products and services provided by the organization (Aityassine et al. 2022; Al-Awamleh et al. 2022; Shared 2016).

## 2.2 *Sustainable Competitive Advantage*

The competition between business organizations to seize the market and retain customer is a real challenge for them, as it imposes a new reality that must be dealt with and adapted to Alshura et al. (2023b), Al-Zyadat et al. (2022), Attiany et al. (2023), Eskafi et al. (2013). Thus, the organization's possession of the competitive advantage represents an essential part of the management's philosophy and its future directions. Kurdi et al. (2023) was the first to refer to the competitive advantage and define it as "an expression of the organization's endeavor to create or possess unique features in order to achieve distinction from other organizations operating in the same industry. Khalayleh & Al-Hawary (2022) defined it as the various characteristics or qualities that characterize the product, or the mark that gives the organization some superiority and transcendence over its competitors. Researchers (Al-Awamleh et al. 2022) agreed on six dimensions of competitive advantage, namely (quality of service, creativity, cost, customer response, organization efficiency, and flexibility).

**Quality:** Quality can be seen as specifications, features, and characteristics of commodities that meet customers desires, as they differ according to the type of commodity, the method of using it, and even how to benefit from it (Porter 1993)..

**Cost:** The study of Alolayyan et al. (2022) indicates that an organization that adopts a diversification strategy for its products can meet the needs and aspirations of many segments in the market, which results in an increase in level of customer satisfaction with those products, and thus achieves sales. This means lower production costs, and hence price distinction (Eldahamsheh et al. 2021).

## 2.3 *Customer Relationship Management and Competitive Advantages*

Bricci et al. (2016) discovered the major impact of trust, commitment, on customer loyalty. Galib's (2013) study indicated that customers utilize social networks to enjoy current technology and the benefits it provides, such as ease of access and usage, as well as the perceived hazards that play a negative role in using customers to manage social customer interactions. According to Lam et al. (2013), managing customer connections using information technology has an effect on the quality of customer relationships, which in turn has a good effect on loyalty. The study hypothesis can be as follows, based on the above literature:

**H1: There is an impact of SCRM on competitive advantage**



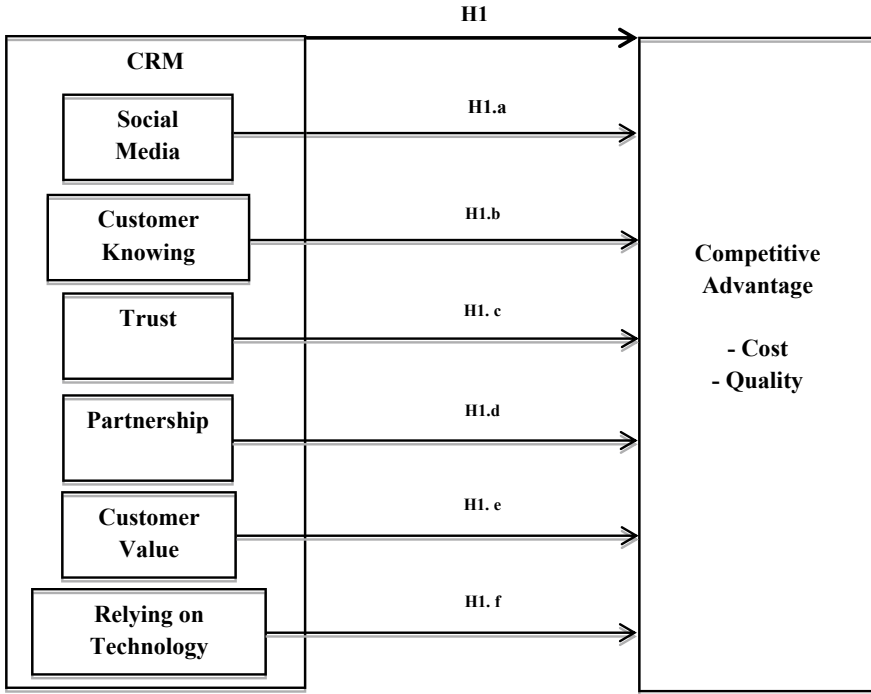


Fig. 1 Study model

### 3 Study Model

See Fig. 1.

### 4 Methodology

#### 4.1 Population and Sample

The target population was the customers of commercial banks in Jordan, where an electronic questionnaire was designed and published on social media platforms for them, e.g., Facebook and WhatsApp. Accordingly, a final sample consisting of (392) valid responses for analysis, whereby they had obtained appropriate indicators after preliminary tests were conducted on it. To test the study hypotheses. (PLS-SEM) was applied via the software SMART-PLS.

## 4.2 Measurement

In general, the questionnaire contained 35 items formed the measurement model to test the impact of SCRM on sustainable competitive advantage, which was borrowed from relevant literature. social customer relationship management (CRM) formed the first part of the questionnaire with 25 items that were taken from the study of Al-Hawary and Aldaihani (2016). Items for social customer relationship management deployed on six dimensions as follows: 4 statements for social media (SM), 4 statements for customer knowing (CK), four items for trust (T), five items for partnership with the customer (P), 4 statements for customer value (CV), and 4 statements for relying on technology (RT). On the other hand, the second section included 10 items for measuring sustainable competitive advantage, which correspond to Al-Hawary and Aldaihani (2016). Items of sustainable competitive advantage divided into two dimensions: cost (C) and quality (Q) with five items for each.

## 5 Results

### 5.1 Measurement Model Analysis

The constructs of the measurement model were ascertained by indicators of validity and reliability (Akour et al. 2023). To retain items within the measurement model, loading values must exceed 0.60 (Muda et al. 2022). Composite reliability (CR) was used to evaluate the reliability of the combinations with a minimum score of 0.70 (Al-Hawary et al. 2023). Convergent validity is applied to determine whether a given item expects a latent variable other than the one to which it belongs (Majdy et al. 2023). On the other hand, it evaluates the measure of change achieved by the constructs as a result of the variance of the determinant related to the estimation error (Pallathadka et al. 2023). The convergent validity of this measurement model was assessed by the average variance extracted (AVE) with a minimum threshold of 0.50 [2, 29, 73]. Table 1 lists the results of convergent validity and reliability for evaluating a measurement model for examining the impact of SCRM on SCA.

Table 1 results show that the items (SM4, RT3, RT4, C5 and Q5) were cancelled from the measurement model as a result their loadings values did not meet the required condition, whilst the rest items were retained as their loadings exceed 0.60, which is the minimum required limit. The composite reliability values were within the range of (0.893–0.938), which means that they were higher than 0.70 and confirm the reliability of the current study's measurement model (AlBrakat et al. 2023b; Mukhlis et al. 2022). On the other hand, the results showed that the values of AVE ranged from 0.676 to 0.833. This result indicates support for instrument convergent validity as a result of its superiority over the lower threshold of 0.50 (Al-Khasswneh et al. 2023; Alshuqairat et al. 2023; Boudlaie et al. 2022). The researchers also implemented a discriminant validity analysis based on comparing the square root of the AVE value

**Table 1** Reflective Measurements Model – A Summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	AVE	Composite reliability (CR)	Cronbach's alpha (CA)
		> 0.60	> 0.50	> 0.50	0.70–0.90	0.60–0.90
<i>(CRM)</i>						
(SM)	SM1	0.838	0.841	0.759	0.904	0.841
	SM2	0.899				
	SM3	0.876				
(CK)	CK1	0.863	0.899	0.768	0.930	0.899
	CK2	0.890				
	CK3	0.889				
	CK4	0.861				
(T)	T1	0.905	0.912	0.792	0.938	0.912
	T2	0.891				
	T3	0.878				
	T4	0.884				
(P)	P1	0.821	0.908	0.722	0.928	0.904
	P2	0.805				
	P3	0.874				
	P4	0.870				
	P5	0.876				
(CV)	CV1	0.864	0.840	0.676	0.893	0.839
	CV2	0.853				
	CV3	0.829				
	CV4	0.737				
(RT)	RT1	0.950	0.923	0.833	0.909	0.808
	RT2	0.874				
<i>(CA)</i>						
(C)	C1	0.897	0.866	0.720	0.911	0.867
	C2	0.892				
	C3	0.865				
	C4	0.728				
(Q)	Q1	0.919	0.901	0.762	0.927	0.895
	Q2	0.897				
	Q3	0.882				
	Q4	0.789				

for each variable with the correlation coefficients between others (AlBrakat et al. 2023b; Al-Khasswneh et al. 2023). Table 2 indicates the results of evaluating the discriminant validity of the measurement model according to the Fornell-Larcker criterion.

Table 2 demonstrated that the values of the square root of AVE were greater than 0.70, and they exceeded all correlation coefficients between the rest of the variables. This result fulfills the Fornell-Larcker criteria. Indeed, evaluating the discriminant validity of the measurement model using the PLS-SEM approach in addition to the previous technique entails extracting a matrix Heterotrait-Monotrait Ratio (HTMT). Kline mentioned that the values of HTMT must be lower than the required threshold value 0.85. Nevertheless, the confidence interval for the HTMT analysis must not take a count value of 1 on any of the constructs (Alshura et al. 2023a, 2023b). The results of HTMT analysis were shown in Table 3.

Table 3 shows that values of HTMT for all measurement model constructs were between 0.109 and 0.846, therefore, they were less than the threshold value of 0.85 (Al-Hawajreh et al. 2023; Al-Husban et al. 2023), which necessitates considering

**Table 2** Fornell-Larcker criterion

Construct	SM	CK	T	P	CV	RT	C	Q
Social media	<b>0.871</b>							
Customer knowing	0.239	<b>0.876</b>						
Trust	0.163	0.675	<b>0.890</b>					
Partnership	0.245	0.691	0.622	<b>0.850</b>				
Customer value	0.223	0.689	0.699	0.659	<b>0.822</b>			
Relying on technology	0.529	0.065	-0.083	0.100	0.054	<b>0.913</b>		
Cost	0.159	0.116	0.171	0.111	0.117	-0.032	<b>0.848</b>	
Quality	0.126	0.226	0.258	0.156	0.334	0.083	0.078	<b>0.873</b>

Bold values represents less than or equal 0.01

**Table 3** HTMT criterion

Construct	SM	CK	T	P	CV	RT	C	Q
Social Media								
Customer Knowing	0.275							
Trust	0.186	0.743						
Partnership	0.281	0.762	0.679					
Customer Value	0.270	0.773	0.789	0.741				
Relying on Technology	0.661	0.105	0.103	0.110	0.101			
Cost	0.187	0.166	0.189	0.166	0.192	0.074		
Quality	0.145	0.253	0.287	0.182	0.389	0.120	0.109	

the measurement model to have appropriate discriminate validity (Al-Armeti et al. 2023; Al-Quran et al. 2023).

### 5.2 Structural Model

The structural model of the studies consists of latent constructs, i.e., variables, and the paths that link them, which indicate the size of the effect between those constructs (Al-hawajreh et al. 2023). Figure 2 reveals the standard estimation of the structural model of the study. It presents the impact of SCRМ on SCA, along with an explanation of the impact of each dimension of SCRМ on SCA within the limits of path coefficient values ranging from  $-1$  to  $+1$  in order to express the relationship depth between any two constructs.

Ramayah et al. (2016) established the crucial values for significance in 2-tailed tests as follows:  $p$  10% (1.64),  $p$  5% (1.96), and  $p$  1 (2.58). Similarly, marketing researchers used the  $p$  5% significant threshold. Bias-corrected bootstrap confidence intervals (lower limit, upper limit) may be utilized to determine if a route coefficient is statistically different from zero. If the confidence interval for a calculated route coefficient does not contain zero, it indicates that this path has a substantial influence. SEM outcomes for this study are shown in Table 4.

The path coefficients of CRM were found to have an impact on CA; the result indicated that (CRM  $\rightarrow$  CA,  $\beta = 0.316$ ;  $t$ -value of 2.961), which H1 was supported. In addition, the first sub-hypothesis results showed that this impact was found statistically significant at  $p < 0.05$ , which indicated support for H1. a. Consequently, the results showed that the impact of CK on CA was found statistically significant at  $p$

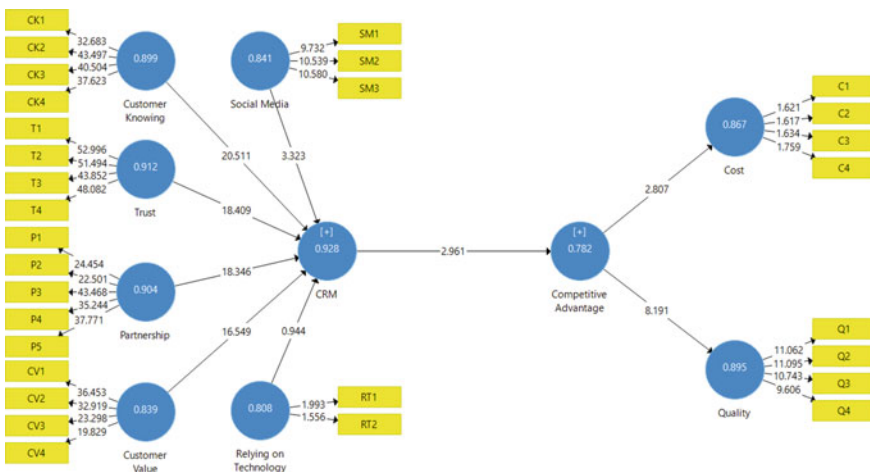


Fig. 2 Structural model results

**Table 4** Structural model results

Hypothesis	Relationship	Indirect effect ( $\beta$ )	S. Error	t-Statistic	P Values	Confidence interval (BC)		Decision
						LL	UL	
H1	CRM $\rightarrow$ CA	0.316	0.107	2.961	0.003	0.068	0.495	Supported*
H1.a	SM $\rightarrow$ CA	0.027	0.013	2.125	0.034	0.006	0.058	Supported*
H1.b	CK $\rightarrow$ CA	0.087	0.029	3.006	0.003	0.023	0.137	Supported*
H1.c	T $\rightarrow$ CA	0.090	0.031	2.918	0.004	0.023	0.146	Supported*
H1.d	P $\rightarrow$ CA	0.100	0.032	3.128	0.002	0.026	0.153	Supported*
H1.e	CV $\rightarrow$ CA	0.078	0.027	2.836	0.005	0.018	0.127	Supported*
H1.f	RT $\rightarrow$ CA	0.006	0.007	0.850	0.396	-0.005	0.023	Not Supported

Note: Significance level at \*  $p < 0.05$  (two-tailed). LL, lower limit at 5%; UL, upper limit at 95% confidence interval; BC, bias corrected

$< 0.05$  which means H1. b was supported also. Thereby, the bootstrap results of the H1. c for this study, indicated that the indirect effect (T  $\rightarrow$  CA,  $\beta = 0.090$ , t-value of 2.918) was significant at  $p < 0.05$ . The results also confirmed that there was a direct effect of H1. d and H1. e on CA at a 5% confidence interval (LL = 0.026, UL = 0.153; LL = 0.018, UL = 0.127) respectively, that does not straddle a 0 in between, which indicated support for these hypotheses. On another hand, in the last hypothesis H1. f of this study the result indicated that (RT  $\rightarrow$  CA,  $\beta = 0.316$ ; t-value of 2.961), which H1. f was not supported, to confirm that as well the confidence interval at the lower limit and upper limit (LL = -0.005, UL = 0.023) which means an estimated path coefficient included zero, this means an insignificant effect of this path.

## 6 Discussion

The study concluded that managing social customer interactions has an effect on competitive advantage in Jordanian commercial banks. According to the study's findings, commercial bank management has implemented social customer relationship management and is up to date on modern banking advances. It demonstrated its earnest effort to deliver all that is new to its consumers, create long-term relationships with them, resulting in a competitive advantage for the bank. Long-term customer partnerships are critical to maintaining the relationship and gaining a competitive edge. Designing a product based on the customer's requirements and aspirations boosts the customer's desire to do business with the bank and achieves what the bank seeks, which is a competitive advantage. The study also concluded that customer knowledge has an effect on gaining a competitive advantage. According to the researchers, this is due to the fact that recognizing the customer's needs and working to meet them has a positive impact on the customers' sense of their value. Trust

also has an impact on the competitive advantage of Jordanian commercial banks, owing to the recognition that the primary purpose is to develop confidence, satisfy customers, and meet their demands. This finding is consistent with Madhavi's study, which found a link between customer trust, market share sustainability, and customer loyalty. The study concluded that social communication has an effect on competitive advantage. This communication results in positive reinforcement and strengthens the bank's image in the minds of customers. It also agreed with Zaker's (2018) findings that social media allows for direct engagement with clients at relatively low prices and high levels of efficiency when compared to traditional communication tools.

## 7 Recommendations

The researchers advise management to create databases for customers and link them to the bank's systems in order to gather more awareness of their customers and understand their behavior to ease their private transactions and to increase the efficiency of commercial banks in responding quickly to the needs of their clients because it is critical to the customer's feeling of security. In addition to establishing policies and procedures within banks, such as holding specialized training courses for commercial bank employees, represented in training them on the art of sharing between banks and their customers, its importance, and the positive results it achieves on both parties to develop bank services and design services.

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# The Impact of Emotional Intelligence on Marketing Performance



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**Abstract** The study aims to know the Impact of Emotional Intelligence (EI) on Marketing Performance (MP). The population of this study consisted of customers in commercial banks in Jordan. A convenience method was conducted to get the study data to follow the comprehensive survey method. Structural equation modelling (SEM) was applied to check the hypotheses of this study. It was found that there is a statistically significant effect for the emotional intelligence on marketing performance in commercial banks in Jordan. According to the result of this study, the researcher recommends to all bank officials and decision makers in all commercial banks in Jordan to give great attention from bank administrations to deal seriously with customer suggestions and complaints.

**Keywords** Emotional intelligence · Marketing performance · Commercial banks · Jordan

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## 1 Introduction

In the presence of recent environmental, economic and technological developments, local and international organizations are showing interest in the intelligence of employees to adapt and conform to their requirements and needs. Several studies have shown the importance of intelligence in achieving the desired goal of professional competence (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019). Emotional intelligence is an effective part in the success of the individual in working life, and that the presence of emotional intelligence among employees increases the capabilities of the organization and makes it able to keep pace with changes and face challenges (Eldahamsheh et al. 2021; Mohammad et al. 2020, 2022; Pallathadka et al. 2023). Emotional intelligence meets marketing performance in many aspects, the most important of which is that both enhance the ability to keep pace with circumstances and adapt to them and lead the individual to find appropriate solutions to the problems facing the individual or the organization (AlBrakat et al. 2023; Aldaihani et al. 2023; Alhalalmeh et al. 2020; Al-Rwaidan et al. 2023; Attiany et al. 2023; Rahamneh et al. 2023; Zahran et al. 2023).

It can be said that marketing performance is the ability of the organization to use its material and human resources more efficiently and effectively to achieve its marketing objectives and compare it with the performance of competitors in the market in order to enhance its strengths and avoid weakness whatever for survival and continuity. All categories of organizations are looking for distinguished performance through modern trends and an emphasis on practices that lead to quality and maximize performance (Aityassine et al. 2022; Al-Alwan et al. 2022a; Al-Awamleh et al. 2022; Al-hawajreh et al. 2023; Al-Hawary and Alhajri 2020; Al-Khawaldah et al. 2022; Alkhawaldeh et al. 2023; AlTaweel and Al-Hawary 2021). Therefore, the study aims to know the Impact of Emotional Intelligence on Marketing Performance.

## 2 Theoretical Framework and Hypotheses Development

### 2.1 *Emotional Intelligence*

The study of emotional intelligence has become a large and important part of philosophers and thinkers since ancient times, and for this reason this term arose in the shadow of ancient philosophy and then became an important subject of study in many sciences, especially neuroscience and genetics., until it was transferred to the field of modern humanities, so this topic was at the forefront of studies and psychological and educational research at the beginning of the current century, and as a result, the modern view of intelligence developed (Alalwan 2018; Alhalalmeh et al. 2022; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Metabis and Al-Hawary 2013).

Emotional intelligence can be seen as “the ability to understand the way people feel and react and to use these skills to make good judgments and to avoid or solve

problems”. Al-Nawafah et al. (2022) defined the emotional intelligence as relatively recent and that it exists since human birth and mental maturity and refers to the ability to adapt mentally and affects behaviors and overcome social problems for a group of emotions, controlling emotions, dealing with information and managing it well, and making the appropriate decision to achieve more appropriate results. They see the emotional intelligence as the knowledge and wisdom to recognize, manage, and command emotions, subjective feelings, emotions, and feelings within a system that influences and is affected in order to ensure quality in performance, organization, and previously planned security with long-term continuity (Alhalalmeh et al. 2022; Al-Hawary and Obiadat 2021; Al-Hawary 2013a, 2013b; Alkhelifat et al. 2023; Al-Quran et al. 2023).

Baba (2020) has used the following dimensions in his study to measure the emotional intelligence “self-motivation, altruistic behavior, self-awareness and self-development.” Alshawabkeh et al. (2022) measured the emotional intelligence by using “motivation, empathy, self-awareness and self-regulation. According to the above, the researcher concluded that the best variables that are compatible with the current study and correctly measure the study problem are the following variables: self-awareness and self-regulation.

**Self-Awareness (SA):** It is the ability of the individual to accurately perceive his emotions and understand his tendencies through situations, and this includes SA at the forefront of his typical reaction towards specific events and new challenges, and there is a large group of studies and research that confirms that self-awareness has a positive effect on marketing performance (Alqahtani et al. 2023; Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2023).

**Self-Regulation:** is the individual’s ability to monitor and modify his emotions, behavior, and perceptions in order to adapt to the changing conditions around him. The development of appropriate self-regulation is linked to many aspects, including improved social adaptation and higher educational attainment later in the individual’s life (Al-Adamat et al. 2023; Al-Zyadat et al. 2022; Rahamneh et al. 2023).

## 2.2 Marketing Performance

Performance in general and marketing performance in particular has become the center of attention for organizations as an entry point for building capabilities and achieving competitive advantages that enable them to adapt to changes and face various challenges and obstacles, which prompted those institutions to measure it where it by using a set of measures or indicators that prove its effectiveness and efficiency to achieve their stated goals (Aldaihani et al. 2023; Kurdi et al. 2023; Mohammad et al. 2023). However, with the development of the marketing concept from product-oriented marketing to customer-oriented marketing, and the development of administrative concepts for decision makers, including managers and officials within institutions, marketing performance measurement measures have

evolved from one standard (the financial standard) to the development of other standards (Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016; Al-Hawary et al. 2020; Dwijendra et al. 2023; Shamaileh et al. 2023).

Marketing performance is one of the means used to measure the competitiveness of organizations, which is an indicator to determine the directions of the organization's activities, whether they are correct or need to correct deviations in order to achieve marketing goals (Al-Alwan et al. 2022b; AlHamad et al. 2022). Customer growth, sales growth, and market share also are used to measure the marketing performance.

**Customer Satisfaction:** customer satisfaction is something that appears both happy and disappointed after equating the impression of a product or result and various expectations (Alolayyan et al. 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021).

**Customer Loyalty:** is one of the most important reasons for the success of organizations, especially in the presence of strong competition facing organizations, as the organization builds through it a strong relationship with customers by meeting their desires and needs in the desired and preferred way (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Alolayyan et al. 2018; Qurah et al. 2023; Shaqrah et al. 2023).

**Customer Retention:** The ability of the organization to retain customers is not only related to what the organization offers of products, but it is related to the way the organization presents its products to its existing customers. Maintaining the customer is not only about offering the customer more which is expected, but rather to work to increase the expectations of the customer, and thus can gain his trust, and this customer will be one of the loyal to the organization (Al-Hawary and Al-Smeran 2017).

### 2.3 *Emotional Intelligence and Marketing Performance*

Al-Hawary et al.'s study (2023) dealt with "Impact of Managers' Emotional Intelligence on Marketing Creativity in Jordan Commercial Banks" where the study results found that there is effect of EI on marketing creativity in Jordanian commercial banks. While Alhalalmeh et al.'s study (2022) dealt with "Emotional intelligence & customer satisfaction in Indian banks." This study studies the relationship between EI among Indian bank employees. Emotional development must be enhanced in service organizations, meaning that the ability to regulate and control emotions is a positive feature strongly associated with customer satisfaction in the service industry. It was found that emotional intelligence is closely related to customer satisfaction, as the researcher concluded that:

**H1: There is an impact of emotional intelligence on the performance of marketing in commercial banks in Jordan.**

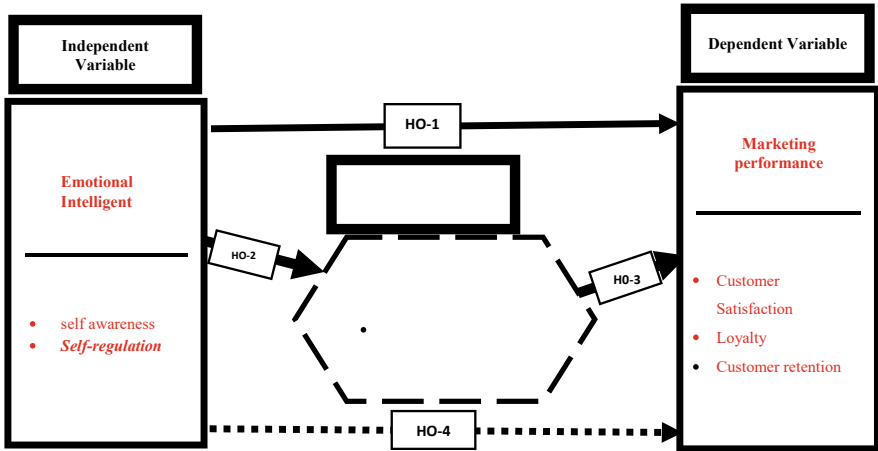


Fig. 1 Study model

### 3 Study Model

See Fig. 1.

### 4 Study Methodology

#### 4.1 Study Population and Sample

The current study follows a cross-sectional design based on a quantitative approach to collect primary data on the impact emotional intelligence on marketing performance in commercial banks in Jordan. Accordingly, the study population was determined, which consisted of customers of commercial banks in Jordan. Hence, the study instrument was disseminated simultaneously to a sample of 452 customers via electronic means. At the end of the data collection process, 401 responses were obtained that fit the requirements of the statistical analysis. These responses accounted for 88.7% of the response rate, which indicates a fair representation of the target population and achieves the criteria for adequacy of sampling (Pallathadka et al. 2023).

#### 4.2 Study Instrument

The electronic questionnaire was the main instrument for collecting the primary data for this study. This instrument consisted of an introduction that confirms the



following research ethics and demonstrates the core objectives of the study. Besides, it contained a section for collecting demographic data of the respondents, along with two sections for its major variables. In the sections related to major variables, respondents were required to rate the items on the basis of a five-point Likert scale, which ranged from a minimum of 1 “strongly disagree” to a maximum of 5 “strongly agree”. A section was allocated to the independent variable, i.e., emotional intelligence, which contained (9) items taken from Baba (2020). These items formed two dimensions for the emotional intelligence, where self-regulation consisting of five items and self-awareness included four items. On the other hand, the last section of the study instrument contained the measures of the dependent variable, i.e., marketing performance, which were evaluated using (14) items drawn from Purwanto et al. (2021). The items of marketing performance formed three dimensions: five items for customer satisfaction, five items for customer loyalty, and four items for customer retention.

### 4.3 *Validity and Reliability*

To evaluate the impact of emotional intelligence on marketing performance, structural equation modeling (SEM) was relied upon as a modern approach to examine the interaction between latent constructs measured by observing variables (Akour et al. 2023; Al-Hawary et al. 2023; Majdy Amiruddin et al. 2023; Mohammad 2019; Pallathadka et al. 2023). The application of this statistical method requires subjecting the study instrument to a test of validity and reliability before conducting an evaluation of the effect size. Accordingly, confirmatory factor analysis (CFA), which is one of the SEM procedures using the AMOS software, was applied to extract the validity and reliability of a measurement model, which were reported in Table 1.

The loadings of emotional intelligence on marketing performance items were between 0.697 and 0.808, indicating that they were all retained as they were above the lower threshold of 0.50 (Mukhlis et al. 2022). The average variance extracted (AVE) values for the research latent constructs were greater than 0.50, which means that they met the convergent validity condition (Al-Khasswneh et al. 2023; Alshuqairat et al. 2023; Boudlaie et al. 2022). Moreover, the comparison results confirmed that the values of AVE were greater than the maximum shared variance (MSV), also, it indicated that the values of the square root of AVE were superior to the correlation coefficients between the other constructs in the model. These results are evidence of achieving discriminant validity according to the Fornell-Larcker criteria (Alshura et al. 2023). On the other hand, the reliability of the measurement model constructs was verified by using Cronbach alpha coefficients ( $\alpha$ ) for internal consistency and McDonald's omega coefficients ( $\omega$ ) for composite reliability with a minimum of 0.70 for both measurements. According to the results in Table 1, the values of Cronbach's alpha coefficients (0.842–0.876) and McDonald's omega coefficients (0.840–0.876) were greater than 0.70, which indicates that the model constructs were reliable (Al-Armeti et al. 2023; Al-Husban et al. 2023).

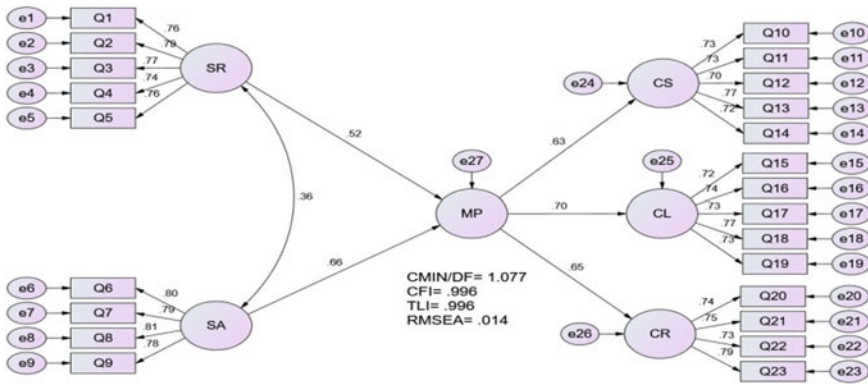
**Table 1** Measurement model evaluation

Constructs	Items	Loadings	VIF	AVE	MSV	$\sqrt{\text{AVE}}$	$\alpha$	$\omega$
Self-regulation (SR)	Q13	0.753	1.252	0.585	0.296	0.765	0.876	0.876
	Q14	0.781						
	Q15	0.778						
	Q16	0.747						
	Q17	0.764						
Self-awareness (SA)	Q18	0.799	1.661	0.630	0.391	0.794	0.872	0.872
	Q19	0.783						
	Q20	0.808						
	Q21	0.786						
Customer satisfaction (CS)	Q22	0.728	–	0.534	0.321	0.731	0.853	0.852
	Q23	0.737						
	Q24	0.697						
	Q25	0.770						
	Q26	0.721						
Customer loyalty (CL)	Q27	0.725	–	0.545	0.355	0.738	0.858	0.857
	Q28	0.740						
	Q29	0.733						
	Q30	0.767						
	Q31	0.730						
Customer retention (CR)	Q32	0.727	–	0.568	0.359	0.754	0.842	0.840
	Q33	0.768						
	Q34	0.734						
	Q35	0.785						

## 5 Hypotheses Testing Results

Based on the results of Table 1, it became clear that there was no multicollinearity between the dimensions of emotional intelligence, where the values of variance inflation factor (VIF) for those constructs were less than 5 (Boudlaie et al. 2022). In this context, it is possible to continue testing the hypotheses through SEM shown in Fig. 2.

The results of Fig. 2 confirm that the structural model for examining the impact of emotional intelligence on marketing performance in commercial banks in Jordan gained appropriate values of the goodness of fit. CMIN/DF was less than 3, the values of CFI and TLI were greater than 0.90, along with the value of RMSEA which was smaller than 0.08 (Al-Armeti et al. 2023; AlHamad et al. 2022; Al-Husban et al. 2023; Mukhlis et al. 2022; Pallathadka et al. 2023). Accordingly, the standardized and unstandardized effect parameters were extracted and listed in Table 2.



**Fig. 2** The structural model used for testing the impact of emotional intelligence on marketing performance

**Table 2** Effect Parameters

Path	B	S.E	$\beta$	t	P
SR → MP	0.292	0.038	0.518	7.623	0.000
SA → MP	0.318	0.037	0.660	8.692	0.000

Table 2 presents the path coefficients related to testing the impact of emotional intelligence on marketing performance. The results point out that the unstandardized path coefficient for emotional intelligence on marketing performance is 0.620, with a standard error of 0.028. The standardized path coefficient is 0.741, which indicates a strong positive relationship between emotional intelligence and marketing performance. A t-value of 22.046 associated with a p-value of 0.000 indicates that this relationship is statistically significant at a level of 0.05 or less.

## 6 Discussion

Regarding to the statistical analysis results related to this study, it was found that there is a statistically significant effect for the EI on MP in commercial banks in Jordan, where the effect of self-awareness had the greatest impact, followed by the effect of self-regulation, where the results showed that when customers in the Jordanian commercial banks are able to respond and sympathize with the feelings of others and are able to respect and appreciate the differences of others with their beliefs and points of view, this reflects positively on the marketing performance as customers are satisfied with the level of service of the bank as they convey a positive image about the bank and advise others clients to transact with banks, and this increases the

loyalty of customers, and therefore they continue to deal with the bank and refuse to deal with any other bank, despite the presence of attractive offers.

## 7 Recommendations

According to the study result, the researcher recommends to all bank officials and decision makers in all commercial banks in Jordan to give great attention from bank administrations to deal seriously with customer suggestions and complaints, so this is an important factor to increase customer satisfaction, and the need for banks to pay attention to knowing the opinions of customers after implementing the service, in addition to increasing interest in asking bank customers about new banking services that meet their ambitions.

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# The Impact of Integrated Marketing Communications Tools on Achieving Competitive Advantage in Jordanian Universities



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**Abstract** The study came to test the impact of the integrated marketing communications on achieving the competitive advantage of private universities in Jordan. The population of this study consists of, administrators and faculty members working in the Department of public relations and Marketing, and employees of the admission and registration department in Jordanian private universities. A random sampling was selected mounted (384). The results indicated that there is an impact of marketing

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communications on achieving the competitive advantage of Jordanian private universities. According to the results of the study, the researchers recommended all officials and decision makers to in order to increase interest in students, study their characteristics and understand their different motives in order to maintain their share and position among competitors in the market.

**Keywords** Integrated marketing communications · Competitive advantage · Private Universities · Jordan

## 1 Introduction

In the past few years, the world has witnessed a significant number of fundamental changes that have clearly affected all organizations with different degrees of progress and growth. Therefore, this remarkable progress has been reflected in the universities. Universities, by their nature, are knowledge-based organizations (Alkhlifat et al. 2023; Alqahtani et al. 2023; Dwijendra et al. 2023; Shamaileh et al. 2023). They need to manage their knowledge assets so that they can fulfill their mission as required. Those in charge of managing universities around the world were able in order to achieve competitive advantage through the continuous commitment of senior management to the supervisory levels, so every senior management that wanted to continue should adopt a mixture of integrated marketing communications to achieve the competitive advantage (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019).

The integrated marketing communications used in universities are important in improving their level of performance, rationalizing the decision-making process, achieving student satisfaction, and developing their commitment to preserving the university and its facilities (AlBrakat et al. 2023a, b; Zahran et al. 2023). Therefore, universities seek to introduce modern integrated marketing communications and work on developing them (Eldahamsheh et al. 2021; Kurdi et al. 2023; Pallathadka et al. 2023). The combination of good integrated marketing communications enables universities to identify the prospective and future market, to know its market share, to know competitors, their capabilities, strengths, and weaknesses, and this in its entirety helps universities to obtain a competitive advantage (Al-Rwaidan et al. 2023; Attiany et al. 2023).

The competitiveness of the academic institution depends mainly on two parts: the first part is the ability of universities to excel and compete in important vital areas such as academic programs, and the characteristics of faculty members in order to keep pace with environmental and competitive updates (Aityassine et al. 2022; Al-Awamleh et al. 2022; Al-Hawary et al. 2023; Al-Hawary 2013b). As for the second part, it is the university's ability to attract the largest possible number of students and financial support and funding from local and foreign markets. The success of the second part depends largely on the success of the first part. Therefore, the competitive advantage can be defined as the ability of the university to compete with other

universities operating in the same activity, through the formulation and application of strategies that put it in a better position (Al-Hawary and Alhajri 2020; Al-khawaldah et al. 2022; AlTaweel and Al-Hawary 2021). Competitive advantage is achieved through optimal use of existing capabilities such as available technical, material, financial, organizational and information resources, in addition to the capabilities, competencies and capabilities of other universities that enable them to design and implement their competitive strategy. (Alhalalmeh et al. 2022; Al-Hawary 2013a). The study came to test the impact of the integrated marketing communications on achieving the competitive advantage of private universities in Jordan.

## 2 Theoretical Framework and Hypotheses Development

### 2.1 *Integrated Marketing Communications*

The word communication means the physical or moral connection that combines two or more, and it means linking something to something. Communication is considered very important for human activities that does a major role in the lives of individuals and societies. This message aims to inform students of the existence of certain services, introduce them to the characteristics of a service, or convince them of them (Al-Hawary et al. 2017; Mohammad et al. 2023). Marketing communication has now become a goal for every private university looking for excellence. Its use and application achieve an important competitive advantage for the university in the market (Alhalalmeh et al. 2020; Al-Nawafah et al. 2022). It is defined as the means through which the organization tries to inform consumers and convince them of the products it produces, whether directly or indirectly.

Al-Hawary and Obiadat (2021) refer to the communication processes resulting from the planning, integration, and implementation of the various elements of marketing communications that lead over time to creating an impact for the brand on the current or potential consumer. It is defined as the activities that aim to satisfy the desires of consumers first and educate them about the product second, as marketing men pay attention to promotion (AlBrakat et al. 2023a; Aldaihani et al. 2023b; Al-hawajreh et al. 2023; Rios et al. 2006).

Marketing communications play a major and important role in maintaining positive and normal relations between private universities and students in the marketing environment, so the student needs guidance and special care to be able to make the decision to join the university, and this depends on his nature, as he most of the time does not join until after he knows What are the features and advantages of the service? Moreover, to realize what the size of the expected benefit is that he will get as a result of receiving it? He also needs to know what the value is and how to get it. Then he tries to test it with other similar services in the market to be able to compare them, and only then does he get closer to the appropriate choice for him and to receiving the service (Al-Adamat et al. 2023a; Aldaihani et al. 2023a; Harahap et al. 2022;

Mohammad 2020; Mohammad et al. 2022). Integrated marketing communications have several elements or methods. Each organization uses the element that suits it and enables it to achieve its strategic goals. Among these elements are the most used:

**Advertising** is an indirect means of communication aimed at introducing the services provided by the university to persuade students to join the university and influence their convictions, behaviors, and attitudes through various means of communication (Al-Adamat et al. 2023a; Hartmann et al. 2005; Rios et al. 2006). **Sales promotion** is a promotional activity adopted by private universities to increase the number of students and effective demand for their services within a short period (Aldaihani et al. 2023a; Mohammad et al. 2023). **Personal selling** is a two-way method of communication between the seller and the buyer, directly persuading the potential consumer to buy a commodity, service, or idea to achieve the appropriate effect on the individual or target group of the sale process (Al-Adamat et al. 2023b; Alkhawaldeh et al. 2023). **Public relations** are defined as the various activities carried out by public or private institutions, individuals, or groups in order to create, establish, maintain, or strengthen trust, understanding, and sympathy with the internal and external public of the institution (Al-Hawary and Abu-Laimon 2013; Amiruddin et al. 2023). **Direct marketing** involves contacting students through several advertising means and inviting them to respond to the advertising message by phone, mail, or the Internet. Thus, the services provided by the university reach the whereabouts of students, whether at home or at work (Al-Hawary and Aldaihani 2016; Al-Hawary et al. 2020).

## 2.2 *Competitive Advantage (CA)*

The CA term currently occupies an important position in the educational sectors in Jordan, especially in Jordanian private universities. It is a strategic element that provides the educational institution with a fundamental opportunity to achieve continuous profits and increase the number of students in it compared to its competitors (AlHamad et al. 2022). Every educational institution, and universities in particular, must have a specific competitive strategy in order to maintain its academic standing and academic reputation in the education sector.

The competitive advantage in university education has been defined as: the institution's ability to improve the level of its graduates and faculty members by providing high-quality educational and research services, which will give it competitive capabilities and advantages in the labor market (Al-Hawary and Al-Smeran 2017; Alolayyan et al. 2018). Al-Alwan et al. (2022) has defined the CA as "a characteristic or set of comparative characteristics that are unique to the organization. Al-Hawary et al. (2020) believe that the dimensions of competitive advantage are five: cost, quality (quality), flexibility, time (speed), and finally creativity and innovation. **Cost**, it means producing products and offering them at the lowest possible cost, comparing them with competitors, and including the cost of work, materials, and indirect expenses (Alshawabkeh et al. 2022; Al-Shormana et al. 2021). **Quality**, which is represented

with good specifications and great performance of products, or the functions provided by universities to obtain high quality in their operations from design and production (Alolayyan et al. 2022). **Flexibility**, which is, adapting to demand and the ability to respond (AL-Zyadat et al. 2022). **Speed** that is, providing production in the required place and time through speed in preparation, preparation, and delivery in time, and faster delivery time (Kurdi et al. 2023; Rahamneh et al. 2023). **Creativity** is the fifth priority referred to in contemporary literature, which is achieving development and creative work in order to achieve creativity in production and use of technology, or finding new ways to produce products and distribute them in a way that differs from what is currently in place (Al-Hawary and Hussien 2017; Al-Hawary et al. 2020).

### ***2.3 Marketing Communications and Competitive Advantage***

Integrated marketing communications work through its tools and mechanisms to provide targeted students with information through which they can learn about the private university and the services it provides (Kurdi et al. 2023). Integrated marketing communications also cover all communications in the locations of the target group of students, creating a unified and integrated image. It also develops dialogue, encourages the exchange of ideas and opinions, and strengthens its relationship with students and employees, which leads to increased loyalty and attachment to the university. It also works to increase profits in addition to increasing effectiveness. Finally, integrated marketing communications save money because they eliminate repetition in several things, such as display ads and graphics. They can also be used for other things like advertising, display, and print advertising. Thus, the fees allocated to agencies are reduced by using a single agency to service all communications (Alolayyan et al. 2022). Personal selling is a very impressive method in terms of its ability to design persuasive messages based on students' needs and desires, but its cost is higher than the cost of advertising. Personal selling is an important method of marketing as one of the elements of the promotional mix that is based on direct contact between the university employee and the student in a way that positively affects the decision to enroll in the university. As for public relations. It is a very cost-effective element that helps in promoting an excellent image of the university in the minds of the students, but there is some risk that the university may lose control of the persuasive messages it wants to broadcast to its target students. Accordingly, the study hypothesis was formulated as follows:

**HO: There is an impact of the integrated marketing communications mix in achieving the competitive advantage of private universities in Jordan.**

## **3 Study Model**

See (Fig. 1).

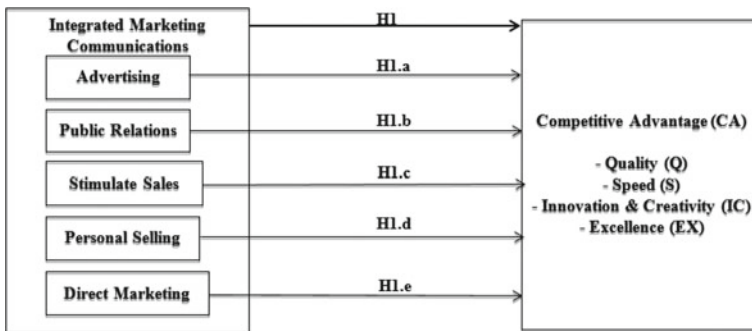


Fig. 1 Proposed Model (prepared by researchers)

## 4 Methodology

### 4.1 Sample and Data Collection

The primary data were collected to examine the impact of integrated marketing communications tools on competitive advantage through a quantitative approach applying a sampling method. The target population was the faculty members, administrators working in the Department of public relations and Marketing, and employees of the admission and registration department in Jordanian private universities, where an electronic questionnaire was designed and published on social media platforms for them, e.g., Facebook and WhatsApp. Accordingly, a final sample consisting of (330) valid responses for analysis, whereby they had obtained appropriate indicators after preliminary tests were conducted on it. Moreover, the process of evaluating the reliability and validity of the measurement model was based on the descriptive parameters of the demographic characteristics of the respondents through the techniques included in the SPSS software, after the dimensions of the outliers. To test the hypotheses, partial least squares structural equation modeling (PLS-SEM) was applied via the software SMART-PLS.

### 4.2 Measurement

The electronic questionnaire of the current study included items distributed into two parts, as the respondents were asked to evaluate these items according to a Likert scale with a minimum of 1 “strongly disagree” and a maximum of 5 “strongly agree”. In general, the questionnaire contained 40 items formed the measurement model to test the impact of integrated marketing communications tools on competitive advantage, which was borrowed from relevant literature. Integrated marketing communications (IMC) formed the first part of the questionnaire with 20 items that were taken from the

study of Al-Hawary and Harahsheh (2014). Items for this variable deployed on five dimensions as follows: four items for advertising (AD), four items for public relations (PR), four items for stimulate sales (SS), four items for personal selling (PS), and four items for direct marketing (DM). On the other hand, the second section included 20 items for measuring competitive advantage (CA), which correspond to Al-Husban et al. (2023); Al-Khasswneh et al. (2023). Items for this variable deployed on four dimensions as follows: five items for quality (Q), five items related to speed (S), five items related to innovation and creativity (IC), and five items related to excellence (EX).

## 5 Results

The results of the current study included two main headings. The first is dedicated to the pre-tests applied to the measurement model and aimed at determining the achievement degree of validity and reliability (Al-Hawary and Hussien 2017). The second includes the results of evaluating the structural model and parameter values to test the hypotheses of the impact of integrated marketing communications tools on competitive advantage through the PLS-SEM approach recommended by Hair et al. (2011).

### 5.1 Measurement Model Analysis

The constructs of the measurement model were ascertained by indicators of validity and reliability (Al-Husban et al. 2023; Hair et al. 2017; Pallathadka et al. 2023). To retain items within the measurement model, loading values must exceed 0.60 (Hair et al. 2017). Composite reliability (CR) was used to evaluate the reliability of the combinations with a minimum score of 0.70 (Hair et al. 2021, 2011). Convergent validity is applied to determine whether a given item expects a latent variable other than the one to which it belongs (AlBrakat et al. 2023b; Pallathadka et al. 2023). On the other hand, it evaluates the measure of change achieved by the constructs as a result of the variance of the determinant related to the estimation error (Hair et al. 2017). The convergent validity of this measurement model was assessed by the average variance extracted (AVE) with a minimum threshold of 0.50 (AlBrakat et al. 2023a, b; Mohammad 2019). Table 1 lists the results of convergent validity and reliability for evaluating a measurement model for examining the impact of integrated marketing communications tools on competitive advantage.

Table 1 results show that the items (PR4, PS4, DM4, Q5, IC5 and EX5) were cancelled from the measurement model as a result their loadings values did not meet the required condition, whilst the rest items were retained as their loadings exceed 0.60, which is the minimum required limit. The composite reliability values were within the range of (0.868–0.938), which means that they were higher than 0.70

**Table 1** Results of reflective measurements model—a summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_ A	(AVE)	Composite reliability (CR)	Cronbach's alpha (CA)
		< 0.60	< 0.50	< 0.50	0.70–0.90	0.60–0.90
Integrated marketing communications (IMC)						
Advertising (AD)	AD1	0.863	0.899	0.768	0.930	0.899
	AD2	0.892				
	AD3	0.889				
	AD4	0.861				
Public relations (PR)	PR1	0.820	0.813	0.710	0.880	0.800
	PR2	0.863				
	PR3	0.845				
Stimulate sales (SS)	SS1	0.905	0.913	0.792	0.938	0.912
	SS2	0.890				
	SS3	0.789				
	SS4	0.885				
Personal selling (PS)	PS1	0.840	0.782	0.688	0.868	0.771
	PS2	0.886				
	PS3	0.757				
Direct marketing (DM)	DM1	0.828	0.843	0.759	0.904	0.841
	DM2	0.899				
	DM3	0.886				
Competitive advantage (CA)						
Quality (Q)	Q1	0.872	0.841	0.678	0.893	0.839
	Q2	0.861				
	Q3	0.838				
	Q4	0.714				
Speed (S)	S1	0.826	0.906	0.722	0.929	0.904
	S2	0.808				
	S3	0.870				
	S4	0.871				
	S5	0.872				
Innovation and creativity (IC)	IC1	0.793	0.731	0.646	0.879	0.867
	IC2	0.763				
	IC3	0.745				
	IC4	0.903				

(continued)



**Table 1** (continued)

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_ A	(AVE)	Composite reliability (CR)	Cronbach's alpha (CA)
		< 0.60	< 0.50	< 0.50	0.70–0.90	0.60–0.90
Excellence (EX)	EX1	0.923	0.906	0.761	0.927	0.895
	EX2	0.879				
	EX3	0.865				
	EX4	0.818				

and confirm the reliability of the current study’s measurement model (Hair et al. 2017). On the other hand, the results showed that the values of AVE ranged from 0.646 to 0.792. This result indicates support for instrument convergent validity as a result of its superiority over the lower threshold of 0.50 (Al-Husban et al. 2023; Al-Khasswneh et al. 2023; Alshuqairat et al. 2023; Boudlaie et al. 2022; Hair et al. 2017). The researchers also implemented a discriminant validity analysis based on comparing the square root of the AVE value for each variable with the correlation coefficients between others (Al-Armeti et al. 2023; Fornell and Larcker 1981). Table 2 indicates the results of evaluating the discriminant validity of the measurement model according to the Fornell-Larcker criterion.

The results in Table 2 demonstrated that the values of the square root of AVE were greater than 0.70, and they exceeded all correlation coefficients between the rest of the variables. This result fulfills the Fornell-Larcker criteria. Indeed, evaluating the discriminant validity of the measurement model using the PLS-SEM approach in

**Table 2** Fornell-Larcker criterion

Construct	AD	DM	EX	IC	PS	PR	Q	S	SS
Advertising	<b>0.876</b>								
Direct marketing	0.239	<b>0.871</b>							
Excellence	0.234	0.130	<b>0.872</b>						
Innovation and creativity	0.194	0.140	0.118	<b>0.803</b>					
Personal selling	0.193	0.555	0.127	0.035	<b>0.829</b>				
Public relations	0.071	0.676	0.158	0.020	0.540	<b>0.843</b>			
Quality	0.675	0.225	0.345	0.230	0.115	0.108	<b>0.824</b>		
Speed	0.689	0.243	0.170	0.208	– 0.032	0.042	0.650	<b>0.850</b>	
Stimulate Sales	0.674	0.163	0.263	0.298	0.084	0.027	0.694	0.620	<b>0.890</b>

**Table 3** The HTMT Criterion

Construct	AD	DM	EX	IC	PS	PR	Q	S	SS
Advertising									
Direct marketing	0.275								
Excellence	0.253	0.145							
Innovation and creativity	0.166	0.187	0.109						
Personal selling	0.230	0.693	0.170	0.160					
Public relations	0.095	0.816	0.197	0.066	0.668				
Quality	0.773	0.270	0.389	0.192	0.158	0.157			
Speed	0.762	0.281	0.182	0.192	0.067	0.048	0.741		
Stimulate sales	0.743	0.186	0.287	0.189	0.110	0.075	0.789	0.679	

addition to the previous technique entails extracting a matrix Heterotrait-Monotrait Ratio (HTMT). Kline (2023) mentioned that the values of HTMT must be lower than the required threshold value.85 (Kline 2023). Nevertheless, the confidence interval for the HTMT analysis must not take a count value of 1 on any of the constructs (Franke and Sarstedt 2019). The results of HTMT analysis were shown in Table 3.

The results of Table 3 indicated that the values of HTMT for all measurement model constructs were between 0.048 to 0.816, therefore, they were less than the threshold value of 0.85, which necessitates considering the measurement model to have appropriate discriminate validity (Eldahamsheh et al. 2021; Franke and Sarstedt 2019).

## 5.2 Structural Model Analysis

The structural model of the studies consists of latent constructs, i.e., variables, and the paths that link them, which indicate the size of the effect between those constructs (Hair et al. 2017). Figure 2 reveals the standard estimation of the structural model of the study. It presents the effect between integrated marketing communications tools on competitive advantage, along with an explanation of the impact of each dimension of integrated marketing communications tools on competitive advantage within the limits of path coefficient values ranging from  $-1$  to  $+1$  in order to express the relationship depth between any two constructs.

Ramayah et al. (2016) specified the critical values for significance in 2-tailed tests as follows:  $p < 10\%$  (1.64),  $p < 5\%$  (1.96), and  $p < 1$  (2.58); also, as usual, the researchers in marketing utilized the significance level of  $p < 5\%$ . Hair et al. (2017) stated that the bias-corrected bootstrap confidence intervals (lower limit, upper limit)

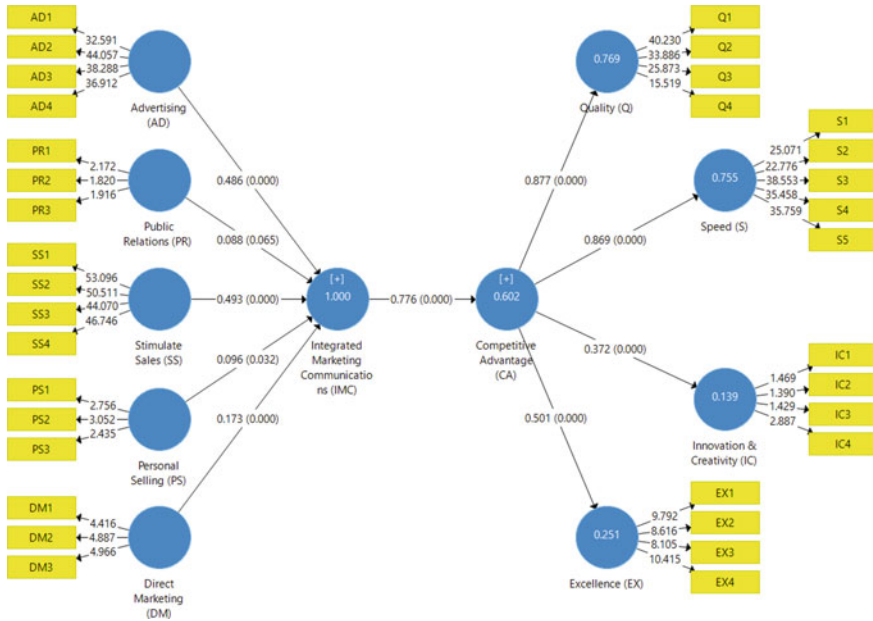


Fig. 2 Structural model results

allow testing whether a path coefficient is significantly different from zero. If the confidence interval for an estimated path coefficient does not include zero, this means there is a significant effect of this path (Hair et al. 2017). Therefore, the researcher set 5000 subsamples with a replacement from the bootstrap cases equal to the original set of data which is 330 and the results of the structural model for this study are shown in Table 4.

As can be observed in Table 4, the path coefficients of IMC were found to have a significant relationship with CA; the result indicated that (IMC → CA,  $\beta = 0.776$ ; t-value of 19.748), which H1 was supported. In addition, the first sub-hypothesis results showed that this relationship was found statistically significant at  $p < 0.01$ , which indicated support for H1.a. Consequently, the results showed that the relationship between PR and CA were found statistically insignificant at  $p > 0.05$  which means H1.b was not supported. Thereby, the bootstrap results of the H1.c for this study, indicated that the direct effect (SS → CA,  $\beta = 0.383$ , t-value of 8.513) was significant at  $p < 0.01$ . The results also confirmed that there was a direct effect of H1.d on CA at a 5% confidence interval (LL = 0.006, UL = 0.125), that does not straddle a 0 in between, which indicated support for these hypothesis. In addition, the results showed that the relationship between DM and CA were found statistically significant at  $p > 0.01$  which means H1.e was supported.

**Table 4** Summary of the structural model results

Hypothesis	Relationship	Indirect effect ( $\beta$ )	S. error	t-statistic	P values	Confidence interval (BC)		Decision
						LL	UL	
H1	Relationship of IMC $\rightarrow$ CA	0.776	0.039	19.748	0.000	0.683	0.841	Supported**
H1.a	Relationship of AD $\rightarrow$ CA	0.377	0.042	8.965	0.000	0.292	0.447	Supported**
H1.b	Relationship of PR $\rightarrow$ CA	0.069	0.036	1.926	0.054	-0.004	0.126	Not Supported*
H1.c	Relationship of SS $\rightarrow$ CA	0.383	0.045	8.513	0.000	0.292	0.461	Supported**
H1.d	Relationship of PS $\rightarrow$ CA	0.075	0.033	2.243	0.025	0.006	0.125	Supported*
H1.e	Relationship of DM $\rightarrow$ CA	0.134	0.036	3.709	0.000	0.046	0.182	Supported**

Note Significance level at \*\*  $p < 0.01$ , \*  $p < 0.05$  (two-tailed). *UL* upper limit at 95% confidence interval, *LL* lower limit at 5%, *BC* bias corrected

## 6 Discussion

The results indicated that there is an impact of marketing communications on achieving the competitive advantage of Jordanian private universities, as this result is consistent with some studies and differs from other studies such as: Al-Damour and Al-Sharida's (2008). Direct marketing provides useful information and an accurate description of university services. This increases the student's awareness of university services. In addition to the importance of direct marketing in presenting the advantages and benefits of services provided by private universities, direct marketing also provides multiple capabilities for directly measuring the reactions of customers. Through the use of direct marketing means, the student avoids the trouble of navigation and research about universities. The student may use advertisements announced by universities to find out the advantages offered by those universities and not others. Public relations does an essential role in achieving the competitive advantage of the university by maintaining relations with students and their parents and drawing a good mental image of the university using various communication tools with the local community. Universities use sales promotion tools to achieve a competitive advantage by offering discounts and announcing the material and moral benefits that students can obtain when they enroll in them. In addition to the university

contacting students through several advertising means and inviting them to respond to the advertising message by phone, mail, or the Internet.

## 7 Recommendations

After presenting a number of results reached in this study, the researcher presented some recommendations: The administrations and officials of private universities must increase interest in the affairs of students, study their characteristics and try to understand their motives in order to maintain their share in the market and among similar competitors. Despite the positive results achieved by the means of marketing communication in universities, they need to be strengthened by increasing their efficiency and effectiveness in influencing students. This study recommends the necessity of commitment and giving financial and human resources to universities in order to achieve a competitive advantage by adopting the concept of integrated marketing communications. In addition to training marketing and promotional cadres who care about the needs of the target group of students and interact with them to achieve effective and fruitful communication in this field, In addition to the necessity for the administration of private universities to develop marketing and promotion departments, which are responsible for studying and following up on the market and carrying out the necessary marketing research.

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# The Impact of Internal Marketing Practices on Continuous Commitment in Jordanian Telecommunications Companies



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**Abstract** The research is designed to test the impact of internal marketing practices on continuous commitment. The study population consisted of customers of Jordanian telecommunications companies. Structural equation modeling (PLS-SEM) to analyze the hypotheses. The study showed an effect of internal marketing practices on continuous commitment. The researchers recommend management to apply internal marketing practices that lead to employee adherence and increase their desire to stay in the workplace.

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**Keywords** Internalmarketing practices on continuous commitment · Telecommunications companies · Jordan

## 1 Introduction

Large and technologically advanced organizations have become one of the phenomena of the current era, which has resulted in an increase in the volume of production and an evolution in the methods of providing services (Alkhlifat et al. 2023; Alqahtani et al. 2023; Dwijendra et al. 2023; Saraireh et al. 2022). Organizations are growing rapidly, which forced them to exert more effort and increase costs and time to select the most efficient employees and continue to retain them in terms of providing appropriate training programs, giving them more incentives and rewards, and providing organizational justice (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019). In return for this commitment, they were required to improve their productivity, perform services for clients, and provide distinguished performance to attain objectives of organizations (AlBrakat et al. 2023a, b; Al-Rwaidan et al. 2023; Attiany et al. 2023; Zahran et al. 2023). Successful firms can use their resources, especially human resources, to develop their goods and achieve a high degree of consumer satisfaction. They work to give all of the requirements to support resources in developing and being innovative to take responsibilities assigned to them, as well as assisting the organization in accomplishing its goals (Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-khawaldah et al. 2022; AlTaweel and Al-Hawary 2021).

Internal marketing practices (IMP) constitutes a basic structure for external marketing activity and plays a significant role in achieving sustainable competitive advantage and reducing differences within the organization, with a focus on the importance of communication between various departments for the success of internal marketing practices (Alhalalmeh et al. 2022; Al-Nawafah et al. 2022; Eldahamsheh et al. 2021; Metabis and Al-Hawary 2013; Mohammad et al. 2020; Tariq et al. 2022). In addition to being a process that pushes employees towards creativity that leads to obtaining the desired results, the success of internal marketing depends on the commitment of senior management and employees to use the open management style (Alhalalmeh et al. 2022; Al-Hawary 2013a, 2013b; Al-Hawary and Obiadat 2021). The aspects of commitment expressed are: acceptance of the organization's values and goals; the desire to strive for the organization; and their desire to associate with the organization (Al-Hawary et al. 2020b). Therefore, this study was designed to test the effect of internal marketing practices on continuous commitment.

## 2 Theoretical Framework and Building Hypotheses

### 2.1 Internal Marketing

Many methods have been developed based on the idea of making the worker’s job satisfactory (Harahap et al. 2022; Metabis and Al-Hawary 2013; Mohammad et al. 2022). Modern and successful organizations seek to build long-term relationships with employees and between them as internal customers who provide products that contribute to attracting external customers. Achieving employee happiness leads to customer satisfaction, enhances employee loyalty to their organizations, and improves the work environment, which polarizes the organization’s atmosphere for the best people and raises their incentive to work (Al-Adamat et al. 2023a, b; Al-Hawary and Al-Smeran 2017; Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Shaqrah et al. 2023). Employees, on the other hand, are regarded as critical to the organization. Meeting the needs of the internal consumer helps the firm (Alolayyan et al. 2018, 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021; Mohammad 2020; Rahamneh et al. 2023). IMP is the best activity in attracting and retaining the best talents by balancing between the employee’s personal circumstances and his work, giving him an opportunity to work with life integration, and participating in making resolution through empowerment opportunities (Al-Adamat et al. 2023b; Al-Alwan et al. 2022a, b; AlHamad et al. 2022; Alkhawaldeh et al. 2023). IMP attempts to provide the foundation for treating employees as clients and the necessity to interact with them as the source and foundation of any valuable and important concept in the business (Al-Hawary et al. 2020a). IMP is used to achieve high levels of employee happiness, which will reflect in the future on the satisfaction of external customers (Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016; Al-Hawary and Obiadat 2021). The studies dealt with IMP in different ways depending on their views or the nature of the industry, and among these dimensions that the researchers addressed as in Table 1.

**Empowerment:** Empowering employees means allowing employees of the organization to make decisions, give them freedom of action, and develop solutions to work problems (Al-Abbadi et al. 2021; Alhalalmeh et al. 2020; AlTaweel et al. 2023). **Training programs:** The training function is one of the functions that complement the function of selecting and appointing employees. Rather, it is necessary to

**Table 1** Dimensions of IMP

Author	Dimensions of IMP
Alkhawaldeh et al. (2023)	Internal communication, training, internal market research, needs and wants
Ismail and Sheriff (2017)	Vision, development, rewards, empowerment, and internal communication
Wilmark (2018)	Job satisfaction, understanding and discrimination, training, job coordination, integration and motivation

create training programs that help develop and increase the skills of employees and improve their capabilities to perform the tasks entrusted to them (AlHamad et al. 2022; Al-Hawary and Abu-Laimon 2013; Alkhalwaldeh et al. 2023). **Rewards and incentives:** There are many types of incentives that can be given to employees in companies; work-related incentives, incentives related to with a work environment such as a working group that is harmonious with each other, good working conditions, and effective supervision (Al-Armeti et al. 2023; Al-Hawary and Al-Rasheedy 2021). **Internal Communication:** It facilitates transactions between employees and exchange information to enhance knowledge (Al-Hawary and Al-Syasneh 2020; Alshuqairat et al. 2023).

## 2.2 *Continuous Commitment*

Organizational commitment consists of three components developed by Meyer and Allen, who dominate organizational commitment research. This model suggests that organizational commitment is the employee's experience of three simultaneous mind-sets: affective, normative, and persistent organizational commitment (Al-Hawary and Al-Syasneh 2020; Alshura et al. 2023a). Continuous commitment denotes employees' participation in numerous organizational activities while taking into account the potential costs of leaving their jobs (Al-Lozi et al. 2018). Those with high degrees of continued commitment or continuity continue to work so that they do not lose any gains or benefits obtained in the past as a consequence of the organization's activity. This type of commitment stems from the workers' desire to stay in the organization as individuals (Al-Hawary and Al-Rasheedy 2021). Continuous commitment is defined by the degree to which an individual experiences a sense of staying put (Al-Abbadi et al. 2021). Continuous commitment is the second structure of organizational commitment (Alhalalmeh et al. 2020).

## 2.3 *Internal Marketing Practices and Continuous Commitment*

Alshura et al. (2023a) found that IMP affect organizational commitment in their study, which aimed to assess the impact of implementing IMP on organizational commitment among employees of insurance businesses in Jordan. Wilmark (2018) discovered that marketing techniques had a significant impact on employee organizational commitment. Marques et al. (2018) indicated in their study, which aimed to measure the impact of IMP, whose dimensions were "generating information, disseminating information, and responding to information", in hotels on the commitment and satisfaction of internal customers, they concluded that IM had an impact on OC and job satisfaction. Ismail and Sheriff (2017), in their study, which was conducted in

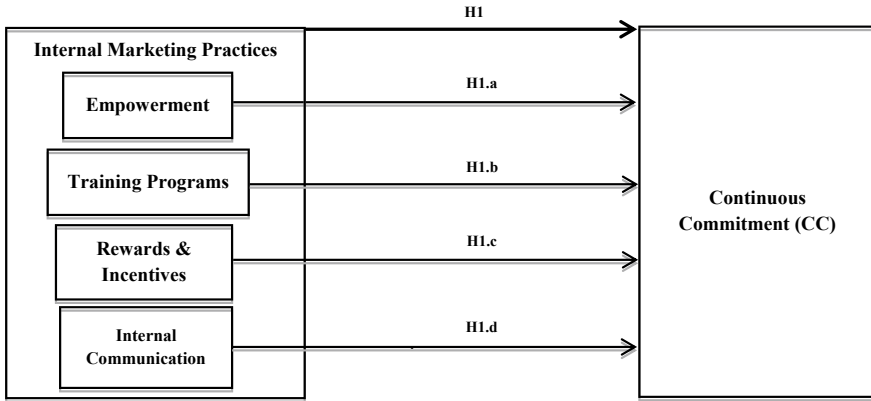


Fig. 1 Proposed model

the banking sector in Yemen, concluded that IMP affect organizational commitment. So the study hypotheses can be as:

**H1: There is an impact of IMP on continuous commitment (CC) on Jordanian telecommunications companies.**

### 3 Study Model

See (Fig. 1).

### 4 Methodology

#### 4.1 Sample and Data Collection

The primary data were collected to examine the impact of IMP on continuous commitment through a quantitative approach applying a sampling method. The target population was the customers of telecommunications companies in Jordan, where an electronic questionnaire was designed and published on social media platforms for them, e.g., Facebook and WhatsApp. Accordingly, a final sample consisting of (355) valid responses for analysis, whereby they had obtained appropriate indicators after preliminary tests were conducted on it. Moreover, the process of evaluating the reliability and validity of the measurement. To test the hypotheses (PLS-SEM) was applied via the software SMART-PLS.

## 4.2 Measurement

The questionnaire contained 21 items formed the measurement model to test the impact of IMP on continuous commitment, which was borrowed from relevant literature. IMP formed the first part of the questionnaire with 16 items that were taken from the study of Al-Hawary and Al-Rasheedy (2021). Items for IMP deployed on four dimensions as follows: 4 statements for empowerment (EMP), 4 statements for training programs (TP), 4 statements for rewards and incentives (RI), and 4 statements for internal communication (IC). On the other hand, the second section included 6 statements for measuring continuous commitment (CC), which correspond to Alhalalmeh et al. (2020).

## 5 Results

The results of this study included two main headings. The first is dedicated to the pre-tests applied to the measurement model and aimed at determining the achievement degree of validity and reliability (AL-Zyadat et al. 2022; Boudlaie et al. 2022). The second includes the results of evaluating the structural model and parameter values to test the hypotheses of the impact of IMP on continuous commitment through the PLS-SEM approach recommended by Hair et al. (2017); Mukhlis et al. 2022; Rahamneh et al. 2023).

### 5.1 Measurement Model Analysis

The constructs of the measurement model were ascertained by indicators of validity and reliability (Fornell and Larcker 1981; Hair et al. 2011). To retain items within the measurement model, loading values must exceed 0.60 (Al-Rwaidan et al. 2023; Hair et al. 2017; Muda et al. 2022; Tan et al. 2017). Composite reliability (CR) was used to evaluate the reliability of the combinations with a minimum score of 0.70 (Hair et al. 2010; Harahap et al. 2022). Convergent validity is applied to determine whether a given item expects a latent variable other than the one to which it belongs (Henseler et al. 2015; Majdy et al. 2023; Tan et al. 2017). On the other hand, it evaluates the measure of change achieved by the constructs as a result of the variance of the determinant related to the estimation error (Saraireh et al. 2022; Urbach and Ahlemann 2010; Zahran et al. 2023).

Table 2 results show that the two items were cancelled from the measurement model as a result their loadings values did not meet the required condition, whilst the rest items were retained as their loadings exceed 0.60, which is the minimum required limit. The composite reliability values were within the range of (0.871–0.927), which means that they were higher than 0.70 and confirm the reliability of

the current study’s measurement model (Hair et al. 2017; Henseler et al. 2015). On the other hand, the results showed that the values of AVE ranged from 0.630 to 0.761. This result indicates support for instrument convergent validity as a result of its superiority over the lower threshold of 0.50 (Barclay and Lloyd 1996; Fornell and Larcker 1981; Pallathadka et al. 2023). The researchers also implemented a discriminant validity analysis based on comparing the square root of the AVE value for each variable with the correlation coefficients between others. Table 3 indicates the results of evaluating the discriminant validity of the measurement model according to the Fornell-Larcker criterion.

The values of the square root of AVE were greater than 0.70, and they exceeded all correlation coefficients between the rest of the variables. This result fulfills the Fornell-Larcker criteria. Indeed, evaluating the discriminant validity of the measurement model using the PLS-SEM approach in addition to the previous technique

**Table 2** Reflective measurements model – a summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	(AVE)	Composite reliability (CR)	Cronbach’s alpha (CA)
		< 0.60	< 0.50	< 0.50	0.70–0.90	0.60–0.90
(IMP)						
(EMP)	EMP1	0.873	0.842	0.679	0.894	0.839
	EMP2	0.863				
	EMP3	0.840				
	EMP4	0.709				
(TP)	TP1	0.854	0.878	0.728	0.915	0.876
	TP2	0.828				
	TP3	0.871				
	TP4	0.859				
(RI)	RI1	0.923	0.907	0.761	0.927	0.895
	RI2	0.879				
	RI3	0.866				
	RI4	0.818				
(IC)	IC1	0.772	0.614	0.630	0.871	0.867
	IC2	0.741				
	IC3	0.728				
	IC4	0.918				
(CC)	CC1	0.853	0.894	0.703	0.922	0.893
	CC2	0.863				
	CC3	0.866				
	CC4	0.859				
	CC5	0.745				



**Table 3** Fornell-Larcker criterion

Construct	CC	EMP	IC	RI	TP
Continuous commitment	<b>0.838</b>				
Empowerment	0.713	<b>0.824</b>			
Internal communication	0.234	0.243	<b>0.794</b>		
Rewards and incentives	0.240	0.345	0.124	<b>0.872</b>	
Training programs	0.689	0.656	0.219	0.177	<b>0.853</b>

**Table 4** The HTMT criterion

Construct	CC	EMP	IC	RI	TP
Continuous commitment					
Empowerment	0.823				
Internal communication	0.823	0.775			
Rewards and incentives	0.260	0.389	0.109		
Training programs	0.775	0.761	0.174	0.194	

entails extracting a matrix Heterotrait-Monotrait Ratio (HTMT). The results of HTMT analysis were shown in Table 4.

The results of Table 2 indicated that the values of HTMT for all measurement model constructs were between 0.109 and 0.823, therefore, they were less than the threshold value of 0.85, which necessitates considering the measurement model to have appropriate discriminate validity (Franke and Sarstedt 2019; Henseler et al. 2015).

## 5.2 Structural Model

The structural model of the studies consists of latent constructs, i.e., variables, and the paths that link them, which indicate the size of the effect between those constructs (Hair et al. 2017). Figure 2 reveals the standard estimation of the structural model of the study. It presents the effect of IMP on continuous commitment, along with an explanation of the impact of each dimension of IMP on continuous commitment within the limits of path coefficient values ranging from  $-1$  to  $+1$  in order to express the relationship depth between any two constructs.

Ramayah et al. (2016) established the crucial values for significance in 2-tailed tests as follows: p 10% (1.64), p 5% (1.96), and p 1 (2.58). Similarly, marketing researchers used the p 5% significant threshold. If the confidence interval for a calculated route coefficient does not contain zero, it indicates that this path has a substantial influence (Hair et al. 2017) (Table 5).

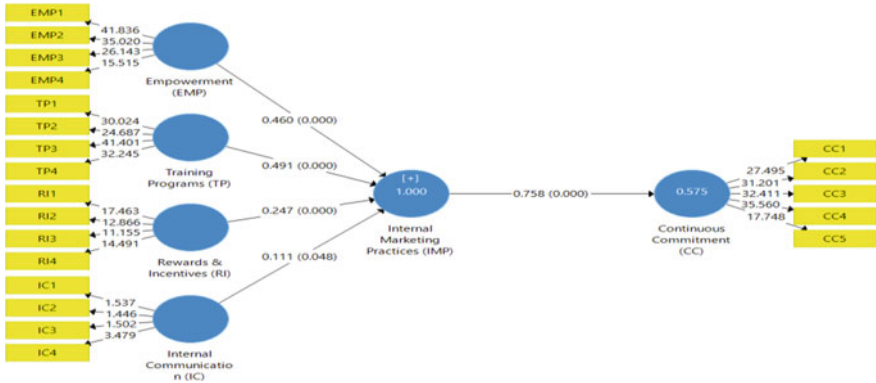


Fig. 2 Structural model results

Table 5 Structural model results

Hypothesis	Relationship	Indirect effect (β)	S. error	t-statistic	P values	Confidence interval (BC)		Decision
						LL	UL	
H1	IMP → CC	0.758	0.037	20.756	0.000	0.667	0.820	Supported**
H1.a	EMP → CC	0.349	0.028	12.324	0.000	0.033	0.299	Supported**
H1.b	TP → CC	0.372	0.035	10.537	0.000	0.307	0.445	Supported**
H1.c	RI → CC	0.188	0.046	4.124	0.000	0.086	0.262	Supported**
H1.d	IC → CC	0.084	0.042	1.987	0.047	0.028	0.179	Supported*

The path coefficients of IMP were found to have an impact on CC; the result indicated that (IMP → CC, β = 0.758; t-value of 20.756), which H1 was supported. In addition, the first sub-hypothesis (H1.a) results showed that this impact was found statistically significant at p < 0.01, which indicated support for H1.a. Consequently, the results showed that the impact of TP on CC was found statistically significant at p < 0.01 which means H1.b was supported also. Thereby, the bootstrap results of the H1.c for this study, indicated that the direct effect (RI → CC, β = 0.188, t-value of 4.124) was significant at p < 0.05. The results also confirmed that there was a direct effect of H1.d on CC at a 5% confidence interval (LL = 0.028, UL = 0.179), which means an estimated path coefficient does not include zero in between and that indicated support for this hypothesis.

## 6 Discussion

IMP have an impact on continuing commitment. Employees are treated as a capital asset by organizations that treat them as accountable, independent, and engaged individuals rather than as a cost to be controlled.

IMP also involve efforts aimed at determining the nature of employees' wants and desires, as well as ensuring their satisfaction with the implementation of these criteria. To cultivate a balance between the employee's personal circumstances and his work, to provide him with opportunities to work with life integration and to participate in decision-making through empowerment opportunities. When management uses internal marketing well, it results in employees having favorable attitudes toward their tasks, which includes commitment. IMP also has a beneficial impact on job satisfaction in the context of services, as customer satisfaction is better in businesses where employees perceive good IMP implementation. IMP has a good impact on employee commitment in order to provide high-quality services to their clientele.

## 7 Recommendations

Researchers recommend managers to implement IMP that increase employee adherence and desire to stay in the workplace, which in turn motivates innovation and energy. IMP, in a nutshell, is a strategic direction concerned with establishing a good work environment for workers. Furthermore, the main feature of any successful organization is to improve the performance of its employees, and thus, the attitudes of the employees toward that work, as well as the extent of the institution's ability to improve the performance of the employees' loyalty.

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# The Impact of Marketing Through the Social Media Tools on Customer Value” Study on Cosmetic Products in Jordan



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**Abstract** The research aims to study the impact of marketing through social media (SM) on achieving customer value. The study population represented the customers of companies selling and manufacturing cosmetic products in Jordan that depend on social media on marketing. SPSS and AMOS software was used by the researcher. The statistically significant results showed the impact of marketing through SM on achieving customer value (CV). The study recommended raising awareness of the importance of marketing through SM with attention to the areas of safety,

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confidentiality and privacy, and holding training and rehabilitation programs and workshops.

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## 1 Introduction

Modern marketing strategies focus on the customer, direct marketing spending to him, and shift from strategies based on products or services to strategies centered on the customer, as the customer is considered the focus of the marketing process and the fundamental reason for the existence of the organization and ensuring its continuity especially in light of the rapid environmental radical changes and massive developments that lead to a rapid and continuous change in customers' different desires and diverse needs, which means that the survival and continuity of the organization in the markets depends mainly on the ability of the organization to meet the diverse and different needs and desires of customers and to deal with any change that may occur suddenly, which created the need to build positive relationships with customers and improve the value and benefit that they get and build an image good for the organization in their minds (Agrawal and Rahman 2017; Akhlagh et al. 2014; Dwijendra et al. 2023; Mohammad 2020; Syed and Mahdi 2017).

Customer value provides a comprehensive view of the effectiveness of marketing strategies, and helps organizations determine their future directions and the reasons that prevent marketing programs from working as planned (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad et al. 2020; Mohammad 2019). From here, the importance of customer value emerges in order to overcome the competition in the business environment, the company must provide value to its customers, and the value of its offers must be higher than the value of its competitors in the eyes of the customer (Eldahamsheh et al. 2021; Mohammad 2019; Tariq et al. 2022).

In view of the technological developments and the increase of using the Internet and smart phones, SM has become one of the most prominent marketing methods used, which contributed to adding many distinctive and new features and characteristics that made marketing more interactive, as it has become a marketing tool that can be employed in building permanent channels of communication with customers and providing them with information in every possible way easily and effectiveness and enable them to contribute and participate in the process of product improvement and development (Al-Awamleh et al. 2022; AlBrakat et al. 2023a, b; Al-Rwaidan et al. 2023; Attiany et al. 2023; Zahran et al. 2023). Modern organizations have tended to diversify their marketing methods and direct them towards focusing on the customer and creating value for him because of his great role in the success of the organizations (Aityassine et al. 2022; Al-Hawary and Alhajri 2020; Al-khawaldah et al. 2022; Alshura et al. 2023; AlTaweel and Al-Hawary 2021). Creating value for the customer is one of the most important of these strategies, as it is a modern vision that seeks to

deal with customers, strengthening the relationship with them, focusing on extrapolating their desires and needs, meeting them in the way they want, and improving the mental image of them in their minds (Alhalalmeh et al. 2022; Al-hawajreh et al. 2023; Al-Hawary 2013a, b; Al-Hawary and Obiadat 2021).

## 2 Theoretical Framework and Building Hypotheses of the Study

### 2.1 Marketing Through Social Networking Sites

Marketing through SM was defined as the use of SM websites in order to do marketing and advertisements for services and products to take advantage of them and benefit from the advantage of communicating with the largest available segment of customers through SM and others (Al-Adamat et al. 2023; Alhalalmeh et al. 2020; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Metabis and Al-Hawary 2013). Marketing through social media is also known as the employment of all SM like Google Plus, Twitter. etc., in carrying out the marketing functions of companies and adopting them as a tool for communication and interaction between them and customers, benefiting from their advantages, identifying customer behavior and strengthening the relationship with them (Al-Adamat et al. 2023; Aldaihani et al. 2023). It is worth noting that social media marketing relies mainly on building social relationships with potential customers to sell services or products in a way that suggests to each user that it is directed and manufactured specifically for him (Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2023, 2022). Researchers differed in defining the dimensions of marketing via social media, given the various and advanced facilities and services provided by these sites that are renewed every day. Table 1 shows the most prominent dimensions addressed in previous studies:

It is important to know that this study adopted the following dimensions of marketing via social media, as follows:

**Social Media Advertising:** Advertising on social media is critical because it allows organizations to identify users, and to create an important audience database (Alhalalmeh et al. 2022). **Social Media Activation:** online activation is a part of internet marketing, including: online advertising, online branding, and direct online marketing (Al-Hawary and Abu-Laimon 2013). **Interaction via SM:** interaction was defined as a communication way which contributes to defensively and mentally influencing the actions, opinions and actions of others through social media (Al-Hawary and Aldaihani 2016; Al-Hawary et al. 2020). **Word of mouth via SM:** is defined in the field of marketing as the process of passing information between a non-commercial caller (who has no return from that) and a recipient of the brand, service, or product (Al-Alwan et al. 2022a, b; AlHamad et al. 2022).

## 2.2 *Customer Value*

Customers are considered long-term investments for companies, so they must obtain the best services for the continuity of their business (Alolayyan et al. 2018). Therefore, it is imperative for companies to be able to take advantage of people's preferences, service creation, and market surveys to be able to better and satisfactorily support customer value for the products they produce. To achieve this, companies must have the necessary qualifications and capabilities in order to integrate elements including customer information and human resources (Alolayyan et al. 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021; AL-Zyadat et al. 2022). The concept of customer value emerged in the 1990s and since then has gained a lot of attention among scholars, marketing researchers, and many marketing practitioners (Kurdi et al. 2023; Rahamneh et al. 2023). In addition to expressing the net profits expected from the customer during the period of its dealings with the companies that they obtain the companies throughout the period of the customer's dealings with it, as an increase in his desire to purchase the company's services and products and recommending others to deal with the company (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017).

The value of the customer is referred to as the difference between the values that he gains from owning and using the product or service and the cost of obtaining it (Al-Hawary and Al-Smeran 2017). Customer value expresses the customer's personal impression regarding the quality, general appearance and efficiency of products or services, the extent to which they respond and fulfill internal desires, and other characteristics and features that express the needs and desires of the customer that he wishes to achieve as a result of obtaining the service or product (Al-Hawary and Harahsheh 2014). AlHamad et al. (2022) study identified dimensions of customer value represented in customer acquisition, customer retention, and customer expansion. The current study adopted the following dimensions:

**Functional value:** it refers to the overall perception of the service's distinction and quality in relation to the desired goal of its existence compared to other alternatives (Al-Hawary and Abu-Laimon 2013). **Emotional value:** this dimension focuses on the intangible aspects of the product or service, such as the mark, the trade name, and the mental status of the service or product (Al-Adamat et al. 2023).

## 2.3 *Marketing Through the Social Media Tools on Customer Value*

The Bolasal and Azouz's (2021) study refer that there is a significant effect of using SM represented by Facebook in creating value for the customer. Thu and Thi (2021) it also sought to identify how the activities applied in SM marketing affect brand loyalty, and the results showed the six elements of SM marketing activities are: entertainment, interaction, trendy, personalization, WM, merchandising have positive associations

with brand loyalty. Hasan and Sohail (2020) study referred that marketers through SM has a significant role in building brand trust and loyalty. A study concluded that social media marketing significantly affects the creation of shared value for customers (Opara and Harry 2020). According to the literature review hypotheses could be as:

**H1: There is an marketing social media (MSM) on customer value (CV) in companies selling and manufacturing cosmetic products in Jordan.**

### 3 Study Model

See (Fig. 1).

## 4 Methodology

### 4.1 Sample and Data Collection

The primary data were collected to examine the impact of SMM on customer value through a quantitative approach applying a sampling method (Babbie 1992; Muda et al. 2022; Sekaran and Bougie 2016). The target population was the customers of companies that sell and manufacture cosmetic products in Jordan in Jordan, where an electronic questionnaire was designed and published on social media platforms for them, e.g., Facebook and WhatsApp. Accordingly, a final sample consisting of (401) valid responses for analysis.

### 4.2 Measurement

The questionnaire contained 23 items formed the measurement model to test the impact of SMM tools on CV, which was borrowed from relevant literature. Marketing social media (MSM) formed the first part of the questionnaire with 15 items that were taken from the study of Al-Nawafah et al. (2022); Bolasal and Azouz (2021). Items for marketing social media deployed on four dimensions as follows: four items related to advertisements (AD), three items for activation (AC), four items related to interaction (IN), and four items for word of mouth (WOM). On the other hand, the second section included eight items for measuring customer value (CV) which correspond to Ahmed (2018); (Hussein and Masakh 2018). These items distributed into two dimensions: functional value (FV) and emotional value (EV) with four items for each.

## 5 Results

The results of the current study included two main headings. The first is dedicated to the pre-tests applied to the measurement model and aimed at determining the achievement degree of validity and reliability (Hair et al. 2021). The second includes the results of evaluating the structural model and parameter values to test the hypotheses of the impact of SMM tools on CV through the PLS-SEM approach recommended by Akour et al. (2023); Hair et al. 2021).

### 5.1 Measurement Model Analysis

The constructs of the measurement model were ascertained by indicators of validity and reliability (Al-Hawary et al. 2023; Majdy et al. 2023; Pallathadka et al. 2023). To retain items within the measurement model, loading values must exceed 0.60 (Hair et al. 2017; Tan et al. 2017). Composite reliability (CR) was used to evaluate the reliability of the combinations with a minimum score of 0.70 (Hair et al. 2011). Convergent validity is applied to determine whether a given item expects a latent variable other than the one to which it belongs (Tan et al. 2017; Urbach and Ahlemann 2010). On the other hand, it evaluates the measure of change achieved by the constructs as a result of the variance of the determinant related to the estimation error (Fornell and Larcker 1981; Hair et al. 2010, 2017; Tan et al. 2017).

Table 2 results show that all measurement model items were retained as their loadings exceed 0.60, which is the minimum required limit. The composite reliability values were within the range of (0.856–0.931), which means that they were higher than 0.70 and confirm the reliability of the current study's measurement model (AlBrakat et al. 2023b; Hair et al. 2017; Mukhlis et al. 2022; Pradhan and Jena 2017). On the other hand, the results showed that the values of AVE ranged from 0.601 to 0.819. This result indicates support for instrument convergent validity as a result of its superiority over the lower threshold of 0.50 (Al-Armeti et al. 2023; Barclay and Lloyd 1996; Boudlaie et al. 2022; Fornell and Larcker 1981; Hair et al. 2011, 2017).

### 5.2 Structural Model Analysis

The structural model of the studies consists of latent constructs, i.e., variables, and the paths that link them, which indicate the size of the effect between those constructs (Hair et al. 2017; Kline 2015). Figure 2 reveals the standard estimation of the structural model of the study. It presents the effect between marketing through the social media tools and customer value, along with an explanation of the impact of each dimension of marketing through the social media tools on customer value within the

limits of path coefficient values ranging from  $-1$  to  $+1$  in order to express the relationship depth between any two constructs.

Ramayah et al. (2016) established the crucial values for significance in 2-tailed tests as follows:  $p$  10% (1.64),  $p$  5% (1.96), and  $p$  1 (2.58). Similarly, marketing researchers used the  $p$  5% significant threshold. According to Hair et al. (2017), bias-corrected bootstrap confidence intervals (lower limit, upper limit) may be utilized to determine if a route coefficient is statistically different from zero. If the confidence interval for a calculated route coefficient does not contain zero, it indicates that this path has a substantial influence (Hair et al. 2017). The structural model outcomes for this study are shown in Table 3.

As seen in Table 3, the path coefficients of MSM were have a significant impact on CV; the result showed that ( $MSM \rightarrow CV, \beta = 0.394$ ;  $t$ -value of 2.139). In addition, the first sub-hypothesis results showed a statistically significant impact at  $p < 0.05$ . Consequently, the results showed an impact of AC on CV was found statistically insignificant at  $p > 0.05$  which means H1.b was not supported. Thereby, the bootstrap results of the H1.c for this study, indicated that the direct effect ( $IN \rightarrow CV, \beta = 0.148$ ,  $t$ -value of 2.293) was significant at  $p < 0.05$ . The results also confirmed that there was a direct effect of H1.d on CV at a 5% confidence interval ( $LL = 0.031$ ,  $UL = 0.227$ ), that does not straddle a 0 in between, which indicated support for these hypothesis.

## 6 Discussion

The study showed an impact of SMM in achieving customer value. Social media also allows customers to record repeated purchases, which are used at a later time to provide a specialized list of quick purchases. In addition, it provides the opportunity to classify products, customize products based on customer desires, and develop staff capabilities to easily identify the most common customer needs and desires, which leads to building successful, positive and lasting relationships with customers and thus gaining their loyalty and satisfaction, which makes them want to constantly deal with this company, and this result is consistent with Bolasal and Azouz (2021) which indicated an impact of the use of SM represented by Facebook in creating value for the customer. And with Hussein and Masakh (2018) which indicated an effect of SMM on loyalty to the hotel brand. And the study of Ahmed (2018), which showed that there is a relationship between the activities of marketing social networking sites and building customer value. And a study by Opara and Harry (2020) that indicated that marketing through social media significantly affects the creation of shared value for customers.

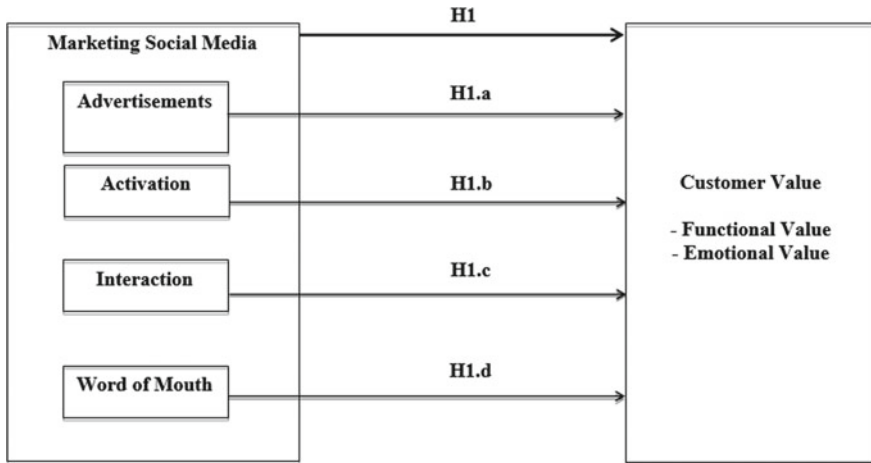


Fig. 1 Study model

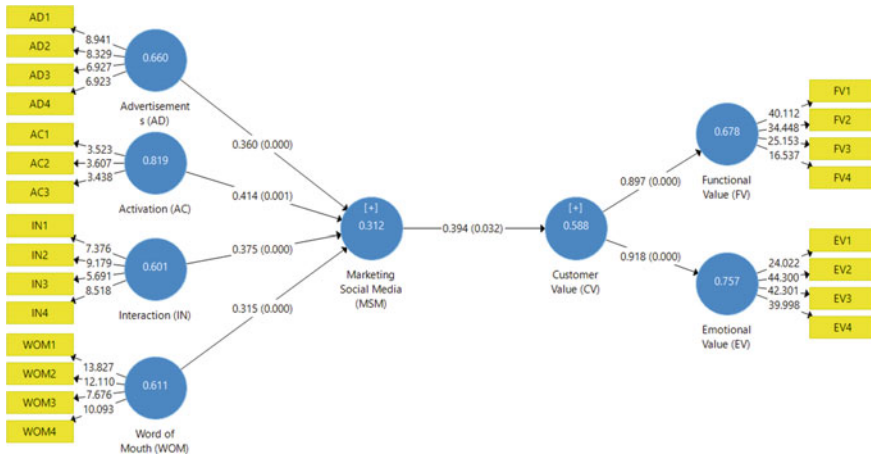


Fig. 2 Structural model results

Table 1 The most prominent dimensions of the independent variable that previous studies dealt with

The study	The dimensions
Opara and Harry (2020)	Content creation, content sharing, and customer interaction
Thu and Thi, (Alhalalmeh et al. 2022)	Entertainment, interaction, trendy, personalization, word of mouth, promotion



**Table 2** Results of reflective measurements model—a summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	(AVE)	Composite reliability (CR)	Cronbach's alpha (CA)
		< 0.60	< 0.50	< 0.50	0.70–0.90	0.60–0.90
<i>Marketing social media (MSM)</i>						
Advertisements (AD)	AD1	0.887	0.848	0.660	0.885	0.827
	AD2	0.852				
	AD3	0.728				
	AD4	0.773				
Activation (AC)	AC1	0.914	0.891	0.819	0.931	0.889
	AC2	0.903				
	AC3	0.898				
Interaction (IN)	IN1	0.767	0.804	0.601	0.856	0.778
	IN2	0.854				
	IN3	0.613				
	IN4	0.830				
Word of mouth (WOM)	WOM1	0.866	0.790	0.611	0.862	0.785
	WOM2	0.795				
	WOM3	0.704				
	WOM4	0.752				
<i>Customer value (CV)</i>						
Functional value (FV)	FV1	0.869	0.840	0.678	0.893	0.893
	FV2	0.860				
	FV3	0.837				
	FV4	0.718				
Emotional value (EV)	EV1	0.814	0.896	0.757	0.926	0.893
	EV2	0.884				
	EV3	0.891				
	EV4	0.889				

**Table 3** Structural model results

Hypothesis	Relationship	Indirect effect ( $\beta$ )	S. error	t-statistic	P values	Confidence interval (BC)		Decision
						LL	UL	
H1	MSM $\rightarrow$ CV	0.394	0.184	2.139	0.032	0.382	0.565	Supported*
H1.a	AD $\rightarrow$ CV	0.142	0.068	2.085	0.037	0.010	0.208	Supported*
H1.b	AC $\rightarrow$ CV	0.163	0.096	1.701	0.089	–0.081	0.297	Not supported
H1.c	IN $\rightarrow$ CV	0.148	0.065	2.293	0.022	0.055	0.211	Supported*
H1.d	WOM $\rightarrow$ CV	0.124	0.059	2.103	0.035	0.031	0.227	Supported*

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# The Role of Digital Promotion in Enhancing the Image of Jordanian Islamic Banks



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**Abstract** The aim of the study is to identify the role of digital promotion in enhancing the image of Jordanian Islamic banks. The study population consisted of clients of the Islamic International Arab Bank., with the sample size determined by simple random sampling. Structural equation modeling (PLS-SEM) was used to

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analyze the hypotheses. The study results showed an impact of digital promotion on the mental image. Based on the aforementioned findings of the study, the study recommends the need to increase the interest of the Islamic Arab Bank in digital promotion as an important element in its marketing operations, and relies on it a lot in its marketing strategies.

**Keywords** Digital promotion · Mental image · Islamic International Arab Bank · Jordan

## 1 Introduction

Marketing is considered one of the old and modern concepts, as a bank is not devoid of marketing activity at different levels, and since the profitability of banks is the basis for its continuity, it was necessary for them to pay attention to marketing activity, in a step that would attract customers and increase their profitability (Al-Hawary and Alhajri 2020; Eldahamsheh et al. 2021; Mohammad et al. 2023; Tariq et al. 2022). Banks in general are considered institutions Services, in which marketing had a prominent role in its continuation and prosperity. Hence the importance of marketing activity, and the importance of the marketing aspect in Islamic banks emerges from being competing with Islamic and conventional banks alike (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019).

Digital promotion has emerged clearly in banking institutions, which represents one of the important elements of the digital marketing mix that is responsible for the institutions' communication with their audience by using modern, multiple, and continuous digital technologies to persuade current and prospective customers, remind them of the services they provide, and distinguish them from competing institutions through an effective digital promotional mix in all aspects (AlBrakat et al. 2023b; Al-Rwaidan et al. 2023; Attiany et al. 2023; Dwijendra et al. 2023; Zahran et al. 2023). Social networking sites, and the modern applications available on smart phones, through which services and products are advertised and promoted and marketed through the adoption of promotional and advertising strategies, thus achieving interaction between the two parties to the promotional relationship (Alkhlifat et al. 2023; Alqahtani et al. 2023; Shamaileh et al. 2023).

The importance of digital promotion has increased as a result of the availability of the infrastructure for the elements and components of information and communication technology, in addition to the significant and rapid increase in the number of Internet users and modern technologies (Alhalalmeh et al. 2020, 2022; Al-Hawary 2013a, b; Al-Hawary and Obiadat 2021; Al-Nawafah et al. 2022).

Mental image plays a major and essential role in determining the behaviour of the individual, and scientific studies have proven that the individual society deals with social reality, approaches it, and gets to know it through the meanings and images that many and various forces, means, and sources worked to form and then consolidate in his mind over extended periods of time (Al-Awamleh et al. 2022;



AlTaweel and Al-Hawary 2021). As a complex process of socialization, many studies in all fields confirm that individuals think through mental images, so addressing individuals and seeking to influence their knowledge, convictions, and behaviours is done by sharpening their memory in different and varied ways (Al-Hawary et al. 2017; Harahap et al. 2022; Metabis and Al-Hawary 2013; Mohammad 2020; Mohammad et al. 2022). So, this research came to test the effect of Digital Promotion in Enhancing the Image of Jordanian Islamic Banks.

## 2 Theoretical Framework and Hypotheses Development

### 2.1 Digital Promotion

Due to the huge technological and digital development, especially in the business and financial sectors, all marketing operations are carried out through digital platforms, and the most prominent of these technological transformations that have appeared are those that affected the means and systems of digital communication (Mohammad et al. 2023; Shaqrah et al. 2023). Online promotion is considered one of the most important areas of digital promotion, and it is recent (Al-Adamat et al. 2023a, b; Alkhlifat et al. 2023; Mohammad 2019; Shamaileh et al. 2023). The Internet has become an effective channel for business organizations to expand their scope and markets; regardless of its size, it offers its various products and services with advanced marketing methods that traditional markets are not familiar with (Al-Adamat et al. 2023b; Alkhaldeh et al. 2023; Al-Rwaidan et al. 2023; Tariq et al. 2022). Digital promotion is the use of social networking sites or search engines to advertise a product or service within paid ads using keywords (Al-Abbadi et al. 2022; Aldaihani et al. 2023a, b; Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Mohammad et al. 2023, 2022; Qurah et al. 2023). Al-Adamat et al. (2023b) defined digital promotion as the digital means that the company undertakes by setting a series of procedures that contribute to achieving the goals of its marketing plan. Al-Hawary and Hussien (2017) defined it as a modern mechanism for advertising products and related information, which is a qualitative transition from traditional promotion to digital promotion through digital marketing channels. The cost of digital promotion is relatively low compared to traditional promotion, and digital promotion is characterized by its ability to measure results more accurately (Alshwabkeh et al. 2022; Khalayleh and Al-Hawary 2022; Kline 2015; Qurah et al. 2023). From the foregoing and by looking at previous studies, most researchers agreed on specific variables for digital promotion, including:

**Digital advertisements**, which are a means of telling about a specific product in order to highlight and clarify after-sales services and motivate customers to purchase it, employ digital means of communication to deliver this product to the largest number of current and prospective customers (Alolayyan et al. 2022; Al-Shorman et al. 2021). **Digital adsare** characterized by their low cost and easy promotion, as

potential customers start interacting the moment the ad starts, which contributes to quickly achieving goals, unlike traditional ads that require time, effort, and money to reach potential customers. **Digital public relations** refers to the integration of public relations and digital means of communication to achieve the goals of public relations. It is the efforts and activities of public relations that are planned, intended, and practiced through modern digital means and systems. **Digital media (visual and audio)**: Digital media refers to more than just the format of digital files, as it represents a broad concept that includes some tools, such as digital pictures, video clips, and music, which is digital content that is represented on accessible media (Khalayleh and Al-Hawary 2022). **Digital Prints**: Digital printing is a modern technology that produces prints directly from computer files instead of slides or photographs, without going through some intermediate media such as color guides or printing plates.

## 2.2 *Mental Image*

The concept of the mental image began to appear in the organizations at the end of the nineteenth century, when the organizations and their leaders, especially the political ones, realized the importance of studying and knowing their image entrenched in the minds of the different masses, during a specific period (Alolayyan et al. 2022; Al-Shormana et al. 2021; Kurdi et al. 2023). Holsti defined the mental image as a group of the individual's knowledge and beliefs in the past, present, and future, which the individual maintains according to a specific system about himself and about the world in which he lives (Aldaihani et al. 2023a). As for Aldaihani et al. (2023b), he defined it as a set of perceptions and mental imagination that an individual performs in order to summon ideas for a specific product or service. Mohammad et al. (2023) believe that the mental image is the impression that is formed through experiences and experiences in the minds of the masses about an organization or a company. Shamaileh et al. (2023) define the mental image as what the customer stores in his memory of the impressions of the institution or its products based on previous perceptions or through the information he receives. Mohammad (2020) believes that the mental image is able to create value for the service and the organization and that it has an impact on consumer behaviour, while Al-Hawary and Obiadat (2021) says that it is a treasure that is difficult to obtain and easy to lose, and the formation of a good mental image has become desirable and a primary goal that organizations seek to achieve (Babit and Agrawal 2019). There was much and varied nomenclature in the administrative literature with regard to the dimensions of the mental image of the organization, the forms of the mental image, namely: **Perception** is a cognitive process that helps clients select, organize, store, and interpret stimuli to create a coherent and effective image of the organization (Al-Hawary and Obiadat 2021; Attiany et al. 2023). **Motivation**: Alqahtani et al. (2023) define motivation as something that encourages and pushes the individual to perform a certain behaviour or action. It is expressed in a hypothetical state that exists within the individual, seeking to alert and stimulate him in order to push him towards achieving a specific

goal (Alqahtani et al. 2023; Shamaileh et al. 2023). **Desire:** It is the lack of something that the individual desires to achieve, but it is less important compared to basic needs, which are self-wishes that individuals wish to achieve and satisfy, according to the environment in which they live.

### ***2.3 Digital Promotion and Mental Image***

Babit and Agrawal (2019) confirmed that smart phone applications and social networking sites are among the channels that contemporary commercial companies have come to use in order to promote their products. Many studies in all fields confirm that individuals think through mental images, so addressing individuals and seeking to influence their knowledge, convictions, and behaviours (Al-Hamoud 2019). Muhammad and Sameh (2023) emphasized the existence of a strong correlation between electronic promotion and competitive advantage, as creating a positive mental image among the company's customers through the company's website and the mission of the institution As for Khalifeti and Kamali (2022), they concluded that the contribution of digital media in influencing the internal and external audience and the effect of the digital media used appear on the audience after increasing turnout and increasing sales. Elias (2022) emphasizes an impact of digital marketing on mental image and customer attitudes. So, the study hypothesis can be as:

**H1: There is an effect of digital promotion on enhancing the mental image of the Islamic International Arab Bank.**

## **3 Study Model**

See (Fig. 1).

## **4 Methodology**

### ***4.1 Sample and Data Collection***

The target population was the clients of the Islamic International Arab Bank in the city of Amman for three branches, as they numbered approximately (32,200) clients., where an electronic questionnaire was designed and published on social media platforms for them, e.g., Facebook and WhatsApp. Accordingly, a final sample consisting of (373) valid responses for analysis, whereby they had obtained appropriate indicators after preliminary tests were conducted on it. Structural equation modeling (PLS-SEM) was applied via the software SMART-PLS.

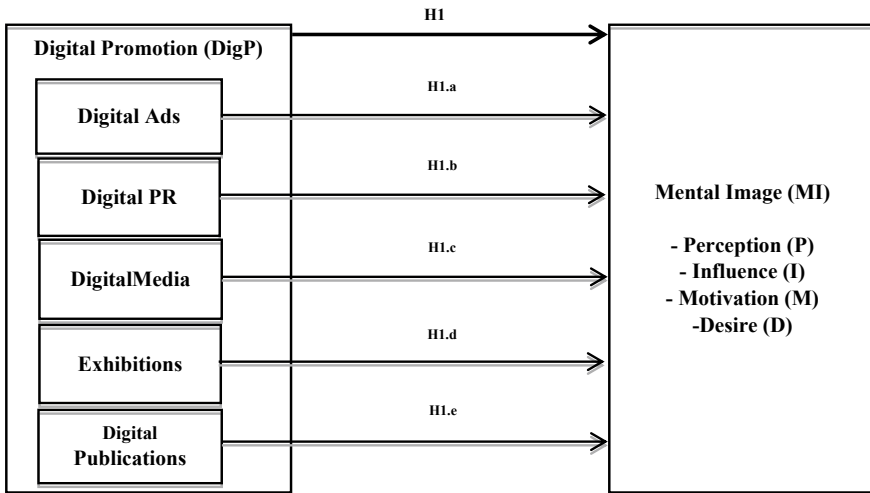


Fig. 1 Proposed model (prepared by researchers)

## 4.2 Measurement

The questionnaire contained 42 items formed the measurement model to test the impact of digital promotion in enhancing the mental image, which was borrowed from relevant literature. Digital promotion (DigP) formed the first part of the questionnaire with 20 items that were taken from the study of Al-Hawary and Obiadat (2021). Items for digital promotion deployed on five dimensions as follows: four items for digital ads (DA), four items for digital PR (DPR), four items for compensation and digital media (DM), four items for exhibitions (EX), and four items for digital publications (DP). On the other hand, the second section included 22 items for measuring mental image (MI) dimensions, which correspond to Alhalalmeh et al. (2022).

## 5 Results

### 5.1 Measurement Model Analysis

The constructs of the measurement model were ascertained by indicators of validity and reliability (Al-Rwaidan et al. 2023; Hair et al. 2011; Muda et al. 2022). To retain items within the measurement model, loading values must exceed 0.60 (Hair et al. 2017; Majdy et al. 2023; Tan et al. 2017; Zahran et al. 2023). Composite reliability (CR) was used to evaluate the reliability of the combinations with a minimum score of 0.70 (Hair et al. 2010, 2017). Convergent validity is applied to determine whether a given item expects a latent variable other than the one to which it belongs (AlBrakat

et al. 2023a, b; Mukhlis et al. 2022; Tan et al. 2017; Urbach and Ahlemann 2010). On the other hand, it evaluates the measure of change achieved by the constructs as a result of the variance of the determinant related to the estimation error (Fornell and Larcker 1981; Henseler et al. 2015; Tan et al. 2017). The convergent validity of this measurement model was assessed by the average variance extracted (AVE) with a minimum threshold of 0.50 (Henseler et al. 2015; Tan et al. 2017). Table 1 lists the results of convergent validity and reliability for evaluating a measurement model for examining the impact of digital promotion on the mental image.

Table 1 results show that the items (DPR4, EX4, DP4, P5, I6, M5, M6 and D5) were cancelled from the measurement model as a result their loadings values did not meet the required condition, whilst the rest items were retained as their loadings exceed 0.60, which is the minimum required limit. The composite reliability values were within the range of (0.868–0.938), which means that they were higher than 0.70 and confirm the reliability of the current study's measurement model (Hair et al. 2017; Pallathadka et al. 2023). On the other hand, the results showed that the values of AVE ranged from 0.646 to 0.792. This result indicates support for instrument convergent validity as a result of its superiority over the lower threshold of 0.50 (Hair et al. 2017). The researchers also implemented a discriminant validity analysis based on comparing the square root of the AVE value for each variable with the correlation coefficients between others (Fornell and Larcker 1981). Table 2 indicates the results of evaluating the discriminant validity of the measurement model according to the Fornell-Larcker criterion.

The results in Table 2 demonstrated that the values of the square root of AVE were greater than 0.70, and they exceeded all correlation coefficients between the rest of the variables. This result fulfills the Fornell-Larcker criteria. Indeed, evaluating the discriminant validity of the measurement model using the PLS-SEM approach in addition to the previous technique entails extracting a matrix Heterotrait-Monotrait Ratio (HTMT). The results of HTMT analysis were shown in Table 3.

The results of Table 3 indicated that the values of HTMT for all measurement model constructs were between 0.048 and 0.789, therefore, they were less than the threshold value of 0.85 (Franke and Sarstedt 2019), which necessitates considering the measurement model to have appropriate discriminant validity (Henseler et al. 2015).

## 5.2 Structural Model Analysis

The structural model of the studies consists of latent constructs, i.e., variables, and the paths that link them, which indicate the size of the effect between those constructs (Hair et al. 2017). Figure 2 reveals the standard estimation of the structural model of the study. It presents the effect between digital promotion on the mental image, along with an explanation of the impact of each dimension of digital promotion on the mental image within the limits of path coefficient values ranging from  $-1$  to  $+1$  in order to express the relationship depth between any two constructs.

**Table 1** Results of reflective measurements model—a summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	(AVE)	Composite reliability (CR)	Cronbach's alpha (CA)
		< 0.60	< 0.50	< 0.50		
<i>(DigP)</i>						
(DA)	DA1	0.863	0.899	0.768	0.930	0.899
	DA2	0.892				
	DA3	0.889				
	DA4	0.861				
(DPR)	DPR1	0.820	0.813	0.710	0.880	0.800
	DPR2	0.863				
	DPR3	0.845				
(DM)	DM1	0.905	0.913	0.792	0.938	0.912
	DM2	0.890				
	DM3	0.879				
	DM4	0.885				
(EX)	EX1	0.840	0.782	0.688	0.868	0.771
	EX2	0.886				
	EX3	0.727				
(DP)	DP1	0.828	0.843	0.759	0.904	0.841
	DP2	0.899				
	DP3	0.886				
<i>(MI)</i>						
(P)	P1	0.872	0.841	0.678	0.893	0.839
	P2	0.861				
	P3	0.838				
	P4	0.714				
(I)	I1	0.826	0.906	0.722	0.929	0.904
	I2	0.808				
	I3	0.870				
	I4	0.871				
	I5	0.872				
(M)	M1	0.793	0.734	0.646	0.879	0.867
	M2	0.763				
	M3	0.745				
	M4	0.903				
(D)	D1	0.923	0.906	0.761	0.927	0.895
	D2	0.879				
	D3	0.865				
	D4	0.818				

**Table 2** Fornell-Larcker criterion

Construct	<i>D</i>	<i>DA</i>	<i>DM</i>	<i>DPR</i>	<i>DP</i>	<i>EX</i>	<i>I</i>	<i>M</i>	<i>P</i>
Desire	<b>0.872</b>								
Digital ads	0.234	<b>0.876</b>							
Digital media	0.263	0.674	<b>0.890</b>						
Digital PR	0.158	0.071	0.027	<b>0.843</b>					
Digital publications	0.130	0.239	0.163	0.676	<b>0.871</b>				
Exhibitions	0.127	0.193	0.084	0.540	0.555	<b>0.829</b>			
Influence	0.170	0.689	0.620	0.042	0.243	- 0.032	<b>0.850</b>		
Motivation	0.118	0.194	0.298	0.020	0.140	0.035	0.208	<b>0.803</b>	
Perception	0.345	0.675	0.694	0.108	0.225	0.115	0.650	0.230	<b>0.824</b>

Bold numbers defines less than or equal 0.01

**Table 3** The HTMT criterion

Construct	<i>D</i>	<i>DA</i>	<i>DM</i>	<i>DPR</i>	<i>DP</i>	<i>EX</i>	<i>I</i>	<i>M</i>	<i>P</i>
Desire									
Digital ads	0.253								
Digital media	0.287	0.743							
Digital PR	0.197	0.095	0.075						
Digital publications	0.145	0.275	0.186	0.816					
Exhibitions	0.170	0.230	0.110	0.668	0.693				
Influence	0.182	0.762	0.679	0.048	0.281	0.067			
Motivation	0.109	0.166	0.189	0.066	0.187	0.160	0.166		
Perception	0.389	0.773	0.789	0.157	0.270	0.158	0.741	0.192	

Ramayah et al. (2016) established the crucial values for significance in 2-tailed tests as follows: p 10% (1.64), p 5% (1.96), and p 1 (2.58). Similarly, marketing researchers used the p 5% significant threshold. If the confidence interval for a calculated route coefficient does not contain zero, it indicates that this path has a substantial influence (Hair et al. 2017). As a consequence, the researcher established 5000 subsamples with a replacement from the bootstrap cases equivalent to the original set of data, which is 258 and the structural model outcomes for this study are shown in Table 4.

As can be observed in Table 4, the path coefficients of DigP were found to have a significant impact on MI; the result indicated that (DigP → MI, β = 0.776; t-value of 19.543), which H1 was supported. In addition, the first sub-hypothesis results showed that this impact was found statistically significant at p < 0.01, which indicated support for H1.a. Consequently, the results showed that the impact of DPR and MI was found statistically significant at p < 0.05 which means H1.b was supported. Thereby, the

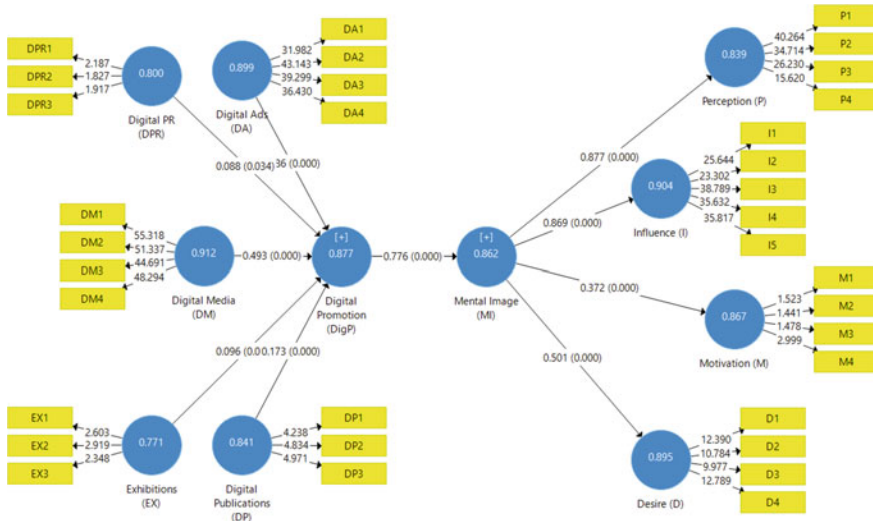


Fig. 2 Structural model results

Table 4 Structural model results

Hypothesis	Relationship	Indirect effect (β)	S. error	t-statistic	P values	Confidence interval (BC)		Decision
						LL	UL	
H1	DigP → MI	0.776	0.040	19.543	0.000	0.700	0.832	Supported*
H1.a	DA → MI	0.377	0.042	8.912	0.000	0.305	0.439	Supported*
H1.b	DPR → MI	0.069	0.036	1.912	0.028	0.010	0.120	Supported**
H1.c	DM → MI	0.383	0.045	8.520	0.000	0.306	0.451	Supported*
H1.d	EX → MI	0.075	0.033	2.290	0.011	0.015	0.118	Supported**
H1.e	DP → MI	0.134	0.036	3.724	0.000	0.067	0.176	Supported*

Note Significance level at \* $p < 0.01$ , \*\* $p < 0.05$  (two-tailed). *UL* upper limit at 95% confidence interval; *LL* lower limit at 5%, *BC* bias corrected

bootstrap results of the H1.c for this study, indicated that the direct effect (DM → MI,  $\beta = 0.383$ ,  $t$ -value of 8.520) was significant at  $p < 0.01$ . The results also showed that there was a significant effect of H1.d on MI at a 5% confidence interval (LL = 0.015, UL = 0.118), which means an estimated path coefficient was included zero in between and that indicates the impact of EX → MI was supported. In addition, the results showed that the impact of DP on MI was found statistically significant at  $p < 0.01$  which means H1.e was supported.



## 6 Discussion

The results related to digital promotion and its dimensions showed that the Islamic International Arab Bank focuses more on its digital promotional tools on digital public relations tools and digital exhibitions to promote the services and products it provides. The Islamic International Arab Bank is also interested in using digital advertisements and modern technology to promote its banking services and it does advertisements through the use of modern digital technologies. The results indicate that the Arab Islamic Bank provides digital means for customers to express their opinions about the services they receive, which provides the bank with direct feedback to benefit from it in improving and developing services. Directly through a technological means. The results indicate that the least tool used by the Islamic International Arab Bank to promote its banking services is digital publications, and this is due to the fact that this tool may be less effective than the rest of the tools, because it does not provide direct interaction with customers. The results related to the mental image showed the great importance of the mental image that is formed by customers through their dealings with the bank, which becomes a major role in their continuity in dealing with the bank and the expansion of the services that they seek to obtain to meet their needs and desires, so the bank is very keen to the mental image of its customers is formed as best as possible to maintain these customers and increase their demand for the services This indicates that what customers care most about in their dealings with the bank is realizing the actual service they get from the bank and the information it provides that helps them determine the type of service they may need.

## 7 Recommendations

Based on the aforementioned findings of the study, the study recommends the need to increase the interest of the Islamic Arab Bank in digital promotion as an important element in its marketing operations, and relies on it a lot in its marketing strategies, especially as it relies heavily on digital technologies in providing its services to customers. And the need to focus on the dimensions of digital promotion, as it has a great role in creating and shaping the mental image of customers. In addition to focusing on digital communication means, and investing them in achieving a kind of effective participation of the bank's customers in promotional activities through designing technical programs and virtual communities that simulate customers, and encourage them to use its website and other technical tools. And the need for the bank to include the appropriate promotional material in the digital promotional tools, which ensures creating or motivating customers.

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# The Role of Digital Public Relations in Improving the Mental Image



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**Abstract** This study came to test the role of digital public relations in improving the mental image of the Jordanian Duty Free Company. The study population includes all customers of the Jordanian Duty Free Shops Company, with the sample size determined by simple random sampling. The study followed the quantitative approach using partial least squares structural equation modeling (PLS-SEM) to analyze the hypotheses. The study found that there is an impact of digital public relations in improving the mental image. According to the results, the recommendations of the study is activating the digital public relations means for the customers of the Jordanian Duty Free Shop Company.

**Keywords** Digital public relations · Mental image · Jordan

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# 1 Introduction

Digital public relations occupies great importance in contemporary administrative systems, as it is assigned a vital role related to showing the prestigious image of the organization and what it offers to society (AlBrakat et al. 2023a, b; Al-Rwaidan et al. 2023; Attiany et al. 2023; Eldahamsheh et al. 2021). Digital public relations constitute a link between the organization and the external community. Digital public relations also affects the thinking of customers by communicating with them so that they have a positive image of the organization, respect and support it, and sympathize with it in facing challenges and obstacles. It expresses a method and an art to find a general understanding of the activities of the organization (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad 2019).

Mental image that customers form towards the organization as a guide for understanding, perceiving, and interpreting things. It is the idea that the customer forms about a specific thing and the consequent positive or negative actions through which their behaviors are shaped, and it is a natural outgrowth of a group of direct and indirect experiences that customers receive. Through their various communication interactions, cultural and cognitive awareness and the formation of public opinion have become one of the many advantages of digital public relations, as it plays an important role in directing customers' thoughts towards a specific issue because it attracts attention through thinking and analysis (Alkhlifat et al. 2023; Alqahtani et al. 2023; Barclay and Lloyd 1996; Shamaileh et al. 2023). The interest of organizations in the concept of mental image has increased in recent times because this concept plays a very important role in forming opinions, making decisions, and shaping behavior for customers, as the mental image plays an effective role in forming the individual's perceptions and knowledge, which leads to a clear impact on individuals' behavior, capabilities, and expectations (Aityassine et al. 2022; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-khawaldah et al. 2022; AlTaweel and Al-Hawary 2021).

The importance of the study appears practically from its results, which may help the decision-makers in the Jordanian Duty Free Shop Company to take the necessary procedures and measures to activate the Public Relations Department digitally, in addition to what the researcher hopes may be achieved for Jordanian companies to enhance their mental image among customers, which is reflected in their competitiveness. Therefore, this study came to test the role of digital public relations in improving the mental image of the Jordanian Duty Free Company.

## 2 Theoretical Framework and Hypotheses Development

### 2.1 *The Concept of Digital Public Relations*

The digital public relations (DPR) term consists of two parts: the first is public relations, and the second is digital. It can be said that public relations has become clear and widely known after it has gone through many developments since its emergence in the 1920s, as it is defined as “the planned and exerted efforts to establish and maintain mutual understanding between the organization and its publics” (Al-Hawary and Harahsheh 2014; Tariq et al. 2022). As for digital public relations, it is “the management of communication between the organization and its customers through the use of Internet applications, including these applications such as the website, electronic games, and text messaging services that provide information via the Internet, and the integration of texts, graphics, images, and video clips” (Alhalalmeh et al. 2022; Al-Hawary 2013b; Al-Hawary and Obiadat 2021). Digital public relations is one of the latest concepts in managing the image and reputation of organizations, and it is defined as “the management of interaction and relations” with the public through electronic dialogue windows with multiple programs and various interactive applications such as YouTube, Facebook, Twitter, and other electronic media that allow the holding of various events and events such as conferences and exhibitions. “On the ground, but also through cyberspace, which is known as virtual events, where dialogue circles are created that are characterized by live discussions between the organization and its customers through its website, through various electronic applications that also allowed the management of events directly via the Internet and satellites” (Alhalalmeh et al. 2022; Al-Hawary 2013a; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Al-Zoubi et al. 2022).

The competitive nature of the business environment also called on organizations to use new means to improve their image with their customers, as digital public relations emerged, which is considered one of the latest concepts in managing the image and reputation of organizations (Aldaihani et al. 2023a; Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2022). After reviewing several previous studies, such as the study of Al-Zoubi et al. (2022), the dimensions of digital public relations can be represented as follows:

**Digital advertisements:** Digital advertisements are defined as “information placed in the behavior of customers via the Internet, related to goods and services, and of an informational nature aimed at prompting the purchase of these goods or services” (Al-Adamat et al. 2023b; Alhalalmeh et al. 2020; Al-Hawary 2013b; Al-Hawary and Obiadat 2021; Alkhawaldeh et al. 2023). **Digital media (audio-visual):** Digital media (audio-visual) was defined as “digital technologies that include text, images, sound, and graphics that are produced, displayed, and presented in one location or multiple locations that interact with each other functionally within the framework of an institutional system that allows the recipient to access, roam, freely choose (Al-Adamat et al. 2023a, b; Aldaihani et al. 2023b; Mohammad et al. 2023). **Exhibitions:** Exhibitions are used in public relations, as they can be participated in



when holding general or specialized exhibitions and meeting with different parties participating in the exhibition, or to establish dialogues and working sessions to exchange ideas and opinions or to expand mutual participation between the parties participating in the exhibition (Al-Adamat et al. 2023a; Shaqrah et al. 2023). **Digital publications** are “digital brochures and brochures that allow the use of printing and color technologies to give a detailed description of the organized event, its products and services marketed and provided through it, and to explain the methods of use and optimal use of them” (Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016).

## 2.2 *Mental Image*

The mental image of companies is considered one of the most important intangible resources that support the continuity of their competitive advantage, and it is one of the strategic assets that lead to creating a competitive advantage and conditions that encourage survival and development. Positive mental image is also considered to have a great impact on the success of companies, and it is able to create value. And it has an impact on the behavior of customers, as it includes a certain perception they have, and this perception may not reflect the objective reality (Al-Hawary 2013a; Al-Hawary et al. 2020; Shaqrah et al. 2023).

It is “the actual image that is formed in people’s minds about the various organizations, and this image may consist of direct or indirect experience, and it may be rational or not rational, and it may depend on evidence and documents or on rumors and undocumented sayings, but in the end it represents a reality” honest to those who carry it in their heads (Al-Alwan et al. 2022a, b; AlHamad et al. 2022). The mental image is subject to reduction and distortion in the sense that it may it does not necessarily reflect the reality of beings, as there may be a mental image of a specific group or “person without reflecting the reality of that group” or that person (Al-Hawary et al. 2023; Alolayyan et al. 2018, 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021).

Al-Hawary and Al-Khazaleh (2020) believes that the mental image consists of the following dimensions: The physical element is the tangible part of the brand. Personality: It is the way in which the product is talked about that is entrenched in the customer’s mind. Relationships: the relationship between the clients and the product Cultural environment: It means integration with the cultural environment in which the brand operates. Reflection: It means what the customer’s mental image reflects about who owns the company’s products. Mental operations: It is all about reflecting the customer’s previous experience in his mind (Alhalalmeh et al. 2020; Al-Hawary and Al-Smeran 2017; Rahamneh et al. 2023). The difference between researchers in defining the dimensions of the mental image of companies is due to the fact that the mental image that customers form towards companies is affected by the simplest constituent elements of the company and its products, which means that there is a great sensitivity towards the mental image as it is based on the different

experiences of customers and is based on their ideas, experiences, and perceptions (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017).

### 2.3 Digital Public Relations and Customer’s Image

The ultimate goal of digital public relations is to build and strengthen the positive mental image of organizations in the minds of customers, as it cares and always seeks to form a good image of the organization and its products (Khalifa 2021), and a lot of papers have indicated how much important is the role that digital public relations plays in forming the image. The mentality of the target customers has increased due to its connection to the Internet, the ability of digital public relations to break geographical barriers, and the use of the Internet as a means that provides opportunities for information, persuasion, and information provision. Public relations uses exhibitions as a means of contacting customers in order to create the appropriate climate to form the mental and personal image of the organization and to spread knowledge and understanding between the organization and its customers. Transferring extracted digital texts without the need to reprint them, and its ability to transfer entire libraries, in addition to referring to used sources easily, and developing spelling correction capabilities for digital texts, in addition to developing scanning devices and software, developing machine translation of digital texts, and establishing information centers (Elrasekh 2019). According to that the study hypothesis were formulated as follows (Fig. 1):

**H1: There is an impact of digital public relations on improving the mental image of the Jordanian Duty Free Company.**

**Image (MI) of the Jordanian Duty-Free Shops Company.**

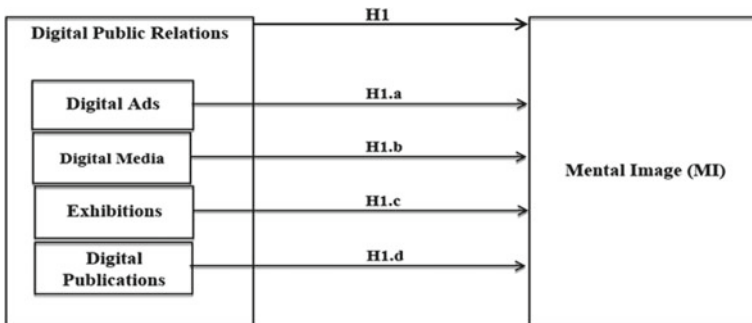


Fig. 1 Proposed model (prepared by researchers)

## 3 Methodology

### 3.1 *Sample and Data Collection*

The primary data were collected to examine the impact of digital public relations on mental image through a quantitative approach applying a sampling method (Sekaran and Bougie 2016). The target population was the customers of the Jordanian Duty Free Shops Company, where an electronic questionnaire was designed and published on social media platforms for them, e.g., Facebook and WhatsApp. Accordingly, a final sample consisting of (471) valid responses for analysis, whereby they had obtained appropriate indicators after preliminary tests were conducted on it. Moreover, the process of evaluating the reliability and validity of the measurement model was based on the descriptive parameters of the demographic characteristics of the respondents through the techniques included in the SPSS software, after the dimensions of the outliers. To test the hypotheses, partial least squares structural equation modeling (PLS-SEM) was applied via the software SMART-PLS.

### 3.2 *Measurement*

The electronic questionnaire of the current study included items distributed into two parts, as the respondents were asked to evaluate these items according to a Likert scale with a minimum of 1 “strongly disagree” and a maximum of 5 “strongly agree”. In general, the questionnaire contained 23 items formed the measurement model to test the impact of digital public relations on mental image, which was borrowed from relevant literature. Digital public relations (DPR) formed the first part of the questionnaire with 17 items that were taken from the study of Alqahtani et al. (2023). Items for digital public relations deployed on four dimensions as follows: four items related to digital ads (DA), four items for digital media (DM), five items related to exhibitions (EX), and four items for digital publications (DP). On the other hand, the second section included five items for measuring mental image (MI), which correspond to Al-Hawary et al. (2020).

## 4 Results

The results of the current study included two main headings. The first is dedicated to the pre-tests applied to the measurement model and aimed at determining the achievement degree of validity and reliability (Hair et al. 2021). The second includes the results of evaluating the structural model and parameter values to test the hypotheses of the impact of digital public relations on mental image through the PLS-SEM approach recommended by Hair et al. (2017).

## 4.1 Measurement Model Analysis

The constructs of the measurement model were ascertained by indicators of validity and reliability (Al-Rwaidan et al. 2023; Hair et al. 2011; Muda et al. 2022). To retain items within the measurement model, loading values must exceed 0.60 (Hair et al. 2011; Kurdi et al. 2023; Zahran et al. 2023). Composite reliability (CR) was used to evaluate the reliability of the combinations with a minimum score of 0.70 (Hair et al. 2017). Convergent validity is applied to determine whether a given item expects a latent variable other than the one to which it belongs (Zahran et al. 2023). On the other hand, it evaluates the measure of change achieved by the constructs as a result of the variance of the determinant related to the estimation error (Fornell and Larcker 1981; Harahap et al. 2022). The convergent validity of this measurement model was assessed by the average variance extracted (AVE) with a minimum threshold of 0.50 (Henseler et al. 2015). Table 1 lists the results of convergent validity and reliability for evaluating a measurement model for examining the impact of digital public relations on mental image.

Table 1 results show that the items (DP4 and MI6) were cancelled from the measurement model as a result their loadings values did not meet the required condition, whilst the rest items were retained as their loadings exceed 0.60, which is the minimum required limit. The composite reliability values were within the range of (0.868–0.938), which means that they were higher than 0.70 and confirm the reliability of the current study's measurement model (Hair et al. 2017; Pallathadka et al. 2023). On the other hand, the results showed that the values of AVE ranged from 0.629 to 0.792. This result indicates support for instrument convergent validity as a result of its superiority over the lower threshold of 0.50 (Hair et al. 2017). The researchers also implemented a discriminant validity analysis based on comparing the square root of the AVE value for each variable with the correlation coefficients between others (Barclay and Lloyd 1996; Fornell and Larcker 1981). Table 2 indicates the results of evaluating the discriminant validity of the measurement model according to the Fornell-Larcker criterion.

The results in Table 2 demonstrated that the values of the square root of AVE were greater than 0.70, and they exceeded all correlation coefficients between the rest of the variables. This result fulfills the Fornell-Larcker criteria. Indeed, evaluating the discriminant validity of the measurement model using the PLS-SEM approach in addition to the previous technique entails extracting a matrix Heterotrait-Monotrait Ratio (HTMT). Kline (2015) mentioned that the values of HTMT must be lower than the required threshold value.85 (Kline 2015). Nevertheless, the confidence interval for the HTMT analysis must not take a count value of 1 on any of the constructs (Henseler et al. 2015). The results of HTMT analysis were shown in Table 3

The results of Table 3 indicated that the values of HTMT for all measurement model constructs were between 0.067 and 0.762, therefore, they were less than the threshold value of 0.85, which necessitates considering the measurement model to have appropriate discriminant validity (Fornell and Larcker 1981; Henseler et al. 2015).

**Table 1** Results of reflective measurements model—a summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	(AVE)	Composite reliability (CR)	Cronbach's alpha (CA)
		< 0.60	< 0.50	< 0.50	0.70–0.90	0.60–0.90
<i>Digital public relations (DPR)</i>						
Digital ads (DA)	DA1	0.863	0.899	0.768	0.930	0.899
	DA2	0.891				
	DA3	0.889				
	DA4	0.861				
Digital media (DM)	DM1	0.905	0.913	0.792	0.938	0.912
	DM2	0.890				
	DM3	0.879				
	DM4	0.885				
Exhibitions (EX)	EX1	0.828	0.891	0.629	0.893	0.855
	EX2	0.848				
	EX3	0.874				
	EX4	0.728				
	EX5	0.666				
Digital publications (DP)	DP1	0.841	0.784	0.688	0.868	0.771
	DP2	0.888				
	DP3	0.754				
Mental image (MI)	MI1	0.816	0.913	0.722	0.928	0.904
	MI2	0.797				
	MI3	0.879				
	MI4	0.872				
	MI5	0.880				

**Table 2** Fornell-Larcker criterion

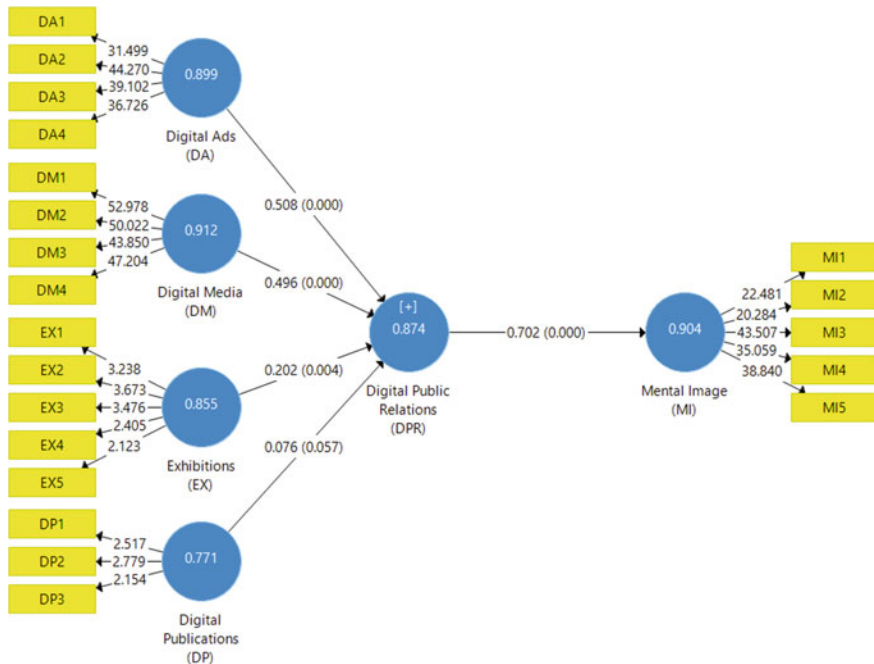
Construct	DA	DM	DP	EX	MI
Digital ads	<b>0.867</b>				
Digital media	0.675	<b>0.890</b>			
Digital publications	0.192	0.084	<b>0.829</b>		
Exhibitions	0.212	0.133	0.600	<b>0.793</b>	
Mental image	0.694	0.624	– 0.029	0.205	<b>0.850</b>

**Table 3** The HTMT criterion

Construct	DA	DM	DP	EX	MI
Digital ads					
Digital media	0.743				
Digital publications	0.230	0.110			
Exhibitions	0.224	0.154	0.748		
Mental image	0.762	0.679	0.067	0.203	

### 4.2 Structural Model Analysis

The structural model of the studies consists of latent constructs, i.e., variables, and the paths that link them, which indicate the size of the effect between those constructs (Hair et al. 2017). Figure 2 reveals the standard estimation of the structural model of the study. It presents the effect between digital public relations on mental image, along with an explanation of the impact of each dimension of digital public relations on mental image within the limits of path coefficient values ranging from  $- 1$  to  $+ 1$  in order to express the relationship depth between any two constructs.



**Fig. 2** Structural model results

Ramayah et al. (2016) specified the critical values for significance in 2-tailed tests as follows:  $p < 10\%$  (1.64),  $p < 5\%$  (1.96), and  $p < 1$  (2.58); also, as usual, the researchers in marketing utilized the significance level of  $p < 5\%$ . Hair et al. (2011) stated that the bias-corrected bootstrap confidence intervals (lower limit, upper limit) allow testing whether a path coefficient is significantly different from zero. If the confidence interval for an estimated path coefficient does not include zero, this means there is a significant effect of this path (Hair et al. 2017). Therefore, the researcher set 5000 subsamples with a replacement from the bootstrap cases equal to the original set of data which is 471 and the results of the structural model for this study are shown in Table 4.

As can be observed in Table 4, the path coefficients of DPR were found to have a significant impact on MI; the result indicated that (DPR → MI,  $\beta = 0.702$ ; t-value of 13.811), which H1 was supported. In addition, the first sub-hypothesis results showed that this impact was found statistically significant at  $p < 0.01$ , which indicated support for H1.a. Consequently, the results showed that the impact on DM on MI was found statistically significant at  $p < 0.01$  which means H1.b was supported. Thereby, the bootstrap results of the H1.c for this study, indicated that the direct effect (EX → MI,  $\beta = 0.142$ , t-value of 2.881) was significant at  $p < 0.05$ . The results also showed that there was a significant effect of H1.d on MI at a 5% confidence interval (LL = 0.002, UL = 0.098), which means an estimated path coefficient was included zero in between and that indicates the relationship of DP → MI was supported.

**Table 4** Summary of the structural model results

Hypothesis	Relationship	Indirect effect ( $\beta$ )	S. error	t-statistic	P values	Confidence interval (BC)		Decision
						LL	UL	
H1	Relationship of DPR → MI	0.702	0.051	13.811	0.000	0.600	0.771	Supported*
H1.a	Relationship of DA → MI	0.356	0.042	8.477	0.000	0.283	0.418	Supported*
H1.b	Relationship of DM → MI	0.348	0.044	7.834	0.000	0.271	0.416	Supported*
H1.c	Relationship of EX → MI	0.142	0.049	2.881	0.002	0.043	0.204	Supported**
H1.d	Relationship of DP → MI	0.053	0.032	1.650	0.049	0.002	0.098	Supported**

Note Significance level at \* $p < 0.01$ , \*\* $p < 0.05$  (two-tailed). UL upper limit at 95% confidence interval; LL lower limit at 5%; BC bias corrected

## 5 Discussion

The study concluded that there is a statistically significant role for digital public relations (digital advertisements, digital media (audio-visual), exhibitions, and digital publications) in improving the mental image of the Jordanian Duty Free Company, and this result is consistent with the findings of some studies which concluded that improving the mental image of the organization requires a review of the marketing of communicative content; the study of Khalifa (2021), which confirmed that achieving continuous communication with the public through social media is the most important method used to draw a good image of the organization in the mind of the public; with other emphasis on the role of public relations in the digital content industry enhances institutional trust. The results of the current study are inconsistent with the results of the studies of Al-Zoubi et al. (2022); Rehman (2020); Yamei et al. (2021) due to the difference in the dependent variable. The results of the current study are also inconsistent with other studies as Syafaat and Wahyudin's (2021) study due to the difference in the approach that was adopted to achieve the objectives of the study. The study attributes these differences in the results to the difference in one of the independent variables or the dependent variable that was adopted by previous studies, and the difference in the organizations under study leads to the difference in the results.

## 6 Recommendations

Based on the previous results, the study recommends activating the digital public relations means for the customers of the Jordanian Duty Free Shop Company for its clear impact on improving the mental image of the company. And the establishment of a special department for digital public relations in the Jordanian Duty Free Shop Company. In addition to increasing the volume of institutional digital advertising due to its low cost and its effective impact on improving the mental image of the Jordanian Duty Free Company, Issuing digital publications periodically on the website of the Jordanian Duty Free Shop Company and ensuring that the appropriate customers are targeted. In addition to intensifying the participation of the Jordanian Duty Free Shop Company in exhibitions and following up on its results through pre- and post-measurements of the impact of these exhibitions on the mental image of customers, and the use of audio-visual digital media as a means of communication with the customers of the Jordanian Duty Free Shop Company through e-mail or mobile messages for ease of application.



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# The Role of Public Policy Making in the Strategic Performance According to the Balanced Scorecard Model



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**Abstract** The current study came to shed light on the role of public policy-making in the strategic performance according to the balanced scorecard model. Therefore, it was focused on the Executive Council of Karak Governorate in Jordan. A random sample of (84) respondent. Structural equation modeling (SEM) was used to test hypotheses. The results demonstrated that public policy-making has a positive impact on the strategic performance. Based on the previous results, the current study recommends reinforcing the principle of participation in drawing up public policies in the governorate in a better way than what is currently practiced.

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**Keywords** Public policy-making · Strategic performance · Karak Governorate · Jordan

## 1 Introduction

The process of drawing public policy goes through many stages that differ from one country to another in terms of their nature and complexity and according to many factors, the most important of which is the political system in the country and the system of government in it (Alkhlifat et al. 2023; Alqahtani et al. 2023; Dwijendra et al. 2023; Shamaileh et al. 2023). The system of government also defines the channels that enable individuals and groups to proceed in resolving the problem at hand, which may have an impact on government work procedures and on those with the authority to make the official political decision, which leads to the adoption of new solutions (Al-Abadi et al. 2022; Al-Hawary 2013a; Al-Hawary and Obiadat 2021; Al-Laila 2016; Khalayleh and Al-Hawary 2022; Mohammad 2019). The relationship between the public interest and public policy is interdependent, based on the fact that the government's mission, whether central or local, must always be in the service and protection of the public interest (AlBrakat et al. 2023a, b; Attiany et al. 2023; Zahran et al. 2023). Accordingly, the concept of serving and protecting the public interest includes the government's practices as it is concerned with providing services to the public, whether they are individuals or institutions, and services and work affairs must be provided according to the best international standards in terms of quality and satisfaction of service recipients (Aityassine et al. 2022; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-khawaldah et al. 2022; AlTaweel and Al-Hawary 2021). That is why it is necessary to find mechanisms and systems that support and enhance strategic performance in various fields of work, keeping pace with changes in the surrounding environment, the ability to sense risks, take advantage of opportunities, and face environmental challenges, in order to continue, succeed, develop, survive, and excel in performance (Al-Armeti et al. 2023; Al-Hawary and Al-Rasheedy 2021). Based on the foregoing, the current study came to shed light on the role of public policy-making in the strategic performance according to the balanced scorecard model in the Executive Council of Karak Governorate.

## 2 Literature Review and Hypotheses Development

### 2.1 Public Policy Drawing

The process of drawing public policy is one of the most important and first stages of making public policy. The process of drawing public policy means those political and non-political processes and procedures that the government takes to reach a consensus

on the definition of the problem, as well as identifying alternatives to solve it and the basis for comparison between them in preparation for choosing the best proposed alternatives to be approved in the form of a binding and compulsory public policy that involves a satisfactory solution to that problem or proposal submitted to the government (Alhalalmeh et al. 2022; Alhalalmeh et al. 2022; Al-Hawary 2013b; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Metabis and Al-Hawary 2013). Public policy is drawn up or made by leaders or decision-makers who have been influenced by or adopted the point of view of some groups or one of the classes of society. Public policy makers are subject to the prevailing ideology, the shape and size of political institutions in society, and the nature of the prevailing pattern of relations between them (Anderson 1994; Eldahamsheh et al. 2021; Mohammad et al. 2020; Tariq et al. 2022). Public policy has many and varied dimensions, including.

**Participation:** To ensure the achievement of the desired goals of drawing up public policy, all parties concerned with solving problems in society must participate. Participation means that collective efforts are directed towards bringing about change in society (Aldaihani et al. 2023; Al-Hawary et al. 2020a; Baalbaki 2009; Kurdi et al. 2023; Mohammad et al. 2023; Rahamneh et al. 2023). **Flexibility:** It is defined as that policy that is characterized by being subject to change, development, modification, and deletion according to the variables resulting from it and imposed on it in order to move away from stagnation and then its failure to introduce new variables (Al-Shammari 2004; Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2022). **Justice:** It is defined as the degree to which workers realize that the rules, regulations, procedures, and policies related to their work are fair for all (Alolayyan et al. 2018, 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021; Hussein 2012). Achieving justice among members of society is linked to political choices. Public policies adopted by governments are divided into four basic types: regulatory policies, developmental policies, distributive policies, and redistributive policies.

## 2.2 *Strategic Performance*

Strategic performance is considered one of the important topics that has attracted the attention of researchers and scholars in the field of management, as it reflects the expected result behind each activity. In light of its definition, the indicators of its measurement are determined, and the procedures that allow for its improvement can be imagined (Al-Adamat et al. 2023b; Al-Alwan et al. 2022a, b; AlHamad et al. 2022; Alkhalwaldeh et al. 2023). Some measure it with outputs, and others measure it with operations, and each has its justifications (Al-Armeti et al. 2023; Al-Shormana et al. 2021). One of the most common definitions of strategic performance is that it expresses the position of the organization in achieving the goals it seeks to achieve and for which it was founded, and the extent of its growth and improvement of its business from one period to another, which mainly focuses on operating all available energies at the lowest costs, with attention to the quality of the product or service, and the

continuous endeavor to develop the elements of production in the organization, which include financial, material, and human resources (Al-Hawary and Obiadat 2021; Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016; Al-Hawary et al. 2020b). Strategic performance is also defined as the organization's ability to deal with its internal and external environment through its access to available resources, the efficiency of its internal operations, and the production of products and services required by the public (Alolayyan et al. 2023; AlTaweel et al. 2023). Al-Shormana et al. (2021) define strategic performance as the process through which strategic planning and strategic performance management are combined in the organization to reach an organizational structure based on strategies and functions. As for Al-Abbadi et al. (2021), strategic performance is defined as the organization's ability to achieve its goals through the efficient and effective use of available resources. AlTaweel et al. (2004) believe that quality, cost, and speed of product delivery are appropriate measures that reflect the strategic performance of companies.

### 2.3 *Balanced Scorecard*

The balanced scorecard consists of a set of performance measures derived (AlHamad et al. 2022; Al-Hawary and Abu-Laimon 2013; Al-Hawary and Al-Syasneh 2020; Alkhalwaldeh et al. 2023; Hair et al. 2017).

**The financial dimension:** It is that dimension that is concerned with the financial aspects of the performance of the organization. Generally, long-term goals in the public and service sectors are measured by the effectiveness and efficiency of these organizations in achieving and meeting the needs of customers at the lowest possible cost and in the shortest possible time (Al-Hawary and Al-Syasneh 2020; Alshura et al. 2023a, b). **Customers' Dimension:** Organizations seek to achieve customer satisfaction in the long term, and this is an important matter for organizations (Al-Adamat et al. 2023a; Al-Hawary and Al-Rasheedy 2021; Al-Hawary and Al-Smeran 2017; Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Shaqrah et al. 2023). **Internal operations dimension:** In order for the organization to be distinguished by its performance in the long term, it must provide all means to enhance the innovation and creativity processes, and in the short term, its operational processes must be efficient in terms of reducing the time period required for designing, developing, and delivering the service or product (Al-Abbadi et al. 2021; Alhalalmeh et al. 2022; AlTaweel et al. 2023; Mohammad et al. 2020). **Learning and growth dimension:** This dimension emphasizes three capabilities: employee capabilities and reorientation, the effectiveness of information systems, and material and moral stimulation.



## ***2.4 Public Policy-Making and the Strategic Performance***

The study of Amin and Hussein (Attiany et al. 2023) aimed at defining the importance of drawing local policies and the performance. The study concluded that there is coordination with the central government for the purpose of drawing up local policies. The results showed that local policies have an effect on the performance of Baghdad Governorate. And in Belkasmi's study (2016), which concluded that the absence of social participation helps widen the gap between the decision-maker and the local population affected by the decision, which leads to a reduction in social and economic returns and a lack of optimal utilization of resources. The reduction of the financial powers of local communities is also considered one of the most important challenges that prevent them from performing their developmental function, and achieving local development at a high rate necessarily requires continuous and increasing financial resource flows at the same time. The results of the study (El-Hadrawi et al. 2018) indicated that there is a relationship between electronic management and strategic performance. Based on above, the study hypotheses can be formulated as:

**H1: There is an impact of public policy-making on the strategic performance.**

## **3 Study Model**

See (Fig. 1).

## **4 Methodology**

### ***4.1 Population and Sample Selection***

The study population was determined, which consisted of Executive Council of Karak Governorate in Jordan. Hence, the study instrument was disseminated simultaneously to a random sample of 94 members via electronic means. At the end of the data collection process, 84 responses were obtained that fit the requirements of the statistical analysis. These responses accounted for 89.3% of the response rate, which indicates a fair representation of the target population and achieves the criteria for adequacy of sampling (Sekaran and Bougie 2016).

### ***4.2 Measurement Instrument***

This instrument consisted of three sections. It contained a section for collecting demographic data of the respondents. A section was allocated to the independent

variable, i.e., public policymaking, which contained (15) items taken from (Amarasinghe et al. 2023; Lourenço 2023; Ruvalcaba-Gomez et al. 2023). These items formed three dimensions for public policymaking with four items for each one: participation, flexibility, and equity. On the other hand, the last section of the study instrument contained the measures of the dependent variable, i.e., strategic performance, which were evaluated using 12 items drawn from (El-Hadrawi et al. 2018; Newbery et al. 2023). The items of strategic performance formed three dimensions with four items for each: customer, internal operation and learning and growth.

## 5 Findings

### 5.1 Measurement Model Evaluation

To evaluate the impact of public policymaking in strategic performance, structural equation modeling (SEM) was relied upon as a modern approach to examine the interaction between latent constructs measured by observing variables (AL-Zyadat et al. 2022; Boudlaie et al. 2022; Mukhlis et al. 2022; Rahamneh et al. 2023; Wang and Rhemtulla 2021). The application of this statistical method requires subjecting the study instrument to a test of validity and reliability before conducting an evaluation of the effect size. Accordingly, confirmatory factor analysis (CFA), which is one of the SEM procedures using the AMOS software, was applied to extract the validity and reliability of a measurement model, which were reported in Table 1.

The loadings of public policymaking and strategic performance items were between 0.726 and 0.897, indicating that they were all retained as they were above the lower threshold of 0.50 (Al-Lozi et al. 2018; Saraireh et al. 2022; Sung et al. 2019). The average variance extracted (AVE) values for the research latent constructs were greater than 0.50, which means that they met the convergent validity condition (Harahap et al. 2022; Howard 2018). Moreover, the comparison results confirmed that the values of AVE were greater than the maximum shared variance (MSV), also, it indicated that the values of the square root of AVE were superior to the correlation coefficients between the other constructs in the model. These results are evidence of achieving discriminant validity according to the Fornell-Larcker criteria (Rimkeviciene et al. 2017). On the other hand, the reliability of the measurement model constructs was verified by using Cronbach alpha coefficients ( $\alpha$ ) for internal consistency and McDonald's omega coefficients ( $\omega$ ) for composite reliability with a minimum of 0.70 for both measurements. According to the results in Table 1, the values of Cronbach's alpha coefficients (0.811–0.897) and McDonald's omega coefficients (0.837–0.899) were greater than 0.70, which indicates that the model constructs were reliable (deLeeuw et al. 2019; Majdy et al. 2023; Zahran et al. 2023).

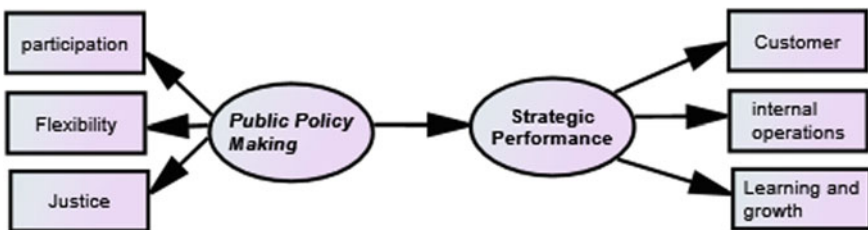
**Table 1** Results of validity and reliability tests

Constructs	1	2	3	4	5	6
1. Participation	<b>0.866</b>					
2. Flexibility	0.864	<b>0.728</b>				
3. Equity	0.675	0.733	<b>0.833</b>			
4. Customer	0.749	0.719	0.899	0.852		
5. Internal operation	0.841	0.829	0.759	0.777	0.884	
6. Learning and growth	0.862	0.596	0.773	0.753	0.766	–
VIF	3.111	3.082	3.292	–	–	–
Loadings range	0.758–0.873	0.765–0.833	0.729–0.859	0.763–0.897	0.726–0.894	0.798–0.882
AVE	0.775	0.759	0.766	0.798	0.797	0.801
MSV	0.742	0.723	0.842	0.799	0.766	0.852
Internal consistency	0.873	0.897	0.842	0.877	0.855	0.811
Composite reliability	0.848	0.837	0.845	0.868	0.899	0.879

### 5.2 Structural Model

Table 1, it became clear that there was no multi collinearity between the dimensions of public policymaking, where the values of variance inflation factor (VIF) for those constructs were less than 5 (Hair et al. 2017; Pallathadka et al. 2023). In this context, it is possible to continue testing the hypotheses through SEM shown in Fig. 2.

The results of Fig. 2 confirm that the structural model for examining the impact of public policymaking in the strategic performance in Jordan gained appropriate values of the goodness of fit. CMIN/DF was less than 3, the values of CFI and TLI were greater than 0.90, along with the value of RMSEA which was smaller than 0.08 (Shi et al. 2019). Accordingly, the standardized and unstandardized effect parameters were extracted and listed in Table 2.



**Fig. 1** Research model

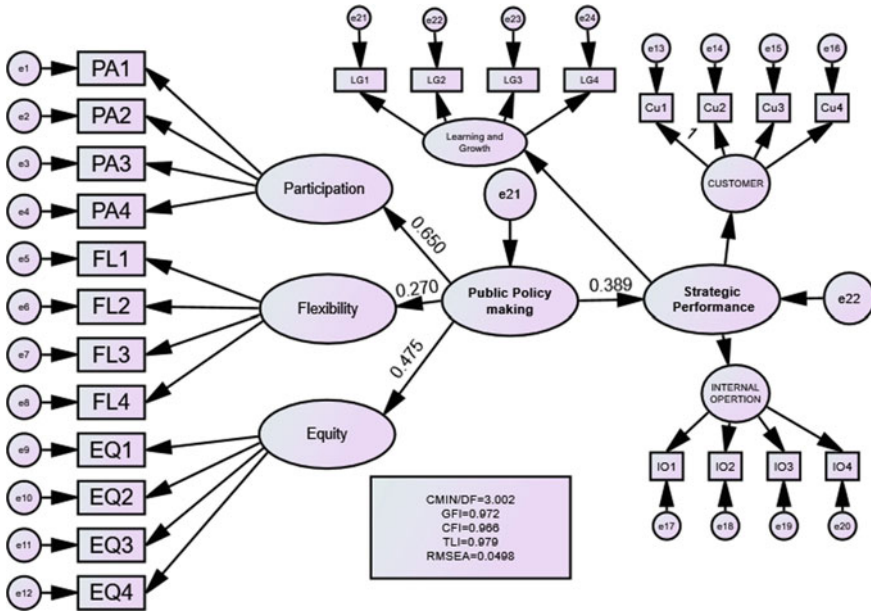


Fig. 2 SEM results of public policy making in strategic performance

Table 2 Hypothesis testing

Hypothesis	Relation	Standard beta	t value	p value
H1	Public policy making → strategic performance	0.389	22.455	0.000
H2	Participation → Customer	0.650	19.474	0.000
H3	Flexibility → internal operation	0.270	11.259	0.000
H4	Equity → learning and growth	0.475	18.442	0.000

Note \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table 2 show that public policy-making has a positive impact on the strategic performance. However, the results indicated that the highest impact was for participation ( $\beta = 0.650, t = 22.455, p = 0.000$ ), and finally internal operation ( $\beta = 0.270, t = 11.259, p = 0.000$ ).

## 6 Discussion

The results revealed that there is an effect of policy-making on the strategic performance of the Executive Council of Karak Governorate. This result can be explained by the fact that the Executive Council of Karak Governorate has adopted the dimensions of public policy-making represented in the participation of government agencies, local community organizations, and influential individuals in the governorate in drawing up public policies that are flexible and fair among all classes of society in the governorate. All of this has a positive impact on enhancing the level of strategic performance of government departments. The result is consistent with the result of the study of Amin and Hussein (2017). The results also indicated that there is policy-making in the financial dimension in the Executive Council of Karak Governorate. This result means that the dimensions of drawing up the general policies referred to above enable the Executive Council in Karak Governorate to implement programs, activities, and projects within the available capabilities and to provide quality services to the people of the governorate in accordance with the applicable laws and regulations. The results also revealed that there is general policy-making in the customer dimension in the Executive Council of Karak Governorate. This result indicates that the council's adoption of the dimensions of participation, flexibility, and justice ensures achieving an acceptable level of satisfaction among the people of the governorate with the services provided to them and satisfying their needs according to the available capabilities.

This result means that the Executive Council of Al-Karak Governorate exercises its internal tasks and operations depending on the strategic plans prepared in partnership with the designated authorities and civil society organizations in the governorate, as well as its keenness on the flexibility and fairness of policies, which enabled it to carry out its tasks in a way that serves the people of Al-Karak Governorate. Finally, the results showed the presence of public policy-making in the dimension of learning and growth in the Executive Council of Karak Governorate. This result demonstrates the relationship between participation in drawing up public policies, their flexibility and fairness, and the interest in the human resource, which is the most important tool in achieving the planned goals in the process of drawing up public policies in the governorate.

## 7 Recommendations

The study recommends reinforcing the principle of participation in drawing up public policies in the governorate in a better way than what is currently practiced, seeking help from specialized experts and consultants and community organizations in a way that helps achieve the planned goals, coordinating with all sectors in the governorate to create fair opportunities for all the people of the governorate, and that the Executive

Council of Karak Governorate promote the principle of transparency in its organizational procedures in a better way than it currently does. The Executive Council of Karak Governorate should also seek to provide the necessary financial resources other than those that have an allocation in the state's general budget to be used in providing additional services to the people of the governorate.

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# Talent Management Practices and Corporate Entrepreneurship: An Evidence from Emerging Market



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**Abstract** This research explores the impact of talent management on corporate entrepreneurship in emerging markets, with Jordan as an example. The empirical research data was collected from 454 managers in entrepreneurial organizations in various sectors of the Jordanian economy with an 86.97% response rate of the total distributor. The research applied structural equation modeling as a statistical approach to analysing the primary research data. The results that talent management practices have been shown to have a significant impact on corporate entrepreneurship. Therefore, a set of recommendations were provided to managers of entrepreneurial organizations.

**Keywords** Talent management practices · Corporate entrepreneurship · Jordan

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## 1 Introduction

Corporate entrepreneurship has recently grown increasingly vital, as they strive to remain competitive in a dynamic business globe. Entrepreneurship is often considered a solution to the problems of classic corporate structures, which may be sluggish, bureaucratic, and exhausting innovation (Al-Abbadi et al. 2021; Al-Alwan et al. 2022a, b; Aityassine et al. 2021; Al-Hawary and Al-Syasneh 2020). Corporate entrepreneurship involves promoting creative thinking and attitudes that lead to incremental improvements to current goods and services based on radical and disruptive innovations (Alhalalmeh et al. 2022; AlHamad et al. 2022; Al-Hawary 2013a, b). Additionally, some corporations rely on the creation of new technology or products through entrepreneurial activities, whilst others may exploit them for developing business models or collaborations that boost performance and competitiveness levels (Al-Hawary and Abu-Laimon 2013; AlTaweel and Al-Hawary 2021).

Human capital is a critical component that determines the future of businesses in volatile circumstances. Corporations require exceptional human resources to support their corporate culture, drive the innovation process, and raise their degree of adaptability (Al-Lozi et al. 2018; Al-Hawary and Harahsheh 2014; Al-Hawary and Nusair 2017; Tariq et al. 2022). As a result, corporate management highlights an effective talent management approach. Talent management is a holistic strategic approach to human resource management focused on maximizing employee potential and ensuring corporations have the skills and expertise required to fulfil their strategic goals (Al-Hawary et al. 2020; Al-Hawary and Al-Rasheedy 2021). It is critical for emerging-market corporations since it allows them to recruit and retain appropriate talent, acquire a trained workforce, and prepare themselves for long-term success (Al-khawaldah et al. 2022; Al-Shorman et al. 2021). Therefore, the purpose of the research was to explore the impact of talent management practices on corporate entrepreneurship in emerging markets, with Jordan as an example.

## 2 Literature Review and Building Hypotheses

### 2.1 *Talent Management Practices*

Talent management was established on many fundamental organizational theories about the techniques of managing and developing human resources. According to the resource-based perspective, talent management is a critical aspect in creating sustainable competitive advantage, as human resource management objectives should coincide with the firm's overall strategy by attracting and maintaining talented individuals (Al-Hawary and Al-Namlan 2018; Metabis and Al-Hawary 2013). Consequently, Almomani et al. (2023) defined talent management as an integrated set of processes and standards for managing exceptional human resources required to achieve strategic goals and fulfil future work demands (Almomani et al. 2023). Talent

management has been described as a management process that guarantees that an organization hires the appropriate individuals with the proper abilities for the position at the right time (Tariq et al. 2022; Boudlaie et al. 2022; Mukhlis et al. 2022). Moreover, Boudlaie et al. (2022) explained it as “a strategic approach to recruiting, developing, and retaining the best talent in the organization, with the goal of achieving business goals and creating a high-performance culture” (Boudlaie et al. 2022). Although academics have generally recognized the essentials of talent management, instruments for assessing it have varied according to circumstance. The most commonly applied aspects when evaluating talent management were: (i) talent recruitment, (ii) talent retention, (iii) learning and development, and (iv) career management (Al-Hawary et al. 2022; Mohammad 2020; Al-Rwaidan et al. 2023).

Talent recruitment, as known as talent acquisition, is the mechanism of attracting and selecting the appropriate candidates who possess unique skills for vacancies (Al-Hawary and Al-Namlan 2018; Almomani et al. 2023). Job analysis, job advertising, interviewing, and selection of individuals who have the abilities, knowledge, and experience required to fulfil the responsibilities of the position are components of talent recruitment. Talent retention describes the variety of policies and methods organizations conduct to prevent talented workers from departing on their own. It encompasses several endeavours, including employee engagement, benefits and compensation, and work-life balance (Al-Hawary et al. 2023; Pallathadka et al. 2023). Talent learning and development is the process of enhancing employee skills, expertise, and abilities using training and development programs. This process includes activities such as on boarding, leadership development, mentoring, and other forms of professional development that may assist employees to improve their job performance (Al-Alwan et al. 2022a; AlHamad et al. 2022; Alshuqairat et al. 2023). Talent career management, as stated by Majdy Amiruddin et al. (2023), is a method that assists employees in managing their professional paths inside the organization through sequential appraisals and self-achievement. Setting professional objectives, identifying career routes, and fostering career mobility and internal progression are all examples of actions that assist employees' career growth and development.

## ***2.2 Corporate Entrepreneurship***

Corporate entrepreneurship is the process of developing activities within an existing organization in order to promote creativity, progress, and competitive advantage. It entails developing an entrepreneurial culture, encouraging entrepreneurial behaviours, and permitting the exploration of novel opportunities within the confines of the organization (Tariq et al. 2022). According to the theory of innovation ambidexterity and dynamic capacities, the core of corporate entrepreneurship is an organization's ability to explore and exploit potential opportunities in the business environment in a timely manner to achieve the organization's strategic goals (Al-hawajreh et al. 2023). Therefore, corporate entrepreneurship has been described as the process by which an individual or a group of individuals, in collaboration with an existing

organization, establishes a new organization or stimulates renewal or innovation inside that organization (Al-Husban et al. 2023). Moreover, Al-Khasswneh et al. (2023) considered corporate entrepreneurship as efforts by the organization to establish new business initiatives or strategic rejuvenation, such as developing new goods or services, accessing new markets, or building new organizational structures and processes (Al-Khasswneh et al. 2023).

Corporate entrepreneurship includes a set of behavioural dimensions toward improving the performance of organizations, which are (i) innovativeness, (ii) risk-taking, and (iii) proactiveness (Al-Hawary and Al-Syasneh 2020; Al-Armeti et al. 2023). Innovativeness is the tendency and willingness to experiment with and implement new theories, methods, or technologies to use in order to add value or enhance performance. Risk-taking indicates the ability and willingness to engage in activities or make decisions that include uncertainty, possible risk, or the probability of undesirable results in order to achieve desired goals (Al-Hawary and Al-Syasneh 2020). Proactiveness, also called forward thinking, expresses one that involves taking the initiative, predicting and acting on future possibilities or obstacles, and effectively influencing or moulding results (Al-Armeti et al. 2023).

### ***2.3 Talent Management Practices and Corporate Entrepreneurship***

Corporations are constantly interested in discovering innovative solutions as a source of competitive advantage. Employees who are talented play a vital part in this process, and human resource management strategies that focus on investing in talent considerably support entrepreneurship. In this regard, Al-Husban et al. (2023) targeted to investigate the relationship between talent management, organizational intelligence, and entrepreneurship tendency of trainers in Hamedan province vocational and technical training centres (Al-Husban et al. 2023). The study revealed that organizational intelligence and talent management both positively improve entrepreneurship. Al-Armeti et al. (2023) performed research on the Golestan Provincial Gas Company to investigate the influence of talent management on organizational entrepreneurship (Al-Armeti et al. 2023). The study's findings indicate that talent management had a significant impact on organizational entrepreneurship, implying that managers should prioritize the talent management system in order to improve innovation opportunities and obtain a competitive advantage. Accordingly, the following research hypotheses could be proposed:

**H1: Talent management practices positively impacts corporate entrepreneurship.**

Figure 1 depicts the impact of each talent management practice, i.e., talent attraction, talent retention, learning & development, and career management, on corporate entrepreneurship that form the research hypotheses.

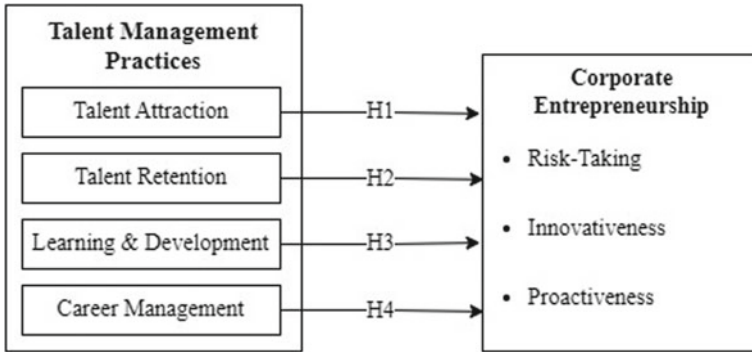


Fig. 1 Research model and hypotheses

### 3 Methodology

#### 3.1 Sampling and Data Collection

Therefore, the convenience sample was applied using Google Forms that were sent via social media and e-mails to those managers. A total of 522 respondents completed the research survey, but 68 responses were excluded from statistical analysis because they were repetitive. Hence, 454 responses, or 86.97% of the total distributed surveys, were analysed. This percentage is considered acceptable from a statistical perspective, as it exceeded the minimum required for the sample in the unlimited population (AlBrakat et al. 2023).

#### 3.2 Measures

The survey comprised three sections: an introduction that outlined the research objectives, a section for gathering demographic information about the respondents, and a section for gathering data about the main research variables. The independent variable of the study was talent management practices, which were measured using 16 items extracted from Almomani et al. (2023). This variable was a second-order construct that was further divided into four first-order constructs. Talent attraction was measured using four items (TA1-TA4), talent retention was measured using four items (TR1-TR4), learning and development were measured using four items (LD1-LD4), and career management was measured by four items (CM1-CM4). The dependent variable of the study was corporate entrepreneurship, which was measured using 11 items according to Al-Hawary and Al-Syasneh (2020). This variable was a second-order construct that was further divided into three first-order constructs. Risk-taking



was measured using three items (RT1-RT3), innovativeness was measured using four items (IN1-IN4), and proactiveness was measured through four items (PA1-PA4).

## 4 Results

### 4.1 Measurement Model

Structural equation modeling (SEM) is a versatile statistical technique that can be used to analyse both quantitative and qualitative data. Confirmatory factor analysis (CFA) is a specific type of SEM that is commonly used in management research to assess the validity and reliability of research instruments (Dwijendra et al. 2023). The primary goal of CFA is to determine the extent to which measures of latent constructs align with the researcher's original conceptualization of those constructs and their underlying factors. In this study, CFA was used to generate the indicator values shown in Table 1, which are used to assess the validity and reliability of the research instrument.

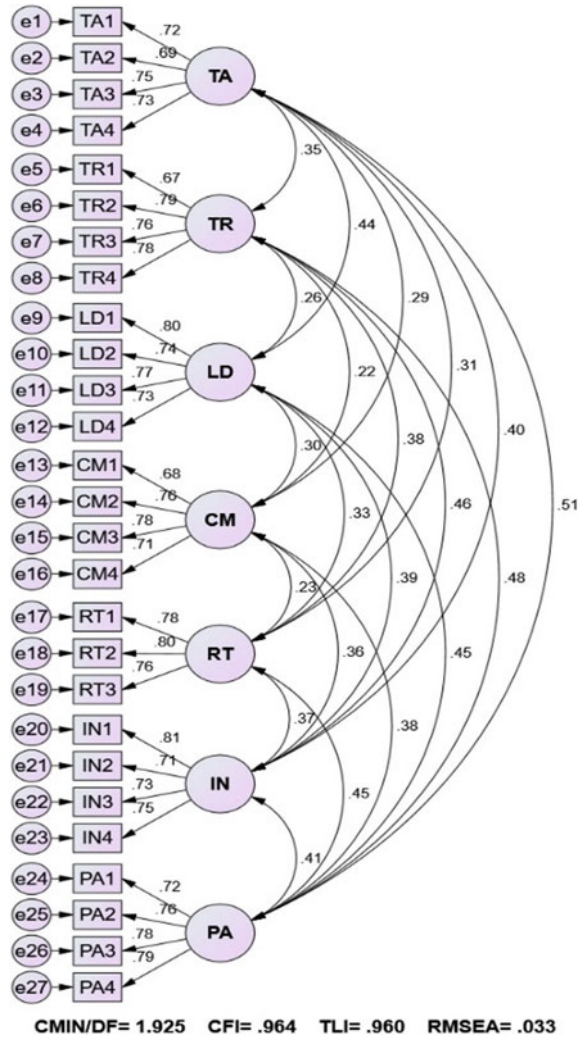
The loading values of all the items on their respective latent constructs were greater than 0.5, ranging from 0.644 to 0.864, indicating that they were all retained as they exceeded 0.5 (Zahran et al. 2023). The values of the average variance extracted (AVE) exceeded the minimum acceptable value of 0.5, which means the convergent validity of the measurement model (Al-Alwan et al. 2022a). The maximum shared variance (MSV) values were less than the AVE values, and the square root of AVE values exceeded the correlation between the other latent constructs. These results referred that the measurement model had discriminate validity (Mohammad et al. 2022). Reliability was also assessed using McDonald's omega coefficient (CR), which was higher than the minimum threshold of 0.70, indicating appropriate composite reliability of the measurement model (AL-Zyadat et al. 2022; Alolayyan et al. 2022). Additionally, the results of CFA not only determine the validity and reliability of the research instrument but also provide information about the degree of consistency among the model variables based on the model fit indices. Therefore, the model fit indices were analysed and presented in Fig. 2.

According to the results of Fig. 2, the measurement model obtained appropriate values of the goodness of fit. The chi-squared ratio over degrees of freedom is 1.925, therefore it was lower than the upper threshold of 3 (Muda et al. 2022; Harahap et al. 2022; Attiany et al. 2023). The comparative fit index (CFI) and the Tucker-Lewis's index (TLI) were 0.964 and 0.960, respectively, thus they exceeded the minimum allowed value of 0.90 (Al-Awamleh et al. 2022). As for the root mean square error of approximation (RMSEA), the results showed that it did not reach the upper value of 0.08 (Al-Awamleh et al. 2022; Rahman et al. 2023; Mohammad 2019; Mohammad et al. 2020).

**Table 1** Validity and reliability of measurement model

Construct	Loadings	AVE	MSV	$\sqrt{\text{AVE}}$	CR
<i>Talent attraction</i>		0.525	0.442	0.724	0.815
TA1	0.725				
TA2	0.692				
EA3	0.746				
TA4	0.733				
<i>Talent retention</i>		0.567	0.493	0.753	0.839
TR1	0.674				
TR2	0.792				
TR3	0.764				
TR4	0.776				
<i>Learning and development</i>		0.579	0.402	0.761	0.846
LD1	0.803				
LD2	0.745				
LD3	0.766				
LD4	0.728				
<i>Career management</i>		0.539	0.368	0.734	0.824
CM1	0.677				
CM2	0.764				
CM3	0.778				
CM4	0.714				
<i>Risk-taking</i>		0.612	0.377	0.782	0.825
RT1	0.785				
RT2	0.799				
RT3	0.762				
<i>Innovativeness</i>		0.566	0.412	0.752	0.839
IN1	0.813				
IN2	0.706				
IN3	0.734				
IN4	0.751				
<i>Proactiveness</i>		0.583	0.407	0.763	0.848
PA1	0.719				
PA2	0.762				
PA3	0.780				
PA4	0.791				

**Fig. 2** The results of confirmatory factor analysis



### 4.2 Structural Model

The research hypotheses were tested by structural equation modeling (SEM). SEM enables researchers to test the suitability of their models, as well as to evaluate relationships between observed variables and latent constructs according to the maximum likelihood approach (Rahman et al. 2023). Figure 3 demonstrates the structural model used to test the impact of talent management practices on corporate entrepreneurship.

According to the results of Fig. 3, the structural model obtained appropriate values of the goodness of fit. The chi-squared ratio over degrees of freedom is 1.811, therefore it was lower than the upper threshold of 3 (Mohammad 2019). The comparative fit

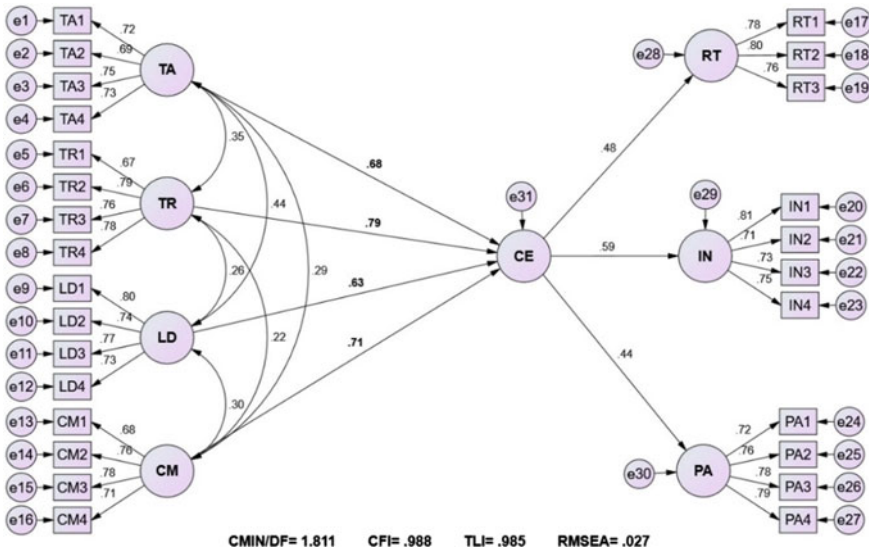


Fig. 3 SEM for testing the impact of TMP on CE

index (CFI) and the Tucker–Lewis’s index (TLI) were 0.988 and 0.985, respectively, thus they exceeded the minimum allowed value of 0.90 (Al-Awamleh et al. 2022). As for the root mean square error of approximation (RMSEA), the results showed that it did not reach the upper value of 0.08 (Mohammad et al. 2020). Accordingly, path coefficients for the impact of talent management practices on corporate entrepreneurship were extracted and included in Table 3. This table includes five columns, each representing the relationship of a talent management practice to corporate entrepreneurship.

The results of Table 3 show that the four paths of talent management practices have a statistically significant positive impact on corporate entrepreneurship. Path coefficients (B) range from 0.677 to 0.820, with the highest talent retention coefficient, indicating that it has the strongest positive impact on company entrepreneurship. The standard regression coefficients ( $\beta$ ) were within the range of (0.633–0.792), which refers that increasing the standard deviation in any combination of talent management

Table 3 Path coefficient for the impact of TMP on CE

Path			B	S.E	$\beta$	t	p
TA	→	CE	0.712	0.052	0.681	13.69	0.002
TR	→	CE	0.820	0.050	0.792	16.40	0.000
LD	→	CE	0.677	0.056	0.633	12.09	0.008
CR	→	CE	0.756	0.053	0.715	14.26	0.000

TA talent attraction, TR talent retention, LD learning and development, CR career management, CE corporate entrepreneurship

practices produces a significant positive impact on corporate entrepreneurship. The  $t$  values were significantly above the critical value of 2.05 (for a significance level of 0.05). In addition, all paths have a  $p$ -value less than 0.05, denoting that the observed relationships between talent management practices and corporate entrepreneurship are statistically significant.

## 5 Conclusion

The findings suggested that talent management practices had a positive impact on corporate entrepreneurship. Consequently, organizations sought to engage in talent management practices to create a work environment that encourages and promotes creative skills, as well as new career opportunities inside current organizations. One of the most significant practices for enhancing entrepreneurship is talent attraction. This is congruent with the findings of Mohammad et al. (2022), which demonstrated that precise recruiting methods may assist organizations in identifying and bringing in personnel with a proven record of entrepreneurial thinking, experience, and accomplishment, therefore building the necessary foundations for corporate entrepreneurial culture. Once talent has been employed, it is critical to develop and encourage entrepreneurial spirit. This involves training, tools, and opportunity for people to improve their entrepreneurial abilities and mentality. Furthermore, talent retention is essential for ensuring the continuance of entrepreneurial activity in organizations. Organizations should establish an environment that advocates for entrepreneurial individuals to stay and contribute their innovative ideas and efforts by providing attractive compensation packages, opportunities for growth and advancement, and stimulating a supportive and inclusive organizational culture. Al-Hawary and Al-Rasheeddy (2021) considered that employees are more inclined to engage in entrepreneurial activities when they feel respected, encouraged, and have the opportunity to contribute meaningfully to the organization (Mohammad et al. 2022). Finally, career management, as a talent management practice, had a significant impact on corporate entrepreneurship. As a result, organizations should promote an entrepreneurial attitude and behaviours inside their organization by developing a clear vision of the promotion ladder that allows employees to forecast their future career paths. According to Al-Hawary and Al-Syasneh (2020), these methods contribute by encouraging people to take chances, experience failure, and learn from it in order to produce entrepreneurial models with a high value on the organization's success.

## 6 Recommendations

Talent management is critical in driving corporate entrepreneurship since the research showed that it helps with the acquisition, development, and retention of employees with entrepreneurial attitudes and abilities. Thus, the study concluded

with a series of recommendations for encouraging organizations to adopt talent management practices to enhance entrepreneurship. Firstly, organizations could develop an entrepreneurial mentality by finding and recruiting employees with an inherent entrepreneurial mindset and choosing candidates whose values, culture, and strategic goals coincide with the organization's core culture. Secondly, promoting entrepreneurship by focusing on developing entrepreneurial activities and behaviours within existing organizations, where talent management should create an innovative environment for individuals motivated by a sense of independence, competence, and positive dialogue among employees. Finally, the alignment of performance management that provides the opportunity to achieve compatibility between performance management systems with the goals of corporate entrepreneurship. Therefore, organizations should include entrepreneurship goals as part of performance appraisals, recognizing and rewarding employees who demonstrate entrepreneurial behaviours and generate innovative results by incorporating measures of entrepreneurship into performance appraisals.

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# The Use of Chatbot as an Artificial Intelligence Tool to Improve Intelligent Digital Marketing



Fayza Al Kuwaiti and Muneer Al Mubarak

**Abstract** Digital eras convert the way of work and make it easy for all industries including marketing. The emergence of artificial intelligence technology and machine learning technology leads marketing beyond digital marketing to intelligent digital marketing. In intelligent digital marketing, the company will be able to classify the customers based on their preferences, which ends up having different segmentations for customers. A chatbot is a tool that was discussed in this research to provide customer service to the customers. Chatbots depending on artificial intelligence, machine learning, and natural language processors can provide 24/7 services to customers. Other than chatbot benefits to help customers, it will help the company to understand customer needs and to target the required segment of customers for the specific service or product. Chatbot also has some limitations and user resistance which the researcher believes will shrink over time. Digital marketing is a huge industry that impacts both the customer and the company. Focusing on digital marketing with the use of artificial intelligence will create a new way of competitiveness and will create a data market. This paper focused on highlighting both digital marketing and chatbot as artificially intelligent tools to support the customer in digital marketing. The paper covers many facts and theories about this topic.

**Keywords** Digital marketing · Chatbot · Artificial intelligence · Intelligent digital marketing

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## 1 Introduction

In this era, where industries have reached the fourth industrial revolution, the development and diffusion of innovations are very fast and efficient. With this context, digital transformation is the target for companies to change their business fundamentally and reach the new global world economic situation. This will increase the competition and will broaden business horizons. It will make new challenges for the companies as customers' needs for services and products could not be as same old thing. Using technologies will highly contribute to the overall business and bring more value to the customers with less cost (Hsu and Liou 2021).

Digital marketing is the online marketing and advertising for a product or a service, this market is operated by digital technologies through electronic devices and online channels. Digital marketing transformation can be an evolution from traditional marketing. Traditional marketing has many limitations on the sales and number of customers as it can target the local market only. Also, it has more competition as the number of shops and businesses increase and the availability of the products becomes high which reduces the product's profit. Thus, digitalization of the market becomes a must to reach more customers and understand customer needs (Ramkumar et al. 2022). On the other hand, intelligent digital marketing is the use of data and artificial intelligence to understand the strength and weaknesses of the company, discover customers' needs, and generate prospective sales. The use of big data and artificial intelligence for targeted and profitable market strategies when entering a new market or changing business strategies or launching new products (Consulting 2021).

Artificial intelligence (AI) is a tool that allows the machine to use some algorithm to solve a problem. artificial intelligence is not a system, but it is used in a system to provide optimal solutions for a particular problem. Machine learning is a subcategory of artificial intelligence where this algorithm can work on itself to improve the provided solutions. It is learning from experience. Machine learning can provide optimal and not optimal solutions based on the experience it had Bhatt (2021). By using machine learning (ML) and artificial intelligence (AI) the implementation of intelligent digital marketing will be more smooth and more realistic, with the repetition of the process the machine can learn and understand the user's requirements and feelings. This can lead to emotional intelligence which is an important aspect of marketing. Using these technologies can add a competitive advantage to the business as it will provide customized services to the users based on their preferences (Ramkumar et al. 2022).

A chatbot is a software that accepts natural languages as input and generates natural language as output. it is an interactive virtual character with a mission to assist the user using text or voice Miklosik (2021). There are two types of chatbots, Simple, and Smart. A simple chatbot is based on a decision tree, it is programmed to follow a specific decision tree with specific options while chatting with a human. A smart chatbot is using Natural Language Processing (NLP) to learn from experience, this machine learning concept analyzed and processed the conversations to build a smart chatbot that enhances user experience and increases user satisfaction (Savanur

et al. 2021). The emerging trend of digital marketing increases the demand for online chatting. This is to ensure that customers will find customer care representatives at anytime from anywhere. The chatbot is the best technology to provide this service to customers at an efficient cost (D'silva et al. 2017). The use of chatbots can enrich the user experience and provide the company with details about customer behavior, patterns of customers, and customer preferences, which will reflect in personalizing the customer experience and give the company a more competitive advantage (Arsenijevic and Jovic 2019). The chatbot must be well-programmed to provide intelligent customer service support and increase customer satisfaction from using the chatbot. Also, chatbots need to use proper native language with good grammar so the customer can clearly understand the information provided by the chatbot (Nursetyo et al. 2018).

### **Research Problem**

“Find and Keep customers” is the most challenging task for a company. But technology has made it easier Bhatt (2021). Reaching customers is a challenge for the company but maintaining the relationship with the customer and keeping them satisfied is a huge challenge for any company. With the current competition between businesses in the digital market, customer loyalty is one of the most valuable assets in the company, as it reduces price competition (Kuksov and Zia 2021). Customer loyalty can be maintained by knowing the needs of customers and predicting their potential needs (Das and Nayak 2022). Customer service is one of the main aspects to maintain customer loyalty. With digital marketing providing 24 h support to the customer is the main key to customer satisfaction (Tmrakar and Badholia 2022).

### **The Scope of Research**

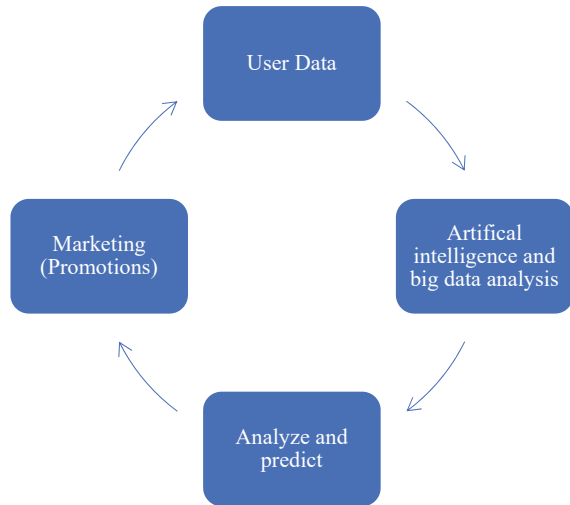
This research studies the use of artificial intelligence in digital marketing and highlights the benefits of using a chatbot as a customer service tool. It studied the impact of chatbots on increasing customer satisfaction. As a limitation of the research, the scope does not include an applied study of the use of chatbots or a measurement of the benefits. This research is important for companies, especially small companies to consider artificial intelligence and specifically to invest in a chatbot as a customer service tool to satisfy their customers. Chatbots need time to learn and produce accurate answers for the customers, so the early the company will start the strong the chatbot will be. Starting early will reflect on the amount of gathered customer data, the more the company has the more personalized experience the company can provide to the customer.

## **2 Literature Review**

### **Background**

Marketing has dynamic nature, it consists of four components: Products, Price, Place, and Promotion. Promotion plays a critical role in the marketing of a product Bhatt

**Fig. 1** Customer demand training model (Gao and Zhang 2020)



(2021a). Marketing is a very important function; it is highly impacted by digitalization, and it has pressure to progress in a competitive way. Nowadays, consumers look for the content of the product or service in a way that measures how it will meet their expectations and how it will satisfy them. To achieve this objective, organizations should compete to provide the “Make for Customer” concept instead of the traditional manufacturing system. Digital transformation will have huge contributions in achieving this objective, organizations should start to create a framework that incorporates cloud computing, communication technologies, big data analytics, business informatics, and digital production system (Sundararajan 2022). Figure 1 shows the customer demand training model that can be used by the company to achieve the “Make for Customer” concept with the help of artificial intelligence, big data, and machine learning technologies.

### What is Digital Marketing?

“Digital marketing is the use of digital means to promote businesses.” Any business can make a website for selling its goods or services, but digital marketing is more than just a website (Srivastav and Gupta 2021). Digital marketing adds extra features to the website to improve customer experience, some of the features can be define as: Search Engine Optimization (SEO tool), is one of the most important digital marketing tools, it can determine the position of the website in the relevant searches. The link to the website at the top of the page will be better as many users will not scroll down to find other links. Email Marketing is another feature which depend on emails sent based on customer segmentations or can be sent as a general message to all customers. Emails must be attractive to the customer so the reader can keep his/her interest till the end.

There are many reasons that make emails very important such as, the number of people using emails is more than the number of people using social media, and

emails are great for follow-up, especially if the buyer is waiting for something or if the company needs to ask for the buyer opinion. The third reason is emails can help to gain new customers and build brand loyalty as it will share sales offer with them. Social Media Marketing is a great feature that involves maintaining social media accounts and pages by keep posting regularly and sharing ideas with the customers. Social media is a great opportunity for the company to interact with the younger generations who are using social media platforms frequently. Content Marketing feature is the text that describes the product or the service, must be of good quality to make sure it interacts with the customers and the potential customers.

It must be unique and creative to maintain the reader's interest in the text. Affiliation Marketing feature refers to hiring third-party people to help in increasing the traffic for the company website. It can be a blogger or another website that gets paid on a commission basis only if there are any sales. Pay-per-click ads are very expensive especially if it ends up without sales. These ads are shown as sponsored ads on different websites, this is a tricky tool as many visitors know it is a paid ad and may not trust it. The last feature is Instant Message Marketing which is the direct communication between the customer and the company. Through this communication channel, the customer can find an answer to an inquiry. This can be done using a customer service representative or a chatbot (Srivastav and Gupta 2021).

### **The Need for Digital Marketing**

During the pandemic in 2019, the need for digital marketing increased, with long lockdowns companies need to reach customers online and give better customer experiences. The customer aims to have personalized interactions through agile business strategies and technologies (Kaponis and Maragoudakis 2022). Digital marketing increases the market size for companies and allows them to go internationally instead of focusing on the local market only (Ramkumar et al. 2022). With this objective, companies need to study customer segmentations and deal with each customer based on the segmentation he/she belongs to, and nothing more than technology can help with that, especially with a large number of information (Kaponis and Maragoudakis 2022). Digital marketing helps the company to build brand loyalty, a customer who had a bad experience with a product may have a good experience with the service and maintenance team in the company and that gave the customer trust and increase his/her loyalty (Srivastav and Gupta 2021).

Digital marketing is not just for businesses it is also a need for customers. With digital marketing, customer has more products that are available online with wide options and quality of each product. These varieties of options make the customer more confident about the purchased item (Srivastav and Gupta 2021).

### **Traditional Marketing vs Digital Marketing**

Traditional marketing is using the old traditional way to promote business such as TV ads, banners, posters, pamphlets, and radio ads. On the other hand, digital marketing refers to using digital means such as emails, chatbots, social media posts, search engine optimization, and pay-per-click ads (Srivastav and Gupta 2021). Table 1 shows some differences between both markets.

**Table 1** Differences between traditional marketing and digital marketing (Srivastav and Gupta 2021)

Aspect	Traditional marketing	Digital marketing
Audience	Reach only local audience	Reach global audience
Direction of message	Messages are like a monologue as they are one-way messages from the company to present their ideas about the product or the service	Messages are like a dialogue where potential customers can contact customer service representatives to clear their queries or ask for customized products or services
Analysis	Hard to accurately analysis because there is no data involved	Can be analyzed easily as data is involved in the whole process
Time requirements	Takes a long time to be designed, printed, and displayed or delivered to an audience	Very fast and can be in parallel through different channels
Cost-effectiveness	Expensive compared to its reach and results	It's very cost-effective. The cost can be zero, in the beginning, and it can increase later but is still not expensive compared to its reach and results

### The Need to Use Artificial Intelligence in Marketing

The use of automation improves the management of the relationship between businesses and customers in terms of both advertising and sales. Machine learning changed e-commerce by using the data mining aspect. Artificial intelligence techniques are used in predicting customer behavior, with this feature artificial intelligence will help organizations to effectively target customers and personalize their experience. There are two key strategic decisions in marketing: segmentation and targeting. With artificial intelligence and data mining segmentation will be done easily, and customers will be divided into segments based on their needs and interests. On the other hand, artificial intelligence will target these customers by adding them to the right segment and showing them what they want to see. Users' historical data and machine learning algorithms can help identify the best advertisements per customer segmentation (Kaponis and Maragoudakis 2022). With that artificial intelligence has covered almost every piece of information needed by companies for marketing, it covers competitor information, product information, market research, and customer insights Bhatt (2021a).

Artificial intelligence has many capabilities that can improve digital marketing. It has the ability to promote products and services to customers, it can also analyze the feedback from advertisements and user behavior. Artificial intelligence can identify the target audience for the product or service quickly and accurately. Also, it can build a good relationship between the business and the customers. With quick responses to customers and finding the right information, customer satisfaction and loyalty will increase (Meepung and Kannikar 2022).

### **Benefits and Challenges of Digital Marketing**

There are many benefits and challenges to digitalizing the market, in this research the advantages can be explain as: many markets transformed into digital markets by studying the opportunities and enhancing the level of production and employee knowledge. Digital transformation allowed the business to be more competitive, especially by using machine learning and artificial intelligence. This gives the business a competitive advantage compared to other businesses in the same field. Also, digital transformation increases employee productivity and innovation, allowing the organization to reach its objectives and goals in an efficient way (Ramkumar et al. 2022). Digital marketing decrease marketing cost (Gao and Zhang 2020). It can be used as an advertising medium to increase the business's brand awareness globally. Digital marketing gets direct feedback from the customers and potential customers which increases the trust of the customer and customer loyalty. It helps to give services to the customers, customer service mechanisms build a brand image in the minds of the customers, and good service results from a happy customer resulting in brand loyalty. Finally, digital marketing can be a platform where the products are available online to the customers and they can order any product at any time from any place in the world (Srivastav and Gupta 2021).

On the other hand, there are many disadvantages to the digital transformation such as: It required endless changes, as technologies are fast to change, and the business needs to cope with these changes, user demands may be changed with time. Implementation of new technologies takes a huge time and needs huge efforts and commitments from the organization. The organization has a challenge to select the right technology according to the organization's business. Security issues related to the company website must be highly considered in digital marketing. The number of shared emails may annoy the customer, and this may lead the customer to mark these emails as spam. Some ads in digital marketing can be more expensive than the sales it is resulting in. Finally, the risk of not attracting visitors enough (Srivastav and Gupta 2021).

### **The Use of Chatbots in Businesses**

Chatbots are software that interacts with users through a chat interface, it simulates a conversation with a human without human presence. Chatbots can answer users' questions based on the database it connected to. With artificial intelligence, a chatbot can learn and predict what user needs to see or purchase (Kaponis and Maragoudakis 2022). Chatbots can be used in many applications such as helpdesk, sales, medical, e-commerce customer service, call centers, hospitality, restaurants, internet gaming, and other applications. It can handle many functionalities for the business such as allowing the customer to place an order and helping the customer to decide about his purchase by narrowing the search options. Chatbot also provides customers with 24 h support and that help the business to provide good service for all the customers around the world. A chatbot is a great helper in scheduling meetings for any business or tracking customers' orders. It can also help in sharing news, promotions, and updates (sendpulse, "chatbot-marketing" 2022). It can consequently



personalize customer accommodation and are considered the prevailing future trend in e-commerce (Kaponis and Maragoudakis 2022).

With the tight online marketing competition demands, companies need to provide excellent customer service that is available 24 h. A chatbot can provide 24 h' customer service at a sufficient cost. But to achieve that chatbot required very professional programming skills and a strong knowledge-based system (Nursetyo et al. 2018). A study in 2009 proved that 63% of online buyers who used the chat feature were more likely to return to that website, while 38% of the respondent reported that they buy from this website because of the successful session with the chatbot. In 2013, Econsultancy publishes a study showing that 73% of the user of chatbots had positive experiences and making chatting the most popular customer support channel (Cancel and Gerhardt 2019).

Another study published by BoldChat in 2012 explains why chatting become the dominant channel for customer support, the study found that 79% of the users thought that the main reason is real-time support at any time of the day. In the same study, 46% of the respondents agreed that the chatbot is the most efficient mode of communication. The same study shows that 29% of the respondents prefer chatbots instead of sending emails and waiting for business working hours to receive a reply. Also, 38% of the respondents realized that the chatbot is very efficient after using it for the first time. And finally, this study found that 15% of the respondents found more information when chatting with the chatbot compared to calling a customer service representative (Cancel and Gerhardt 2019).

### **Chatbot History**

In 1950, Alan Turing proposed a groundbreaking paper "Computing Machinery and Intelligence" in this paper Turing theorized that a truly intelligent machine can replace a human during a text conversation. With this idea, Turing started the chatbot concept. But by that time there were no chatbots or computer programs that could do this. In 1966, things changed, with ELIZA the first chatbot in the world. In 1980, computer scientists began using artificial intelligence technology in the chatbot, this was a huge boost for chatbot abilities as it allowed the chatbot to learn from experience as a normal person. So, more conversations gave the chatbot more knowledge to reply accurately. The first chatbot that was powered by artificial intelligence and machine learning was Jabberwacky, it was created by programmer Rollo Carpenter in 1988. In 1995 a new version of the chatbot was generated, it was an online version of Jabberwacky, called ALICE (Artificial Linguistic Internet Computer Entity) this version of the chatbot was not intelligent, it can reply base on a static database and it cannot learn for the experience. With ALICE chatbot could provide services around the world. In 2001 people start to use messaging techniques, which gave the chatbot more power and make it more popular. The chatbot SmartChild could answer many messages by that time, and it was able to become the most popular chatbot in history (SmartChild is a text-based version of Apple Siri) (Cancel and Gerhardt 2019).

### Chatbot Architecture

The meaning of chatbot architecture is the process that starts with the user adding a request or a question to the bot and the response that the Bot will provide to the user (Tamrakar and Wani 2021).

Figure 2 shows that it is essential for the chatbot to have a data resource and a knowledge base for implementing any chatbot. From the above figure, a chatbot has an interface with the user, when receiving a required the chatbot analyzes it using dialogue management, it will go then to the assigned data resource hub to find the information for the request and generate the response to the user. Dialogue management will include machine learning mechanisms and natural language processing if the chatbot is smart and uses artificial intelligence.

### The Benefits of Using Chatbots

There are many benefits of chatbots as customer service agents, chatbot provide 24X7 customer support, this will increase customer satisfaction as the chatbot provides consistent services around the clock and is ready for assistance at any time. Also, chatbot helps customers to self-serve, as a customer can get immediate help to continue their actions. Reducing company costs is one of the main benefits of chatbots. Chatbots can reduce the number of customer service employees. Also, the delegation of customer support to chatbots helps the company to avoid full-time human support costs. Another benefit of chatbots as a customer service agent is can save employees time and that allows them to focus on more innovative tasks and improve their skills. Chatbot is a great tool to provide multi-lingual support to users. As the main target of digital marketing is to reach the global market, chatbots will be extremely adaptable and valuable. Chatbots also, have the access to customers' information, they can gather customers' rating information, reviews, and feedback. This will help the company to conduct real-time analytics easily and provide a better experience to its customers. With chatbot, customers will get a consistent user experience.

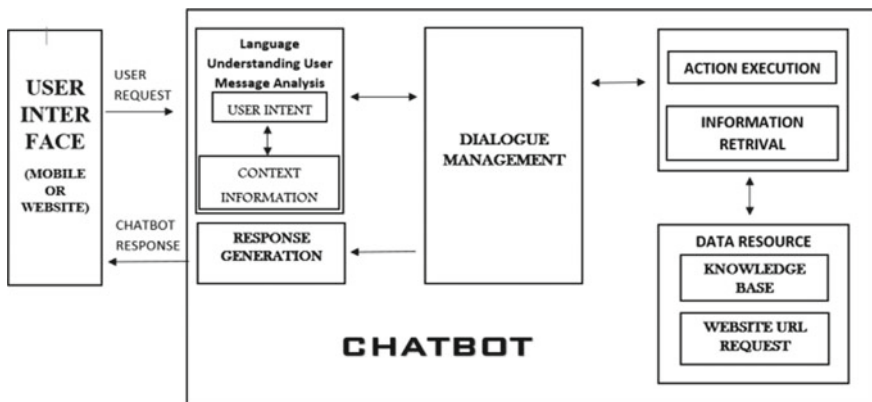


Fig. 2 Architecture of chatbot (Tamrakar and Wani 2021)

And with the use of artificial intelligent, chatbots are trained to provide recommendations for customers when they need them. Chatbots can establish a promotional conversation with users. It can be used as part of other channels such as the company website, Facebook, WhatsApp, Telegram, mobile application, or messaging systems (Tamrakar and Badholia 2022).

On the other hand, chatbot has many challenges, and some of these challenges are related to artificial intelligent implementation in the company. Some of these challenges are listed as follows, social challenges: which are related to societal norms and the attitude and expectations toward the new technology. It will also cover the social understanding of the chatbot and the employee's concerns about job losses. Economic challenges: include profitability and financial sustainability and the cost behind the chatbot. Technological challenges include what the bot learns with time and the way it will structure these data. Data challenges: how to design a chatbot decision tree and how to guide the chatbot to get the best answer every time. This challenge can be minimized by having a good knowledge management framework. Organizational and managerial challenges: Organizational readiness may affect the implementation of chatbots. Organizations may face challenges with human resources, technologies, and managing the chatbot according to the organization's strategy. Ethical challenges: the organization needs to make sure that the customer knows that he/she is talking to a machine and not a human customer service agent. And that there will be a possibility of mistakes due to the machine learning process (Campion et al. 2020).

### **When to Use a Chatbot?**

A chatbot is not the right solution for every digital marketing business, it may be costly and has less impact on some businesses. There are some situations that make the chatbot a good option for the business such as, if there is an overwhelming customer service representative on a daily base, and if most customers' requests ask the same inquires. The second reason is if the business shopping cart has a high rate of abandonment, some customers find it difficult to complete the purchasing process due to the difficulties to reach something or find an answer, so customers end up leaving the shopping cart. The third reason is the frequency of asking the same question over and over to different customers. The last reason is if the business is focusing on providing services not products, in this case, customers need to get assistance immediately at any time (Akinbobola et al. 2022).

### **Chatbot as Marketing Tool Examples**

According to the sprout social index, nearly 55% of businesses and brands use direct messaging for digital marketing and providing one-to-one communication with customers. There are many examples of chatbot that shows practical uses and diverse their businesses from other businesses, here is a list of some e-commerce chatbots: HelloFresh which is dealing with the customers in a very smart way, it enriches the customers' experiences by asking many questions that are not open-ended. The second example is Domino's Pizza chatbot implemented in Facebook Messenger and Domino's Pizza's official website, Domino's Pizza has one of the best chatbot marketing tools, it can take the customized order from the customer,

repeat the order to the customer and find the nearest store to deliver the order to the customer without the need to sign in or create a new account. Another example of a successful chatbot is the Sephora chatbot, it started in 2017 it gave the same features as domino's pizza chatbot with additional features to offer beauty coaching via makeup tutorials and product reviews.

River Island is a London-based fashion company; it is using a chatbot to help in streamlining its customer service. They launched the chatbot in April 2020 and within six months they earned 15 million content engagements and 6.1 million post links, the use of the chatbot in River Island proves that it is not only a fashion-forward business, but it is also focusing on the future and digital marketing. The KLM Royal Dutch Airlines is also an excellent example of using a chatbot in hospitality. The chatbot in the airline has the nickname "BlueBot" it is available on Facebook Messenger. It is providing real-time customer support that has many features such as booking a ticket, viewing baggage information, asking for a refund, and checking flight status. In case "BlueBot" cannot answer any question, it will connect to a live customer service representative (Kenan 2022).

### 3 Conclusion

The era of intelligence has arrived, and artificial intelligence and big data technologies are leading the transformation of digital marketing to intelligent digital marketing. These two technologies can fully utilize current marketing data to learn more about user experience and increase user satisfaction. Also, they can help in providing more accurate, targeted, and creative digital marketing strategies (Gao and Zhang 2020).

Artificial intelligence and big data will help organizations to understand customers' demands to increase their competitive advantage. Marketing is mainly depending on digging and researching customers' needs, artificial intelligence with the use of chatbots can dig to find customers' preferences. Chatbots need to be more intelligent and need to use emotional intelligence to sufficiently communicate with users (Gao and Zhang 2020). Using chatbots as part of marketing and promotions is not to replace humans, it is to empower humans to do a more efficient job. Chatbots can handle most customers' inquiries, especially since billions of people now prefer to communicate via messaging. It is not chatbot versus humans, it is chatbot and humans working together to provide innovative services (Cancel and Gerhardt 2019). However, chatbot failure in helping customers sometimes may lead the customer to leave the website, for this purpose the website should make sure that the chatbot can redirect to a customer service representative when needed. Companies need to make sure not to use poorly programmed chatbots or rush the implementation of chatbots in the organization and providing a chatbot with limited capabilities will end up frustrating the customers (Akinbobola et al. 2022). The next step is the governance

of artificial intelligence, the innovation changes in technologies need government policies, corporate visions, and long-term strategies (Lee 2021).

### Study Limitations and Future Research

This study focus on the literature review results based on other researchers conducted regarding chatbot and intelligent digital marketing. The study needs to investigate more on the use of chatbots as one of the tools to improve intelligence digital marketing by applying quantitative analysis. Further steps must be taken to test the implementation of the natural language process (NLP) and machine learning (ML) of the chatbots to deal with different languages. Knowledge management is an essential part of implementing chatbots. A framework must be introduced to maintain the knowledge between the chatbot and the other digital resources such as social media channels.

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# Effect of Customers Green Consciousness on Customers Purchase Intention: A Field Study on Green Technology (Home Appliances)



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**Abstract** The study aims to test the impact of customers green consciousness on customers purchase intention. The Population of the study consisted of all buyers who purchased green technology products in Amman; a convenience sample was selected through distributing our questionnaire face-to-face approach at different companies and places in Amman. The study hypothesis was tested using structural equation modeling (AMOS). The results of the analysis show that there is an effect of customers green consciousness on customers purchase intentions. According to the findings, managers must improve their green brand positioning, image, and awareness to increase their green purchasing intentions in this ecological era.

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**Keywords** Customers green consciousness · Customers purchase intention · Green technology · Jordan

## 1 Introduction

Historically speaking, Green marketing attracted instant recognition in the past couple of decades. The most important issues that led to such a high recognition are global warming, depletion of stratospheric ozone layer, acid rain and desertification (Al-Abbadi et al. 2022; Kalafatis et al. 1999; Mohammad et al. 2022). Furthermore, people all around the world are growing increasingly worried about the dangers of ecological deterioration; currently, customers could readily determine a company's environmental performance through ecologically friendly goods. Thus, this study only focusses on environmental issues, for example, One increasingly popular viewpoint is that companies that want to promote environmentally friendly activities or "going green" to present and future customers ought to implement a customer-centric strategy to achieve sustainability (AlBrakat et al. 2023a; Al-Rwaidan et al. 2023; Attiany et al. 2023; Eldahamsheh et al. 2021; Mohammad et al. 2020; Tan et al. 2017; Urbach and Ahlemann 2010). Green as a concept and idea are becoming trendier in the recent years, the definition of the word green is a market niche that needs greater environmentally friendly products and offerings (Aityassine et al. 2022; Al-Awamleh et al. 2022; AlTaweel and Al-Hawary 2021). Green branding and marketing is defined as the marketing of goods and services that are perceived as environmentally pleasant as per The American Marketing Association. Al-Hawary and Alhajri (2020); Al-khawaldah et al. (2022) mentioned that the primary principle of a green marketing campaign is a marketing strategy, which basically translated into a long-term strategy that depends on building brand and consumer loyalty. Therefore, the understanding of green marketing strategies application is essential for all the stakeholders of a business (Alhalalmeh et al. 2020; Al-Nawafah et al. 2022). There for the study aims to examine the impact of customers green consciousness on customers purchase intention.

## 2 Theoretical Framework and Building Hypotheses

### 2.1 *Customers Green Consciousness (CGC)*

Many studies have found that customers who have a favorable attitude toward the environment are more likely than those who have a negative attitude to participate in specific environmental efforts such as recycling and donating money to green organizations (Alhalalmeh et al. 2022; Al-Hawary 2013a, 2013b; Al-Hawary and Obiadat 2021; Al-Hawary et al. 2023; Amiruddin 2023). Al-Hawary (2013a) in his study



of responses to advertising for a fictional laundry detergent, the researchers gave their subjects ads that featured the identical information but alternatively emphasized either the product's environmental qualities or its cost-saving benefits. The researchers reasoned that high EI customers would file the same purchase intents and attitudes toward the ad for each appeal since the 'green appeal' would be noticed (Al-Adamat et al. 2023b; Alhalalmeh et al. 2022; Shamaileh et al. 2023). Researchers found a link between this type of appealing and EI for advertising attitude but not with purchase intention. Humans who felt less concerned about the environment had a more positive view toward the advertisement that emphasized the product's environmental attributes, as predicted, compared to the one that emphasized the cost-saving benefits; there was no such difference for people who were extremely concerned about the environment. However, this conclusion was not discovered in the Journal of Marketing Communications. Because Al-Hawary and Obiadat (2020) provided the same information to their participants in each advertisement, this conclusion may not be surprising, and the difference in attitude toward the advertisement may simply reflect that the low EI customers did not find the cost-saving offer credible. More research is needed in this area, and research conducted in a variety of settings may provide a more conclusive explanation for how customers' reactions to green marketing materials are influenced by their level of EI (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017).

Customers around the world are becoming more aware of the environmental problems worldwide because of the feedback they receive from the impact of environmental crises and the increases of the environmental protection activates, therefore consumer environmentalism has become more prevalent in the last two decades (Eldahamsheh et al. 2021; Amiruddin 2023; Mohammad et al. 2023). Companies may begin employing the notion of green marketing to begin developing and enabling any trade of any ecological goods in order to meet customers' environmental demands or desires (Alolayyan et al. 2018; Kalafatis et al. 1999; Rahamneh et al. 2023). Furthermore, green marketing is an extremely broad notion that embraces all marketing actions designed to promote and sustain customers' environmentally friendly attitudes and behaviors (Alolayyan et al. 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021).

## ***2.2 Customers Purchase Intention***

Repeat purchase intention (PI) is defined as an individual's assessment about repeating the purchases process from the same company product or brand. Intention indicates the amount of interest and effort that customers spend to finally take an actual action and purchasing decision, and argue that the main influence that allow companies to predict consumer behavior is consumer attitudes (Al-Alwan et al. 2022; AlHamad et al. 2022; Dwijendra et al. 2023). Values and lifestyle are the main things that may force customers to accept green products, as it is more likely that customers

might accept green product or brands if it fits into their values and lifestyle (Al-Adamat et al. 2023a; Al-Hawary et al. 2020). Companies that provide green product must start emphasizing on the importance of environmental initiative, as they need to start educating customers regarding green attributes or green products. Kalafatis et al. (1999) utilized Ajzen's Theory of Planned Behavior (TPB) to investigate factors impacting buyers' intentions to buy green products in the UK and Greece. The theory of planned behavior model and the buying of green items had a significant match. In the UK sample, societal norms were shown to have a direct influence on consumer intention to purchase green products, whereas perceived control was connected with the intention to purchase green products among UK consumers. Customers in the United Kingdom value social conventions and societal approval.

### ***2.3 Customers Green Consciousness and Customers Purchase Intention***

Al-Hawary and Al-Fassed (2021) examined the influence of customers' prior values on their purchase intentions for organic private care goods using the notion of intentional conduct. Organic product purchases are influenced by environmental and aesthetic concerns (Al-Adamat et al. 2023b; Aldaihani et al. 2023; Alkhalwaldeh et al. 2023; Mohammad et al. 2023). Additionally, previous experience with organic products has been demonstrated to impact customers' attitudes and purchasing intentions. The notion of planned behavior might be applied to the perception of behavioral control over people's attitudes and buying intentions for green goods. The impact of social norms (both injunctive and descriptive) on consumers' environmentally friendly conduct was investigated; social norms, personal environment norms, and self-monitoring behavior each impact environmentally friendly behavior (Al-Hawary and Abu-Laimon 2013; Alshuqairat et al. 2023; Boudlaie 2022; Kalafatis et al. 1999; Al-Hawary and Aldaihani 2016). People who practise a superior level of self-monitoring are influenced by injunctive social norms, while those who practice low levels of self-monitoring are impacted by descriptive social norms. The study hypotheses may be written as follows:

**H1: There is an Effect of customers green consciousness on customers purchase intention.**

## **3 Study Model**

See (Fig. 1).

## 4 Research Methodology

### 4.1 Population and Sample

The Population of the study consisted of all buyers who purchased green technology products in Amman, A convenience sample was selected through distributing our questionnaire face to face approach at different companies and places in Amman, where the sample consisted of (550) buyers who participated in the study, of which (36) didn't return the questionnaire, and (18) were not valid for statistical analysis, and (496) valid one were analyzed.

### 4.2 Study Instruments

The paper questionnaire was developed to collect data from the study's sample, it contained four main sections, the first section was about demographics, such as (age, Gender, household income, level of education, and work sector), the second section was for consumer purchase intention relied on Chin and Chang (2012; Mukhlis et al. 2022), and the third section was for consumer Green Consciousness adopted by Remar (2015) and was covered by (36 item).

## 5 Study Analysis

- Reliability and factor analysis of the Instrument (customers Green Consciousness)

All of the study sample responses applied on (customers Green Consciousness) variable were subjected to analysis in order to detect the reliability of the questionnaire by using the Cronbach alpha equation to measure the internal consistency of the items. Also the responses were subjected to the (Exploratory Factor Analysis) using (Principal Component Analysis) to explorer the factors, using the vertical rotation (Varimax) (Akour et al. 2023; Al-Hawary et al. 2023; Amiruddin 2023; Pallathadka et al. 2023), and Table 1 shows the results of these two analyzes.

As shown in Table 1 all of the internal consistency values (Cronbach's Alpha) for the dimensions (CGC) are acceptable for the purposes of this study, which reached (0.83). The table also shows that all the values of the variance ratio (% of variance) and all the dimensions are high reaching (69.87%). And that all the values of the loading are high, ranging between (0.65) and (0.92) as suggested to be above (0.50) (Al-Armeti et al. 2023; AlBrakat et al. 2023b; Al-hawajreh et al. 2023; Al-Husban et al. 2023; Al-Khasswneh et al. 2023; Alshura et al. 2023).

Reliability and factor analysis of the instrument (customers purchase intention)

**Table 1** Reliability and factor analysis of the instrument

No.	Item	Loading
	Customers green consciousness, cronbach's alpha = 0.83, % of variance = 69.87	
CGC1	Customers behavior affects the environment	0.83
CGC2	Sustainability of natural resources important	0.81
CGC3	Climate change is a global environmental problem	0.72
CGC4	I buy some products because of the environmental claims	0.65
CGC5	I purchase brands packaged in recyclable or reusable materials	0.78
CGC6	Environmental pollution is a problem in Jordan today	0.85
CGC7	Individuals should encourage their friends, families and acquaintances NOT to use products that pollute the environment	0.92

The sample responses on (*CPI*) variable were subjected to analysis in order to detect reliability of the questionnaire by using the Cronbach alpha equation to measure the internal consistency of the items. Also the responses were subjected to the (Exploratory Factor Analysis) using (Principal Component Analysis) to explorer the factors, using the vertical rotation (Varimax), and Table 2 shows the results of these two analysis.

As shown in Table 2 all of the internal consistency values (Cronbach's Alpha) for the dimensions (*CPI*) are acceptable for the purposes of this study, which reached (0.78). The table also shows that all the values of the variance ratio (% of variance) and all the dimensions are high reaching (55.90%).And that all the values of the loading are high, ranging between (0.58) and (0.87).

**Table 2** Reliability and factor analysis of the Instrument

No.	Item	Loading
	Customers purchase intention toward green technology products, cronbach's alpha = 0.78, % of variance = 55.90	
CPI1	I buy green technology products in order to save water and electricity	0.62
CPI2	I buy technology products out of concern for the environment	0.58
CPI3	Green branded products match my interests in the environment	0.87
CPI4	I am highly satisfied with green branded products	0.82
CPI5	I would recommend green branded products to others	0.79

**Table 3** Constructional equations modeling analysis results by determining weights of standard regression coefficient

Hypothesis	Path			Estimate	S.E	C.R	P
	CPI	←	CGC	0.493	0.004	112.277	***

\*\*\*  $p < 0.01$

## 6 Hypotheses Testing

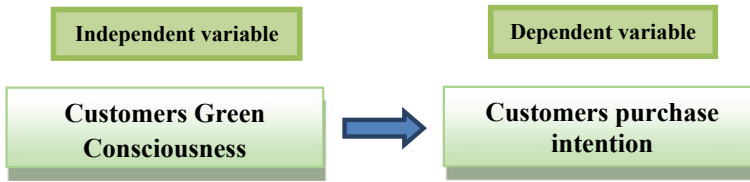
The first major hypothesis was tested by determining the effect of the variable (CGC) on the (CPI) using structural equation modeling (AMOS). Where in this program, it is possible to present the proposed model of the relationship between the two variables (CGC, CPI) in order to study the impact of a variable (CGC) on the (CPI), and figure shows the proposed model using the AMOS program.

After determining the target sample in the analysis, as well as the method of estimating the standardized and non-standardized regression weights for the study variables, which requires the use of the Bootstrapping method to determine the statistical significance. Table 3 shows the results of the structural equations analysis by setting the (Standardized Regression Weights) values and the (CR) values to test the first main hypothesis.

There is a statistical significant impact of (CGC) on (CPI), were the value of CR was (112.277) and statistically less than the statistical significance level of ( $\alpha \leq 0.01$ ), which lead to the reject of the first Null hypothesis and the acceptance of the alternative hypothesis “CGC has significant effect on CPI”, where the Standardized Regression Weights result was (0.493).

## 7 Discussion

The main aim of this study is to investigate the effect of customers green consciousness on customers purchase intentions toward green technology products in Amman. The researcher studied the most efficient and applicable variables of green brand in the green technology product markets in Amman from his perspective and according to previous studies. The results of the analysis show that there is an effect of CGConCPI, which also match the result of Huang, Yang and Wang (Henseler et al. 2015); Farida and Ardyan (2015), and most of the others too, this result is attributed to the acknowledged reality that customers green consciousness, if utilized effectively can be a competitive edge on its own. On the other hand the results showed that green brand trust have an effect on CPI, which totally aligned with the results in Farida and Ardyan (2015), study titled Repeat purchase intention of Starbucks customers in Indonesia: A green brand approach, were their results showed that there is no effect of brand trust on CPI. Furthermore, Zubair (2014) results show that GBA positively affect CPI which has been proven in our research results which also shows that green brand



**Fig. 1** Study model

awareness has a positive effect on CPI. On the other hand, You et al. (2013) found in their study that BI effect CPI, which agrees with our results whereby we found that GBI positively affect CPI.

## 8 Recommendations

According to the findings of the study, managers and decision makers must improve their green brand positioning, image, and awareness in order to increase their green purchasing intentions in the environmental era. Marketers should start by developing tactics for increasing views of green businesses and assisting potential customers in developing adequate green awareness to form a longer-term relationship in the environmental era. The most crucial brand attributes in determining the efficacy of marketing initiatives are brand image and brand awareness. Consequently, this study advises marketing managers to concentrate on the creation and maintenance of both green brand image and green brand awareness. Studying the impact of green brand on consumer decision making process and its individual stages, further investigate of the impact of GB with the rest of its variables (Pricing, distribution, green brand loyalty, demographics factors. Income) on CPI. Future Studies might not only encounter views and opinions of green brand consumer s, but also decision makers, managements and concerned marketing departments for enrichment and broader perspectives, in addition, further studies might expand beyond literature on subject matter to investigate another mediator variable other than CGC effect on the relationship between GB and CPI.

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# The Impact of Creative Behavior on Achieving Marketing Ambidexterity: A Field Study in Commercial Banks in Jordan



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**Abstract** The objective of the research is to examine the impact of creative behavior on achieving marketing ingenuity. The study population was limited to a category (branch manager, department head, division head and administrator) of the commercial banks workers, and the number of questionnaires valid for statistical analysis was (356) questionnaire. (PLS-SEM) was used to analyze the hypotheses. The results of the study concluded that creative behavior has an impact on marketing ingenuity.

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The study recommends to enhancing Originality in the work of their employees by enabling employees to complete the tasks assigned to them in a renewed manner.

**Keywords** Creative behavior · Marketing ambidexterity · Commercial banks · Jordan

## 1 Introduction

The success of commercial banks in general and their survival in a complex and dynamic environment requires the adoption of distinct strategies, work methods and behaviors; including what enables it to balance between matching current market requirements and current customer needs, exploiting available marketing opportunities and achieving short-term goals on the one hand, and adapting to changing market conditions, future customer needs, and exploring future marketing opportunities in addition to achieving long-term goals (Al-Alwan et al. 2022a, b; Alhalalmeh et al. 2022; Al-Quran et al. 2023; AlTaweel and Al-Hawary 2021). The concept of marketing ingenuity reflects the state of balance in the distribution of management's attention between alignment and adaptation as well as the performance of marketing activities based on exploitation, marketing activities based on exploration, and between achieving short-term and long-term marketing goals (Alhalalmeh et al. 2022; Al-Hawary 2013a, b; Al-Nawafah et al. 2022; Alolayyan et al. 2018; Eldahamsheh et al. 2021).

The need for creativity emerges when decision-makers in banks realize that there is a discrepancy between the bank's actual performance and the desired performance. Therefore, it can be said that the issue of creative behavior is now occupying an advanced position on the list of priorities in the management of the human element. Thus, Successful commercial banks have recently realized that the creative behavior of employees plays an important role in their success, which made them rely and focus on it (Metabis and Al-Hawary 2013).

The external environment of commercial banks is not stable, but has become of a highly variable nature, which resulted in the emergence of complex and intertwined marketing opportunities and problems that affected those banks in general (Al-Armeti et al. 2023; Al-Hawary et al. 2023; Alkhalwaldeh et al. 2023; Alshura et al. 2023). Subsequently, they had to innovate marketing solutions to explore and exploit marketing opportunities in order to achieve marketing ingenuity, which is considered one of the main factors for the survival and progress of these banks (AlTaweel et al. 2023; Sekaran, 2003). However, the innovation of solutions is not a coincidence, but rather requires providing the appropriate environment for creativity and open horizons for imagination to find appropriate solutions in order to achieve creative behavior (Al-Adamat et al. 2023; Al-Barakat et al. 2023; Alkhlifat et al. 2023). Through the difficulties and challenges faced by commercial banks resulting from the intensity of competition in that sector (Aldaihani et al. 2023a, 2023b; Mohammad et al. 2020; Tan et al. 2017). After review of previous studies the researcher identified a lack

and discrepancy in the results of recent studies dealing with the impact of creative behavior on marketing ingenuity in the context of commercial banks, especially in Jordan. So, the study came to identify the impact of creative behavior in achieving marketing ambidexterity.

## 2 Theoretical Framework and Hypothesis

### 2.1 *Creative Behavior*

The current stage is characterized by continuous change in the various fields of financial service, which prompted commercial banks in various countries to keep pace with these developments and try to benefit from them as much as possible, especially with regard to the most prominent feature of the modern era which was represented by information technology and the financial and other service activities associated with it, which led many banks to focus their efforts on developing their personnel from human resources to keep pace with that development (Al-Hawajreh et al. 2023; Al-Husban et al. 2023; Almomani et al. 2023). The essence of innovative banks is based on their development of a regulatory environment that works to shape creative directions in an intellectual and practical approach (Abazeed et al. 2023; Al-Quran et al. 2023).

Perspectives on creative behavior differ according to the angle from which researchers view creativity, and the concept of creative behavior differs with the variation in place and time, where today it differs according to the different sectors and the nature of the activities of institutions (Martins and Terblanche 2003). Martins and Terblanche (2003) defined creative behavior as the actions of employees adopted by management which creates new ideas and work patterns to improve production and management processes. Researchers Puccio and Cabra (2012) defined creative behavior as a creative act, or a set of actions that are demonstrated through behavior. Al-Hawary and Aldaihani (2016) indicated that the factors of creative behavior are.

**Originality:** Hawary and Aldaihani (2016) defined it as the ability to produce original responses, i.e. less repetition within the group to which the individual belongs as the characteristic of originality refers to new and original ideas in relation to its products, where it leads little by little to presenting what is new and original. **Idea generation (fluency):** This is done through brainstorming about everything that is new, and presenting new proposals and ideas that can be applied in practice. **Risk and the spirit of risk:** Risk and the spirit of risk reflect the extent of the individual's able to handle matters in various circumstances, and defending their own ideas (Al-Quran et al. 2023). **Problem Solving:** the individual's ability to find ways to solve problems (Al-Hawajreh et al. 2023).

## 2.2 *Marketing Ingenuity*

Marketing researchers refer to the term marketing ingenuity which is one of the modern concepts that seeks to achieve competitive superiority where it works to build a positive organizational environment and develop organizational culture that contributes to the advancement of marketing performance and customer orientation towards the market (Aldaihani et al. 2023a, b; Al-Hawary and Harahsheh 2014; Al-Hawary and Alhajri 2020; Harahap et al. 2022; Mohammad et al. 2022; Rahamneh et al. 2023). Marketing management requires a scientific methodology on which to base the practice of its activities in all its fields (Al-Abbadi et al. 2022; Khalayleh and Al-Hawary 2022; Mohammad et al. 2022; Mohammad 2019).

Ambidexterity is defined as the degree of compatibility and balance achieved between competing points of view in order to achieve a stated goal (Aityassine et al. 2022; Al-Hawary and Obiadat 2021; Al-Hawary et al. 2020; Alolayyan et al. 2022). It is defined as attempting to exploit current resources while also exploring new potentials (AlHamad et al. 2022). Exploration of opportunities, exploitation of opportunities, and flexibility are examples of marketing inventiveness.

**Exploration:** Exploration is a different approach to creating value, as employees devote their energy to creativity and innovation through their previous experiences, taking into account the risks involved, by trying to be the first entrants to the markets in order to gain the largest possible market share (Al-Hawary and Al-Rasheedy 2021). **Exploiting Opportunities:** Exploiting opportunities depends on the principles derived from operational rules and laws, in addition to the role of executive managers in effective business marketing that affects customers' opinions directly or indirectly (Shamaileh et al. 2023).

## 2.3 *Creative Behavior and Marketing Ambidexterity:*

Najm and Al-Shammari (Puccio and Cabra 2012) pointed out that creative behavior has an effective and significant impact on achieving high performance. Creative behavior contributed to defining the parameters of the model that can be used to translate through the past, identify the present, predict the future and prepare for it by adopting a road map through which the foundation is established to build a coherent and integrated image for applying the dimensions of creative behavior according to scientific foundations. Al-Faili and Abdul-Hussein (2020) also indicated in their study; which aimed to demonstrate the effect of creative behavior in enhancing marketing ingenuity on a sample of medical and nursing staff at Al-Shaheed Hospital, that there is a strong correlation and influence between creative behavior in its dimensions and marketing ingenuity in its dimensions. The study hypotheses can be as:

**H1: There is an impact of creative behavior (CB) and marketing ambidexterity (MA) in Jordanian commercial banks.**

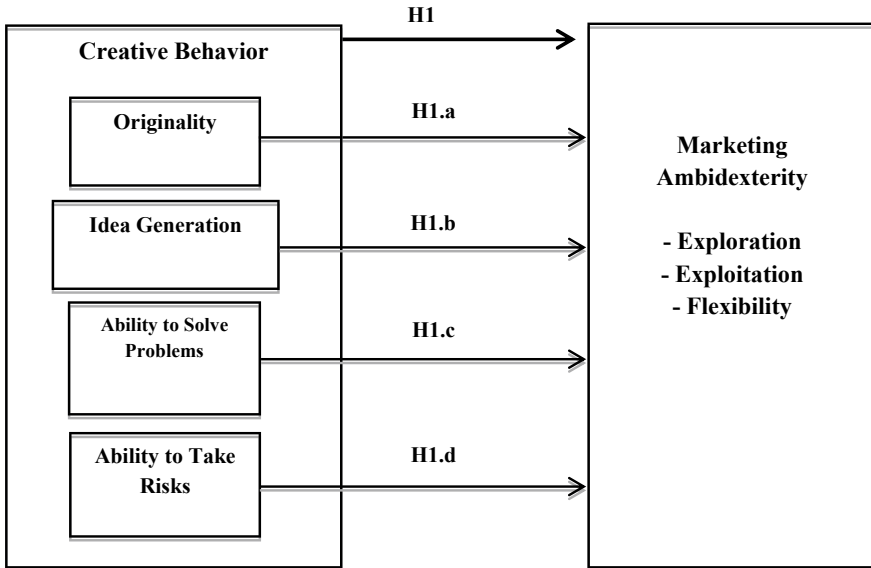


Fig. 1 Study model

### 3 Study Model

See (Fig. 1).

## 4 Methodology

### 4.1 Sample and Data Collection

A simple random sampling. 17,805 employees in (13) Jordanian commercial banks that made up the target population for this study. In addition, according to Sekaran (Shamaileh et al. 2023), The researchers distributed the questionnaire link through several methods, including the use of smart applications such as WhatsApp, social networks, and personal relationships to help spread the link. After the data collection procedure, 356 questionnaires were gathered and considered appropriate for analysis. This equated to an 89% response rate, showing an acceptable level of involvement. Smart-PLS 3.2.9 was used to assess the measurement and structural model of the study model.

## 4.2 Measurement

The instruments had a total of 34 items that focused on the model's two components. These items were altered from previously published work to ensure their relevance and conformity with the study topic (Abazeed et al. 2023; Al-Hawajreh et al. 2023; Al-Hawary et al. 2023; Almomani et al. 2023; Alshura et al. 2023). The 34 items were separated into 21 items for creative behavior based on the setting of this study. The CB dimensions contained 5 items for originality (O), 5 items for idea generation (IG), 6 items for the ability to solve problems (ASP), and 5 items for the ability to risk-taking (ATR). Additionally, 13 items for marketing ambidexterity (MA) dimensions were modified from the dimensions of exploration (E), exploitation (EX), and flexibility (F), which each included four items.

## 5 Results

### 5.1 Measurement Model Analysis

The validity, i.e., convergent and discriminant validity, and reliability, i.e., internal consistency, were evaluated in the PLS measurement model analysis. All item loadings needed to be in excess of 0.7 or 0.6 (AL-Zyadat et al. 2022; Hair et al. 2021, 2017), the composite reliability (CR) value needed to be 0.7 or higher, and the average variance extracted (AVE) needed to be at least 0.5 (Mohammad et al. 2023) were the requirements for the measurement model. While the AVE evaluates the amount of change reported by a construct from its constituent indicators and the measurement error, convergent validity checks whether a given item successfully measures the latent variable it is supposed to measure (Shaqrah et al. 2023; Tan et al. 2017). Table 1 displays the most current reliable and valid measurement model performed using SmartPLS version 3.2.9.

Table 1 shows that five items (ATR2 and EX4) were eliminated because they had low factor loadings, whereas the other items all had factor loadings above 0.6. The results additionally demonstrate that all constructions' composite reliability (CR), ranged from 0.862 to 0.948, exceeded the cutoff point of 0.7. This demonstrates the validity of the measuring model employed in this investigation (Al-Rwaidan et al. 2023; Martins and Terblanche 2003; Mukhlis et al. 2022; Zawahra, 2022). Convergent and discriminant validity were investigated for the measurement model in terms of validity. (AVE) values above 0.5, ranging from 0.528 to 0.804 (Al-Rwaidan et al. 2023; Franke and Sarstedt 2019; Hair et al. 2017; Khalayleh and Al-Hawary 2022), proved the convergent validity.

When items should load on their own factor more highly than on other constructs, discriminant validity is verified. This reveals that all constructs satisfied the criteria for discriminant validity, and it is suitable. Thus, it may be argued that the measuring



**Table 1** Reflective measurements model—a summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	(AVE)	(CR)	(CA)
		< 0.60	< 0.50	< 0.50	0.70–0.90	0.60–0.90
<i>(CB)</i>						
(O)	O1	0.873	0.856	0.608	0.885	0.838
	O2	0.814				
	O3	0.696				
	O4	0.749				
	O5	0.759				
(IG)	IG1	0.898	0.933	0.785	0.948	0.932
	IG2	0.894				
	IG3	0.861				
	IG4	0.883				
	IG5	0.895				
(ASP)	ASP1	0.777	0.835	0.528	0.870	0.822
	ASP2	0.792				
	ASP3	0.644				
	ASP4	0.797				
	ASP5	0.687				
	ASP6	0.647				
(ATR)	ATR1	0.858	0.787	0.611	0.862	0.785
	ATR3	0.798				
	ATR4	0.694				
	ATR5	0.768				
(MA)						
(E)	E1	0.816	0.856	0.626	0.893	0.852
	E2	0.788				
	E3	0.764				
	E4	0.811				
	E5	0.775				
(EX)	EX1	0.899	0.878	0.804	0.925	0.878
	EX2	0.904				
	EX3	0.887				
Flexibility (F)	F1	0.812	0.896	0.757	0.926	0.893
	F2	0.887				
	F3	0.889				
	F4	0.890				

**Table 2** Fornell-Larcker criterion

Construct	ASP	ATR	EX	E	F	IG	O
Ability to solve problems	<b>0.727</b>						
Ability to take risks	0.353	0.782					
Exploitation	0.011	0.153	<b>0.897</b>				
Exploration	0.111	0.196	0.752	<b>0.791</b>			
Flexibility	0.067	0.134	0.675	0.704	<b>0.870</b>		
Idea generation	0.153	0.216	0.648	0.743	0.651	<b>0.886</b>	
Originality	0.714	0.273	0.023	0.058	0.015	0.139	<b>0.780</b>

**Table 3** The HTMT criterion

Construct	ASP	ATR	EX	E	F	IG	O
Ability to solve problems							
Ability to take risks	0.416						
Exploitation	0.130	0.184					
Exploration	0.186	0.248	0.848				
Flexibility	0.129	0.164	0.760	0.791			
Idea generation	0.181	0.253	0.710	0.826	0.712		
Originality	0.804	0.323	0.081	0.112	0.120	0.159	

model is reliable and valid. On the basis of this, the validity of the instrument and the data were established (Table 2).

The Heterotrait-Monotrait Ratio (HTMT) is a sort of criterion that was used in Smart-PLS for this measurement purpose to assess the discriminant validity of the measurement model. Table 3 presents the results of the HTMT criterion.

### 5.2 Structural Model Analysis

Latent variables or constructs and the relationships between them make up the structural model (Hair et al. 2017). The structural model’s schematic diagram, shown in Fig. 2, shows the CB and MA dimensions. The five hypotheses put out in the study are shown by arrows between the constructions. The linkages between CB and MA as well as the relationships between CB dimensions and MA are depicted by the standardized estimates in the structural model in Fig. 2. The coefficient of path values, which range from – 1 to + 1 and represent the strength of any relationship between any two constructions, need additional explanation (Hair et al. 2017).

Critical values for significance in 2-tailed tests were given by Ramayah et al. (Qurah et al. 2023) in their study as follows: p 10% (1.64), p 5% (1.96), and p

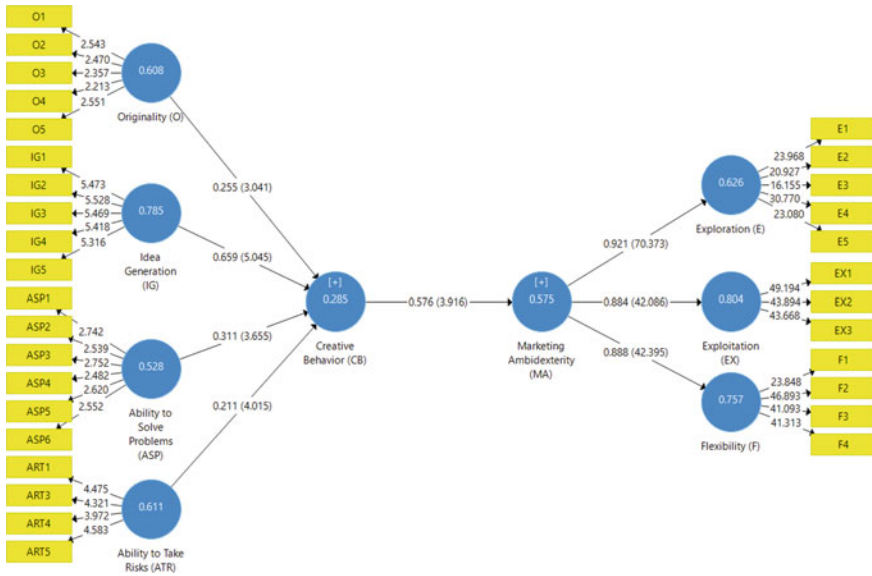


Fig. 2 Structural model results

1% (2.58). Typically, marketing researchers use a significance level of p 5%. Bias-corrected bootstrap confidence intervals (lower limit, upper limit) may be employed to determine if the path coefficient substantially deviates from zero, as stated by Hair et al. (2017). If the confidence interval for a calculated path coefficient does not contain 0, then the influence of that specific path is substantial. The 356 instances that made up the original set of data were replaced with 5000 subsamples to conduct this investigation. Table 4 lists the outcomes of the structural model used for this investigation.

As can be observed in Table 4, the path coefficients of CB were found to have an effect on MA; the result indicated that (CB → MA, β = 0.576; t-value of 3.916).

Table 4 Structural model results

Hypothesis	Relationship	Indirect effect (β)	S. error	t-statistic	P values	Confidence interval (BC)		Decision
						LL	UL	
H1	CB → MA	0.576	0.147	3.916	0.000	0.617	0.730	Supported**
H1.a	O → MA	0.147	0.054	2.726	0.006	0.038	0.218	Supported*
H1.b	IG → MA	0.379	0.155	2.445	0.015	0.153	0.715	Supported*
H1.c	ASP → MA	0.179	0.054	3.317	0.001	0.095	0.241	Supported*
H1.d	ATR → MA	0.122	0.040	3.045	0.002	0.054	0.201	Supported*

Note Significance level at \*\*p < 0.01, \*p < 0.05 (two-tailed). LL lower limit at 5%; UL upper limit at 95% confidence interval; BC bias corrected

In addition, the -hypothesis results showed an impact at  $p < 0.01$ . Consequently, the results showed an impact of IG on MA  $p < 0.05$ . Thereby, the bootstrap results of the H1.c for this study, indicated that the direct effect ( $ASP \rightarrow MA$ ,  $\beta = 0.179$ , t-value of 3.317) was significant at  $p < 0.05$ . The results also confirmed that there was a direct effect of H1.d on CA at a 5% confidence interval (LL = 0.054, UL = 0.201), that does not straddle a 0 in between, which indicated support for these hypothesis.

## 6 Discussion

The results concluded that creative behavior has an impact on marketing ambidexterity in commercial banks; this can be explained through the changes that occur in the activities and jobs performed by employees in those banks. The current study agreed with the study of Al-Faili and Abdul-Hussein (2020), as it concluded that there is an effect of creative behavior in enhancing marketing ingenuity. This result is consistent with Jong (2016), which indicated that creativity leads to achieving marketing success which revolves around the organized ability to protect intellectual property rights for product development. The current study agreed with the study of Zawahra (2022), which concluded that there is an impact of creative behavior with its combined dimensions on smart organizations. The study also agreed with the study of Najm (2021), which concluded that there is an effect of adopting creative behavior in achieving high performance. The study further agreed with the study of Maghrabi (2022), where it was concluded that there is an impact of creative behavior on human resource management.

As it became clear through the results that there is an effect of originality on marketing ambidexterity, the current study agreed with the results of the study of Al-Faili and Abdel-Hussein (2020), where it became clear that there is an effect of the axis of originality in enhancing marketing ingenuity. The study also agreed with what was stated in the study of Maghrabi (2022), where the results showed an impact of the originality axis on human resources management. The study agreed with what was stated in the study of Maghrabi (2022), where the results showed that there is an effect of the axis of idea generation on human resource management. In addition to the impact of the ability to take risks and risk on marketing ingenuity. The current study also agreed with what was stated in the study of Al-Faili and Abdel-Hussein (2020), where it became clear that there is an effect of the risk-taking axis in enhancing marketing ingenuity. Finally, the study agreed with what was stated in the study of Maghrabi (2022), where the results showed that there is an effect of the axis of the ability to take risks on the management of human resources.

## 7 Recommendations

The study recommend managers in commercial banks to work on enhancing Originality in the work of their employees by enabling employees to complete the tasks assigned to them in a renewed manner that is commensurate with the work environment in Jordanian commercial banks. In addition to encouraging the generation of ideas for its employees by training employees on methods of generating a multitude ideas in a short time. Furthermore, it is recommended to consolidate the concept of the ability to take risks by motivating the bank's employees to take advantage of their failure in some work tasks and consider it an experience to benefit from in facing work problems in the future. Finally, the need to empower commercial banks in Jordan to explore marketing opportunities by working to recruit individuals with high skills and experience.

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# Empowering Small Fashion Retailers with Social Media Marketing (SMM) Strategies: Literature Review



Wafa Haider and Allam Hamdan

**Abstract** The feasibility of this study is high. It aims to explore the effectiveness of SMM in the fashion retail industry, which is a relevant and timely topic. The research objectives and questions are clearly defined, and the study will use a comprehensive review of existing literature and case studies to provide insights and recommendations for businesses. There are also reliable sources of data and information available on this topic, making the study feasible to conduct.

**Keywords** Social media · Digital marketing · Fashion industry

## 1 Introduction

Digital marketing is an essential component in enhancing business performance. Social media offers a platform for people to strengthen their social bonding. To reach the target audience online through social media platforms, digital marketing is used with conventional marketing communications, which accelerates productivity and thus generate huge revenue for a business. The worldwide accessibility of the internet brings positive impact on society and human life, which in turn is utilized by companies in digital marketing. It helps to make the world human-centered and connected with the help of technology (Trad and Al Dabbagh 2020). The fashion commission of Saudi Arabia plays a crucial role in strengthening the fashion industry by increasing talent, boosting technology and competencies. Accessibility of this industry can be improved with the help of digital marketing tool and financial support from the commission, which will help large companies and small startups to merchandise and sell their products both in domestic and international markets. Social media has emerged as a powerful marketing tool that can significantly impact revenue growth for businesses across various industries. Social media marketing (SMM) has gained significant importance in the fashion retail industry of Saudi Arabia, as it has become

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a crucial factor for businesses to enhance their sales and profitability. While the literature on SMM is growing, there is still a need for further research to fully understand its implications., there is a research gap that requires specific attention to its role within the fashion retail industry of Saudi Arabia.

## **2 Literature Review**

### ***2.1 Social Media Marketing: A Comprehensive Overview***

SMM is a strategy used by businesses to promote their products or services through social media platforms (Li and Bernoff 2011). It involves creating and sharing content on various social media channels to engage with customers, build brand awareness, and ultimately drive sales.

The concept of SMM has evolved rapidly over the years, and it is now considered an integral part of the marketing mix (Singh and Sonnenburg 2012). Social media platforms such as Facebook, Twitter, Instagram, LinkedIn, and TikTok have changed the way businesses interact with customers and promote their brands.

Each social media platform has unique features and functionalities that can be leveraged for marketing purposes. For example, Facebook provides businesses with the ability to create targeted ads (Zahay and Griffin 2010), whereas Instagram is known for its visual storytelling capabilities. Twitter is often used for real-time engagement with customers, and LinkedIn is a popular platform for B2B marketing. TikTok has emerged as a platform for short-form video content and influencer marketing.

The significance of SMM in today's business world cannot be overstated. With billions of users on social media platforms, businesses can reach a large audience at a relatively low cost compared to traditional marketing channels. Social media also allows businesses to engage with customers in real-time, providing valuable feedback and insights. Additionally, SMM can help businesses build brand loyalty and trust by creating meaningful connections with customers.

### ***2.2 The Role of Social Media Marketing in Fashion Retail***

SMM has become a critical component of the fashion retail industry's marketing strategy, offering unique opportunities to engage with customers and increase brand awareness (Beyene et al. 2020; Balawi and Ayoub 2022). By leveraging social media platforms such as Instagram, Facebook, and TikTok, fashion retailers can showcase their products, create personalized shopping experiences, and build meaningful connections with their target audience (Okazaki 2016; Pantano and Viassone 2015).

In recent years, influencer marketing has emerged as a popular SMM strategy in the fashion industry (Dwivedi et al. 2020). Influencers, who have a large following on social media, partner with fashion retailers to promote their products, often through sponsored posts or collaborations. This strategy has been successful in reaching a wider audience and generating buzz around new product launches (Chen et al. 2020).

SMM has also allowed fashion retailers to gather valuable customer feedback and insights (Liang et al. 2017). Through social media analytics tools, retailers can track their performance, monitor customer feedback, and adjust their marketing strategies accordingly (Kim and Ko 2012).

While SMM offers numerous benefits to the fashion retail industry, it also poses challenges such as managing customer expectations and maintaining brand authenticity (Hajli 2014). However, with the right strategies and tools in place, fashion retailers can effectively leverage social media to enhance their brand image, engage with customers, and drive sales (Thirumagal et al. 2023).

### ***2.3 Opportunities and Challenges of Social Media Marketing in Saudi Arabia's Fashion Retail Industry***

The fashion retail industry in Saudi Arabia has experienced a significant shift in consumer behavior due to the widespread use of social media platforms (Alalwan et al. 2017). Social media marketing (SMM) has emerged as a promising marketing tool for fashion retailers in Saudi Arabia to connect with their target audience and expand their customer base. According to Algharabat and Rana (2019a, b), SMM has a significant positive impact on consumers' purchasing intention in the fashion industry.

SMM presents several opportunities for fashion retailers in Saudi Arabia. Firstly, social media platforms allow fashion retailers to reach a wider audience than traditional marketing methods (Alalwan et al. 2017). Secondly, it provides an opportunity for fashion retailers to engage with their customers and receive instant feedback, which can be used to improve their offerings (Algharabat and Rana 2019a, b). Thirdly, social media platforms can be used to showcase a brand's personality and values, which can help to build brand loyalty among customers (Alalwan et al. 2017).

However, the implementation of SMM in the Saudi Arabian fashion retail industry is not without challenges. Cultural barriers pose a significant challenge as they restrict the type of content and communication strategies that can be employed on social media platforms (Alalwan et al. 2017). For instance, certain cultural norms and values may limit the use of certain types of advertising, such as ads that feature models wearing revealing clothing. Therefore, fashion retailers need to be mindful of cultural sensitivities when designing their social media marketing campaigns (Alareeni et al. 2022; Ahmad et al. 2023).

Another challenge is the lack of knowledge and expertise among fashion retailers in Saudi Arabia when it comes to effectively utilizing social media for marketing

purposes (Algharabat and Rana 2019a, b). Many fashion retailers in Saudi Arabia may not have the necessary skills or resources to develop and execute effective social media marketing campaigns (Albinali and Hamdan 2021). Therefore, there is a need for training and education programs to help fashion retailers acquire the skills and knowledge required to leverage social media for marketing purposes.

#### ***2.4 Strategies and Tactics for Effective Social Media Marketing in Fashion Retail***

Effective SMM strategies for fashion retail involve a combination of tactics aimed at building brand awareness, engaging with customers, and driving sales (Smith et al. 2012). Some key strategies include creating a strong social media presence, developing a content strategy, utilizing influencer marketing, and leveraging user-generated content.

To create a strong social media presence, brands need to be active on multiple platforms such as Facebook, Instagram, Twitter, and TikTok, and ensure their profiles are fully optimized with engaging content, eye-catching visuals, and relevant information (Stephen and Galak 2012). This helps to build brand awareness and attract a larger following.

Developing a content strategy involves creating a variety of content types such as images, videos, blogs, and social media posts that are tailored to the platform and audience (Wang et al. 2012). It is essential to create content that resonates with the target audience, showcases the brand's personality and values, and ultimately drives engagement and sales.

Influencer marketing involves partnering with influencers who have a large and engaged following on social media platforms to promote products or services. Collaborating with influencers can help brands reach new audiences, build trust and credibility, and generate buzz around new products or collections (Smith et al. 2012).

Leveraging user-generated content involves showcasing content created by customers such as photos and reviews, which can be shared on social media platforms to build social proof and trust with potential customers (Wang et al. 2012).

Finally, effective SMM in fashion retail requires a combination of strategies aimed at building brand awareness, engaging with customers, and driving sales. Brands need to create a strong social media presence, develop a content strategy, utilize influencer marketing, and leverage user-generated content to succeed in today's competitive market (Stephen and Galak 2012).

## ***2.5 A Comparative Analysis of Social Media Marketing in the Fashion Retail Industry: Saudi Arabia versus Global Trends***

The fashion retail industry in Saudi Arabia has witnessed a significant shift in consumer behavior due to the widespread use of social media platforms, particularly Instagram (Sultan 2019). However, while social media has become a popular tool for fashion retailers to engage with customers, there is still a lack of understanding and utilization of more advanced social media marketing techniques (Algharabat and Rana 2019a, b). In contrast, global trends in social media marketing for fashion retail show a greater emphasis on data-driven decision making and targeted advertising (Kaplan and Haenlein 2010). Brands are using social media analytics to track consumer behavior and preferences and using this data to tailor their marketing messages and offerings.

In addition to data analytics, influencer marketing has become a key strategy for fashion brands globally. By partnering with high-profile influencers, fashion brands can reach wider audiences and build brand awareness (Majumdar and Dasgupta 2019). Influencer marketing can also help to increase brand credibility and authenticity by leveraging the trust and loyalty that influencers have built with their followers (Bhattacharya and Sen 2003).

While some fashion brands in Saudi Arabia have begun to incorporate influencer marketing into their social media strategies, there is still a significant gap in terms of utilizing advanced techniques such as data analytics and targeted advertising. A study by Algharabat and Rana (2019a, b) found that many fashion retailers in Saudi Arabia have a limited understanding of the benefits of social media marketing and are not using advanced techniques to increase their revenue growth.

To better compete with global players, businesses in the fashion retail industry in Saudi Arabia need to incorporate more advanced social media marketing techniques such as data analytics and influencer partnerships. By doing so, they can increase their reach, engagement, and revenue growth, and better meet the evolving needs and preferences of their target audience.

## ***2.6 Future Directions for Social Media Marketing in the Fashion Retail Industry***

The future of social media marketing (SMM) in the fashion retail industry in Saudi Arabia is promising and presents several opportunities for brands to connect with their customers and enhance their overall experience. One potential future direction is the incorporation of emerging technologies such as augmented reality (AR) and virtual reality (VR) into SMM strategies. AR and VR technologies can allow customers to try on clothes virtually, visualize outfits in different settings, and even attend virtual fashion shows, enhancing the customer experience (Alalwan et al.

2018). This technology presents a significant opportunity for fashion retailers to differentiate themselves and create a unique and engaging customer experience.

Another future direction for SMM in the fashion retail industry in Saudi Arabia is the integration of e-commerce capabilities into social media platforms. By allowing customers to purchase products directly from social media channels, fashion brands can streamline the purchasing process and increase their revenue (Gandhi et al. 2020). This trend is becoming increasingly popular globally and is likely to continue in the future.

Additionally, the use of big data analytics to improve customer targeting and personalization is another potential future direction for SMM in the fashion retail industry in Saudi Arabia. By analyzing customer data from social media interactions, fashion brands can gain insights into consumer preferences, behavior, and trends, allowing for more targeted and effective marketing campaigns (Alalwan et al. 2018). This approach can help fashion brands to tailor their offerings and marketing messages to better meet the needs and preferences of their target audience.

Finally, there is a growing trend towards sustainable and ethical fashion, which presents an opportunity for fashion brands to incorporate socially responsible messaging into their SMM strategies. By promoting sustainable and ethical practices, brands can appeal to customers who are increasingly conscious of the environmental and social impact of their purchases (Gandhi et al. 2020). This trend is likely to continue in the future, and fashion brands that incorporate socially responsible messaging into their SMM strategies are likely to have a competitive advantage.

### 3 Conclusion

In conclusion, the marketing strategy of the fashion retail industry now incorporates social media marketing as a fundamental component, providing unique opportunities for engagement with customers and increasing brand awareness. The different social media platforms offer distinct features that businesses can leverage for marketing purposes, and influencer marketing has emerged as a popular strategy in recent years. Social media marketing has also been shown to have a positive impact on revenue growth in various industries, including fashion retail. However, it is important to address the challenges associated with social media marketing, such as managing customer expectations and maintaining brand authenticity. To effectively leverage social media marketing in the fashion retail industry, businesses should focus on building brand awareness, engaging with customers, and leveraging social media analytics tools to track performance and adjust marketing strategies accordingly. The adoption of social media marketing in the Saudi Arabian fashion retail industry presents new opportunities for businesses to reach out to their target audience, but also poses challenges that must be addressed to ensure success. Overall, social media marketing is a powerful tool for businesses to connect with customers, build brand loyalty, and drive revenue growth.

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# The Role of Artificial Intelligence in Brand Building: A Review



Hend Hamed Musaiqer and Allam Hamdan

**Abstract** This literature review explores the role of artificial intelligence (AI) in brand building and the challenges and opportunities associated with its implementation. With the increasing availability of data and advances in machine learning techniques, AI has become a powerful tool for businesses to enhance their brand building efforts. The review examines the existing literature on the use of AI in brand building, including its potential to improve customer engagement, personalize marketing strategies, and optimize brand messaging. However, the review also highlights the challenges associated with AI implementation, such as the need for high-quality data, potential biases in algorithms, and the risk of losing the human touch in brand interactions. Through a comprehensive analysis of the literature, this review provides insights into the current state of AI in brand building and identifies areas for future research.

**Keywords** Artificial intelligence · Brand building · Customer · Marketing · Personalization

## 1 Introduction

Brand building is the process of creating a brand, and maintaining it. And it is an important component of every business. It entails developing a company's identity, beliefs, and vision and communicating these to the intended audience. Because of increased competition and changing customer behavior, brand building has gotten more difficult in recent years. Strategic brand management has emerged as a hot topic among brand researchers, with many theories of brand value and how branding tactics effect customer behavior being investigated. Wide research has presented multiple branding models by including key branding hypotheses and investigating their correlations with various contexts. How customers experience brands, in particular, is

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crucial for designing marketing strategies. Brand experience is an essential predictor of both direct and indirect consumer behavior outcomes such as customer loyalty and satisfaction and intent to purchase. Customers, can become loyal when positive encounters presented (Kim 2019). AI is gaining popularity among marketers and consumers. The psychological bases of AI in consumer behavior and usage of AI are frequently linked to psychology area. Additionally, the significance of understanding process psychologically in the field of AI is obvious. Scientists who are working on AI with the objective of developing computers that could execute tasks that would require intelligence if performed by a human (Mariani 2021). One of the developing technologies that organizations can employ to improve their brand creation efforts is artificial intelligence. AI has the ability to renovate the way businesses approach brand building. Nowadays, we witness a wide range of AI technology in the form of mobile applications and devices in the homes of consumers.

## 2 Literature Review

### 2.1 *Brand and Artificial Intelligence*

A **brand** is a name, word, sign, symbol, design, or a mix of all used to distinguish one seller's products or services from those of rival businesses. McDonald's, Mercedes-Benz, Sony, Coca-Cola, Apple, Adidas, etc. are a few examples of well-known brands. Giving a brand name or symbol to a product gives it a unique individuality known as branding. Branding is a critical component that cannot be disregarded in today's competitive climate. Brand identity, brand image, and brand equity are all important aspects of branding. The study seeks to clarify the significance of these ideas for both the firm and the consumers as well as how a firm may effectively develop them. (Ramanujan 2017).

Computers, as opposed to traditional concepts, are defined as artificial intelligence (AI), which is defined as mathematical and physical applications that can handle complexity. However, viewpoints and studies on the extent to which AI may be employed for tasks similar to those performed by the human brain, notably decision making, are limited and vary in focus, technology, and purpose (Trunk 2020).

Incorporating technology into business is not a new trend, as machines have been utilized to assist humans in production processes for decades. Machines, on the other hand, are a tool that is totally directed by humans and is less defined in real social cooperation contexts than organizations are. AI assumes that machines will respond and react to humans, signaling a potential shift in the human-machine connection. Opportunities and hazards, on the other hand, are not agreed upon or adequately evaluated, demanding extra investigation (Trunk 2020).

**Artificial intelligence** is a rapidly evolving technological phenomenon that many businesses are attempting to leverage in order to boost efficiency and reduce costs. AI looks to be capable of replacing humans by intelligent tasks reserved previously

for the human mind. Instead of replacing the human mind, AI can be utilized to augment intelligence. Our research seeks to examine these varied points of view, and their implications and possible concerns in an era of growing artificial awareness. We show that the target is to achieve IA through AI deployment (Hassani 2020).

Disruptive technologies blockchain, and artificial intelligence have changed the operation of businesses function. The most current technological disruptor is artificial intelligence (AI), which has immense marketing transformation potential. Practitioners throughout the world are looking for the best AI solutions for their marketing tasks (Abdulla et al. 2023; Hamdan et al. 2022). A thorough literature review, on the other hand, can emphasize the importance of artificial intelligence (AI) in marketing and point the way forward for further research.

Because of its practical usefulness in current and future industry, artificial intelligence (AI) in marketing has gained traction. Because of the increasing scope and volume of AI in marketing research studies, meta-synthesis of previous studies is crucial for determining future study areas. The systematic literature review has been attempted before, but previous reviews are descriptive, leaving the latent intellectual network structure untouched. Identifying research subthemes, hot subjects, and future research areas (Verma 2021).

Stuart Russell, professor of computer science and Smith-Zadeh professor in engineering at University of California, Berkeley, *describes AI a bit differently on his website*: “It’s the study of methods for making computers behave intelligently. In general, a computer is intelligent if it does the correct thing rather than the wrong thing. The correct action is the one that is most likely to achieve the goal, or, to put it another way, the action that maximizes expected utility. Learning, reasoning, planning, vision, language understanding, and robotics are all examples of AI tasks.

### 3 Brand Building

Customers can become loyal as a result of positive interactions. According to (Keller), experience is the foundation for processing information and making inference, resulting in brand relations, which may affect consumer happiness and loyalty (Cleff et al. 2018) The ability to manage consumer experience is closely related to a brand’s ability to remain on the market for an extended period of time (Sherry 2005). As a result, it is critical to understand how consumers interpret brand experiences and how the experiences affect the process of developing consumer-brand relationships (Kim 2019).

In order to influence consumers, marketers must acknowledge the importance of offering a great brand experience and evoking favorable sensations for participation products. Marketers cannot expect customers trust naturally lead to brand attachment and purchase intention unless a successful experience was provided. This is particularly true for low participation product instances, when brand trust does not result in brand attachment. As a result, marketers are urged to change focus to brand

experience in order to boost attachment image and trust for involvement products via experiential marketing strategies (Kim 2019).

Internet provided benefits to consumers like recommendations and suggested product service (Roggeveen et al. 2017), may minimize time in shopping and personalized customer service, AI provides new opportunities in marketing activity. The analysis of AI demonstrates an extensive range of benefits that will be given to consumers (Jarek 2019).

Information technology gives rise to artificial intelligence. The Oxford Dictionary defines artificial intelligence as the theory and development of computer systems capable of performing tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and language translation (Jarek 2019).

### ***3.1 Artificial Intelligence Success***

Artificial intelligence has been used extensively in business, with considerable success in marketing and brand building. The following are some aspects that have found success in this industry.

1. **Predictive analytics:** Understanding what and why it happened, and what can be done next begs the obvious question, “What should we do about it?” Prescriptive analytics use advanced algorithms to recommend ideal decisions and their implications based on predicted data (Schweyer 2018). Prescriptive analytics data Machine learning algorithms are used in these analytics to assess previous data and anticipate future events (Karthick and Gopalsamy 2023; Rajumesh 2023).

In marketing might provide individual sales people with individualized action plans outlining what they should do to increase sales, which items to bundle for specific consumers, which classes to attend, and predict customer behavior and what product they will buy and many more (Schweyer 2018).

2. **Personalization:** Personalization employs artificial intelligence to adapt marketing messages and content to specific customers depending on their interests and actions. Personalized product recommendations, targeted email campaigns, and tailored online experiences are examples of this.

Image generating applications for marketing. Personalization of images used in communications such as social media and emails postings is one attractive potential marketing usage that may be researched (Liu et al. 2019) show how learning may be used to analyses personalities displayed in social media postings labeled with certain businesses.

In a slightly different vein, the photographs that customers have posted to social media different platform can reveal their stated personality.

Rather of creating for each customer a wholly fresh visual content, marketers may strive to use image generation to adjust visuals, change them to better correspond with the expressed personality of the consumer (Schweidel et al. 2023).

3. Chatbots and virtual assistants: use natural language processing to provide information and assistance plus interaction with customers. In marketing, they can be used to answer client questions, recommend products, and even manage transactions.

The growing number of messaging apps and voice assistants is driving the demand for conversational AI platforms. To keep ahead of the competition, some companies are investing in chatbots. Customers prefer chatting as the primary form of contact. The market's expansion is being hampered by a preference to deal with data privacy and security.

Conversational AI deployment is expected to rise further as more firms integrate platforms into chat and call centers to provide continuous interaction to improve engagement with the customers. (esearchAndMarkets.com).

4. Image and video recognition: uses vision algorithms to analyze images and videos and identify objects, customers and other features

The system can make payments and get approval by comparing face images (Jarek 2019).

This can be used in marketing to analyze social media images and videos for brand mentions, sentiment analysis, and even to identify potential influencers.

A while back the availability of data and computer capacity limited AI uses in marketing. However, with the explosion of digital data and the development of more sophisticated machine learning algorithms, artificial intelligence is now playing an agile role in marketing. Predictive analytics, for example, has been utilized in direct mail marketing for decades, while recent advances in AI-powered personalization have resulted in greater engagement and conversions in email marketing and targeted advertising. Chatbots and virtual assistants are also increasingly widespread in customer care, while picture and video recognition are being used to evaluate social media material and inform marketing strategy.

### ***3.2 Theoretical Frameworks***

Shimp and Terence (2010) defines brand awareness as “a condition in which the brand name is on the minds of consumers”. It is a basic characteristic of brand equity; in the customers eyes, brands have no equity if people are unaware of it. Achieving brand awareness is a significant problem for new brands, and there are two stages of awareness: brand recognition and brand recall. Marketing communications purpose is to move a brand from unknown to top of mind.

Consumers have no direct encounter with the seller when doing online transactions, making it difficult to evaluate the things ordered or the seller's identity. As

a result, trust becomes a critical aspect in online purchase loyalty. Furthermore, in order to purchase goods or services, payment is frequently made with a credit card. It is quite likely that you will be scammed, and the stuff you receive will not be as requested.

When compared to traditional sell and purchase transactions, online clients will weigh the uncertainties and hazards when transacting with online vendors. Buyers have few opportunities to learn about quality and test the desired product via a Web media. When a buyer makes a purchase from an unknown website, they have no way of knowing whether the quality on offer is acceptable and reputable (Sastika et al. 2016).

Electronic loyalty is described as the customer's psychological urge to use a specific online merchant or provider. On the electronic transaction mechanism, it is described as a customer's good opinion toward an electronic firm and lead to recurrent purchasing behavior. Customer will be loyal when they visit the website on a regular basis and make a purchase. Some research imply that trust and loyalty are related to website design in the realm of online transactions (Sastika et al. 2016).

Below branding theories can be applied to the use of AI in branding to help businesses create a stronger, more effective brand image. By leveraging AI-powered tools to create personalized experiences, build emotional connections, and improve their positioning in the market, Businesses may build a brand that connects with their target audience and delivers long-term success.

1. Brand personality theory: This theory suggests that a brand can be personified by giving it human-like qualities. As AI-powered tools become more prevalent in branding, businesses can use these tools to create a consistent brand personality across all their marketing channels. Artificial intelligence can be used to analyze customer information and create personalized messaging that reflects the brand's personality.
2. Brand equity theory: The theory suggests that a brand's value is determined by its ability to create a strong emotional connection with its customers. AI powered tools can help businesses understand the customers' emotions and preferences, which allow them to tailor their messaging and marketing efforts to create a more emotional connection with their audience.
3. Brand identity theory: This theory suggests that a brand's identity is determined by its visual and experiential elements. AI can be used to create highly customized and personalized experiences for customers, allowing businesses to create a strong brand identity that resonates with their audience.
4. Brand positioning theory: This theory suggests that a brand's position in the market is determined by how it is perceived by its customers relative to its competitors. AI-powered tools can help businesses analyze their competition and identify opportunities to differentiate their brand and improve their positioning.
5. Brand resonance theory: theory suggests that a brand's success is determined by its ability to build a relationship with its customers that goes beyond simple transactions. AI can be used to create personalized experiences that build trust

and loyalty with customers, helping to create a stronger resonance between the brand and its audience

### ***3.3 The Role of AI in Brand Building***

AI has the potential to revolutionize the way companies approach brand building. AI can provide insights into consumer behavior, preferences, and trends that can help businesses create more effective branding strategies. Here are some of the ways that AI can be used in brand building:

#### **1. Personalization**

One of the benefits of AI is that it may assist businesses in personalizing their brand messaging. Personalization is an important part of brand building because it allows businesses to establish a more emotional connection with their customers. By evaluating client data for example browsing habits, history of customer purchase and social media interactions, AI can assist businesses in personalizing their content. AI can then utilize this information to provide customized messaging to each customer, resulting in a better brand engagement.

#### **2. Content Creation**

AI can also be used to create content that is more engaging and relevant to the target audience. AI-powered content creation tools can analyze customer data and create content that is tailored to their interests and preferences. This can help companies create more effective brand messaging that resonates with their target audience.

AI-powered content creation has pushed the boundaries of customization. You may engage your site's customers by only displaying content that is relevant to them. This approach to get people to interact with the material, especially on e-commerce sites. You can recommend things to customers based on search history. Consider the phrase 'customers who bought X also bought Y.' It has also proven to be extremely beneficial in subscription businesses. Continuous use of the service necessitates more data for the machine learning algorithm and, as a result, better recommendations (Nair and Gupta 2021).

#### **3. Customer Service**

AI can also play a central role in improving customer service, which is an essential aspect of brand building. AI-powered chatbots can provide customers with quick efficient responses to their inquiries. This can help companies provide a more positive customer experience and enhance their brand reputation.

#### **4. Predictive Analytics**

AI can be used to analyze customer data and make predictions of future behavior. Predictive analytics can help companies identify potential customers and target them

with more relevant messaging. This can help businesses create more effective brand campaigns that are tailored to their target audience.

### 5. Social Media Monitoring

AI can also be used to monitor social media conversations and identify potential brand advocates. Social media monitoring tools can analyze millions of social media conversations in real-time and identify influencers who are talking about a company's brand. This can help businesses identify potential brand ambassadors and build stronger brand relationships.

## 3.4 Challenges and Limitations

While many benefits can be gained by using AI in brand building, there are some challenges that businesses need to be aware of. Some of the challenges include:

### 1. Customer service

One of the challenges is satisfying increased client expectations in the market. Researchers have been working hard to uncover the essentials in the customer journey that influence satisfaction and perception. Most businesses fail to build successful self-service platforms and receive complaints from Unsatisfied customers as a bad customer service Despite taking all precautions. Despite the fact that many organizations have used AI, the majority of them have yet to fully understand its benefits. Some machine learning algorithms can grasp human emotions; thus, it is incorrect to suppose that AI just promotes impersonal relationships (Brynjolfsson and McAfee 2017). According to the Global AI survey (2017), while communicating with Chatbots, two out of every three clients are unaware that they are interacting with Chatbots.

Conversely, the application of AI leads in many operational complications; thus, it is critical for enterprises to mitigate such complexity through developing and training personnel to provide them with the necessary skill sets.

### 2. Data Privacy

AI relies on data to provide insights and make predictions. However, businesses need to be careful of data privacy laws and ensure that they are responsible of collecting and using customer data ethically.

If these models are to fully perform, data is required. Saving data for longer periods of time, on the other hand, may breach existing data protection rules.

The principles of openness and individual engagement necessitate transparency and individual be informed about the uses of their personal information. It is difficult to provide transparency in the setting of AI. When a software thrives on surprising correlations and produces inferences and predictions that defy human understanding (Kuner et al. 2018).



### 3. Bias

AI-powered solutions can be biased if the data is biased. This can lead to wrong predictions and insights, which can negatively impact brand building efforts. Given the number of potential sources of bias that are recognized and numerous reasons that allow bias to be in the system, we cannot expect one solution. Instead, we propose a hybrid approach includes quantitative assessments, procedures, monitoring, evaluation and data review, and experiments. Before delving into the preceding stages, we establish rules for the procedures intended to incorporate (Roselli et al. 2019).

### 4. Integration

Integrating AI-powered solutions into existing brand building strategies can be challenging. Businesses need to ensure that their AI solutions are integrated seamlessly with their existing systems and processes. It's difficult to tell what's going on within the dark boxes. As a result, the decisions made by algorithms are incomprehensible to human and cannot be trusted and validated. Hesitation is considerably greater in the areas of medical research and financials, where explanation is critical since erroneous decisions might result in terrible losses or economic devastation. It is critical that we have an absolute trace to follow the evolution of data and complicated AI-based system behaviors (Dinh and Thai 2018).

### 5. Cost

AI-powered solutions can be expensive to develop and implement. Businesses need to weigh the costs and benefits of using AI in brand building and ensure that the investment is worth it.

Poor quality of data leads to poor decision making which leads to company loss. The cost of poor data quality can cost an organization 8–12% of its revenue (Dey and Kumar 2010). Because much of the data gathered over a few years is unplanned and derived from many sources, the overall quality is expected to be low in many organizations. It will be disastrous if poor quality data is used. As a result, one of the major problems in the deployment of AI-enabled devices is data quality, which becomes particularly serious in any organization (Dwivedi et al. 2019).

## 3.5 *Present of AI*

Nowadays the researcher pay attention to the relationship between a firm, customers and the function of AI. researchers propose “Understanding the Role of Artificial Intelligence in Personalized Engagement Marketing” how AI perform in website content, prices, product selection and ad messages that match an individual customer's preferences. They go into details regarding how personalization of information effect branding and customer management strategies for firms (Haenlein and Kaplan 2019).

### **3.6 *Future of AI***

The future of AI in brand building is likely to be focused on even more personalization and automation. Here are some potential directions for AI in brand building:

1. **Hyper-personalization:** AI will continue to analyze massive volumes of client data in order to provide highly tailored experiences for each customer. This will necessitate brands collecting and using customer data responsibly and ethically.
2. **Autonomous Marketing:** AI will automate many aspects of marketing, such as analyzing data, creating content, and even making marketing decisions. This will allow brands to be more agile and responsive to changing customer needs, as well as reduce costs.
3. **Voice and Visual Search:** As more consumers use voice and visual search to find products and services, AI will play an increasingly role in optimizing content for these search methods.
4. **Augmented and Virtual Reality:** AI will help brands create more immersive and personalized experiences in augmented and virtual reality. This will allow customers to interact with products and services in an innovative way.
5. **Ethical and Responsible AI:** As AI becomes more prevalent in brand building, it will be important for brands to use AI in an ethical and responsible manner. This includes being transparent about how customer data is collected and how it is used, ensuring that AI is not used in a way that could harm customers or contribute to bias.

## **4 Conclusion**

AI is altering the way organizations approach brand building. Companies can develop more tailored experiences, monitor their online reputation more effectively, and produce more interesting content by using the power of AI.

The role of AI in brand building is becoming increasingly important as businesses strive to create more effective branding strategies that resonate with their target audience. By leveraging AI-powered solutions, businesses can provide a more personalized and efficient customer experience, create more effective branding campaigns, and build stronger brand relationships. However, businesses need to be aware of the challenges associated with using AI in brand building, including data privacy, bias, integration, and cost. Overall, AI has the potential to revolutionize the way businesses approach brand building, and it is an area that businesses should continue to explore and invest in. While artificial intelligence is still in its early phases, the future of AI in brand building is likely to be focused on creating more personalized and automated experiences for customers, while also ensuring that AI is used in an ethical and responsible manner.

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# The Impact of E-commerce on the Development of Entrepreneurship: Literature Review



Fawzeya Yusuf Zainal and Allam M. M. Hamdan

**Abstract** This literature review examines the relationship between e-commerce and entrepreneurship in Bahrain. The review explores the theoretical perspectives, empirical evidence, government policies, successful case studies, challenges, and opportunities of e-commerce for entrepreneurship in Bahrain. The review finds that e-commerce presents opportunities for entrepreneurship by providing access to new markets, reducing transaction costs, and enabling more efficient business processes. However, challenges such as limited access to finance and human resources and addressing trust and security issues in online transactions need to be addressed. The review suggests that policymakers and entrepreneurs need to develop effective strategies for leveraging e-commerce platforms to create new opportunities for entrepreneurship and overcome these challenges. The review concludes that Bahrain's future economic growth and success will depend on the continued development and effective utilization of e-commerce.

**Keywords** E-Commerce · Entrepreneurship · Government Policies · SMEs

## 1 Introduction

In recent years, the Kingdom of Bahrain has been making strides towards diversifying its economy and promoting entrepreneurship. As a small island nation in the Arabian Gulf, Bahrain's economy has traditionally been dependent on the oil and gas industry. However, the government's efforts to promote a more diversified economy have led to the growth of various sectors, including the electronic commerce (e-commerce) industry.

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E-commerce, defined as the buying and selling of goods and services over the internet, has become increasingly popular worldwide, with its convenience and accessibility appealing to a wide audience (Laudon and Traver 2020). In Bahrain, e-commerce has been identified as a tool to enhance the country's economic growth and entrepreneurship, as it provides a platform for small and medium-sized enterprises (SMEs) to reach a wider audience and expand their businesses beyond their physical locations (Alalwan et al. 2017).

Although e-commerce has been identified as a potential catalyst for entrepreneurship in Bahrain, the extent to which it has impacted the development of entrepreneurship in the country remains unclear. Therefore, this literature review seeks to explore the impact of e-commerce on the development of entrepreneurship in the Kingdom of Bahrain. By examining the existing literature on the topic, this review aims to provide insight into the opportunities and challenges that e-commerce presents for entrepreneurs in Bahrain, as well as the potential implications for the country's overall economic growth and development.

Overall, this literature review seeks to contribute to the understanding of the role that e-commerce plays in fostering entrepreneurship in Bahrain, and to identify areas for future research and policy development in this field.

## **2 Literature Review**

### ***2.1 Context and Background***

According to a study by Al-Mudimigh and Zairi (2012), e-commerce has become an important factor in improving the competitiveness of businesses in Bahrain. The study found that e-commerce provides opportunities for businesses to increase their market share, reduce costs, and enhance customer satisfaction. The authors suggest that Bahraini businesses need to focus on developing their e-commerce capabilities to remain competitive in the global market.

Another study by Al-Hadid and Al-Qirim (2010) highlights the challenges faced by e-commerce in Bahrain, including a lack of trust in online transactions, low levels of awareness and understanding of e-commerce, and limited access to technology infrastructure. The authors suggest that the government needs to take a more active role in promoting e-commerce and providing support to small and medium-sized enterprises (SMEs) in the sector.

Additionally, a study by Al-Qirim (2011a, b) emphasizes the importance of payment systems in the success of e-commerce businesses in Bahrain. The study found that the lack of secure and reliable payment options is a major barrier to the growth of e-commerce in the country. The author suggests that the government needs to work with financial institutions to develop secure and reliable payment systems to support e-commerce growth.

## **2.2 *History of the Problem***

According to a study by Al-Qirim (2011a, b), the development of e-commerce in Bahrain was hampered by several factors in the early 2000s, including a lack of infrastructure, limited internet access, and a lack of trust in online transactions. The author suggests that these factors contributed to a slow uptake of e-commerce in Bahrain during this period.

Another study by Al-Hadid and Al-Qirim (2010) highlights the challenges faced by e-commerce in Bahrain in the early 2000s. The authors suggest that the lack of trust in online transactions was a major barrier to the growth of e-commerce in the country at that time. They also note that there was limited awareness and understanding of e-commerce among businesses and consumers in Bahrain.

However, in recent years, the government of Bahrain has taken a number of steps to promote the development of e-commerce and to support entrepreneurs. The launch of the National E-commerce Strategy in 2019 is one such example. According to a report by the Bahrain Economic Development Board (EDB) (2019a, b), the strategy aims to encourage the growth of e-commerce in Bahrain and to develop a supportive ecosystem for entrepreneurs. The report highlights that the strategy includes a range of measures, including the development of e-commerce infrastructure, the provision of training and support for entrepreneurs, and the promotion of e-commerce through marketing and awareness campaigns.

Furthermore, a study by Al-Mudimigh and Zairi (2012) highlights the role of online marketplaces in the early development of e-commerce in Bahrain. The authors suggest that these marketplaces enabled entrepreneurs to sell their products and services online, and to reach a wider audience than they would have been able to otherwise.

## **2.3 *Overview of E-commerce and Entrepreneurship in Bahrain***

E-commerce adoption among Bahraini companies has increased significantly since the early 2000s, with more than half of all businesses in the country now engaged in e-commerce activities (Al-Alawi and Al-Marzooqi 2017a, b). A study by Al-Qirim (2011a, b) found that online shopping has become increasingly popular in Bahrain, particularly among younger consumers who are more comfortable with using technology. The author suggests that the growth of e-commerce in Bahrain has been driven by a range of factors, including the government's support for e-commerce development, the growth of online marketplaces, and the increasing availability of online payment options.

Entrepreneurship has also been on the rise in Bahrain, with the government actively promoting and supporting small business creation. According to a report by the Global Entrepreneurship Monitor (GEM) (2019), Bahrain has one of the

highest rates of early-stage entrepreneurship in the Middle East and North Africa region. The report highlights that the government has taken a range of measures to support entrepreneurship, including the establishment of a number of incubators and accelerators, the provision of funding and support for startups, and the development of policies to create an enabling environment for entrepreneurship.

However, challenges still need to be addressed in both e-commerce and entrepreneurship in Bahrain. For example, Al-Jabri and Sohail (2012a, b) note that the lack of appropriate infrastructure, such as logistics and payment systems, can impede e-commerce development in Bahrain. The authors suggest that the government needs to work with private sector stakeholders to develop the necessary infrastructure to support e-commerce growth. Additionally, Al-Mudimigh and Al-Tamimi (2014a, b) found that SMEs in Bahrain face challenges in access to finance and human resources, making it difficult for them to take advantage of e-commerce opportunities. The authors suggest that the government needs to provide more support to SMEs in the form of financing, training, and mentoring programs.

## ***2.4 Understanding the Relationship Between E-commerce and Entrepreneurship***

There are several theoretical perspectives on entrepreneurship that can help us understand the relationship between e-commerce and entrepreneurship. One such perspective is the resource-based view (RBV), which suggests that entrepreneurs can create value by leveraging their unique resources and capabilities (Chen and Chen 2018a, b). In the context of e-commerce, this may involve leveraging online platforms and digital marketing techniques to reach a wider audience and generate more revenue.

Ghezzi and Cavallo (2017) propose the effectuation approach as another theoretical perspective that can help us understand the relationship between e-commerce and entrepreneurship. The authors suggest that the effectuation approach emphasizes the role of entrepreneurs in creating new opportunities through a process of experimentation and iteration. In the context of e-commerce, this may involve starting small and testing different products or markets before scaling up.

Li and Li (2017) propose a conceptual framework that integrates these and other theoretical perspectives to explain the relationship between e-commerce and entrepreneurship. According to their framework, e-commerce can facilitate entrepreneurship by providing access to new markets, reducing transaction costs, and enabling more efficient business processes.



## ***2.5 E-commerce and Entrepreneurship: Empirical Evidence from the Literature***

Empirical studies have provided evidence of the positive relationship between e-commerce and entrepreneurship. For example, Al-Tamimi and Al-Mudimigh (2015a, b) found that e-commerce adoption was positively associated with entrepreneurial intention among SMEs in Bahrain. They suggest that e-commerce adoption can be an important factor in stimulating entrepreneurial activity, as it provides SMEs with access to new markets and customers.

Another study by Al-Qirim (2011a, b) found that e-commerce has the potential to enhance entrepreneurial activity in Bahrain by reducing barriers to entry and enabling SMEs to compete more effectively with larger firms. The author suggests that e-commerce can also help to overcome some of the challenges associated with traditional brick-and-mortar businesses, such as high overhead costs and limited geographic reach.

Hsieh and Wu (2017a, b) conducted a study of the moderating role of social capital in the relationship between e-commerce adoption and entrepreneurship performance in Taiwan. They found that social capital played a significant moderating role, as it helped SMEs to overcome barriers to e-commerce adoption and to access the resources and knowledge they needed to succeed.

Wang and Lin (2017a, b) conducted a study of e-commerce adoption and firm performance among SMEs in China. They found that entrepreneurial orientation played a mediating role in the relationship between e-commerce adoption and firm performance. Specifically, they found that e-commerce adoption was positively associated with entrepreneurial orientation, which in turn was positively associated with firm performance.

## ***2.6 The Role of Government Policies in Supporting E-commerce and Entrepreneurship in Bahrain***

Government policies can play a key role in supporting e-commerce and entrepreneurship in Bahrain. For example, El-Gohary and Eid (2016a, b) note that the Bahraini government has implemented various initiatives to support e-commerce development, such as the establishment of a national e-commerce portal and the provision of legal and regulatory frameworks. However, the authors suggest that more needs to be done to support SMEs in terms of access to information and knowledge about e-commerce.

Al-Ramadhan and Al-Harthy (2018a, b) found that government policies in Bahrain can encourage e-commerce adoption among SMEs by providing access to funding and training programs. However, the authors note that more needs to be done to ensure that these programs are accessible to all SMEs, regardless of their size or sector.

Another study by Al-Mudimigh and Al-Tamimi (2015) found that government policies can also play a role in promoting e-commerce adoption by addressing issues related to trust and security in online transactions. The authors suggest that policy-makers in Bahrain should focus on developing effective strategies for building trust and ensuring the security of e-commerce transactions.

However, there are also challenges associated with government policies in this area. For example, Al-Tamimi and Al-Mudimigh (2016) found that SMEs in Bahrain face challenges in terms of access to information and knowledge about e-commerce, which can limit their ability to take advantage of available government support.

## ***2.7 Opportunities and Challenges of E-commerce for Entrepreneurship in Bahrain***

E-commerce presents both opportunities and challenges for entrepreneurship in Bahrain. One opportunity is the ability to reach a wider customer base and generate more revenue through online sales channels. Al-Mudimigh and Al-Tamimi (2016a, b) note that e-commerce can facilitate the creation of new businesses and the growth of existing ones, by reducing entry barriers and enabling more efficient business processes. However, they also note that SMEs in Bahrain face challenges in terms of access to finance and human resources, which can make it difficult for them to take advantage of e-commerce opportunities.

Another study by Al-Qirim (2011a, b) highlights the importance of developing effective marketing strategies for e-commerce entrepreneurship in Bahrain. The author suggests that businesses need to focus on building trust with customers and developing effective online marketing campaigns to reach a wider audience.

Al-Somali et al. (2009a, b) note that there are challenges related to trust and security in e-commerce transactions, which can limit consumer adoption of online sales channels. They suggest that policymakers and entrepreneurs in Bahrain need to address these challenges by developing effective strategies for building trust and ensuring the security of e-commerce transactions.

## ***2.8 Case Studies of Successful E-commerce Entrepreneurship Ventures in Bahrain***

Several successful e-commerce entrepreneurship ventures have emerged in Bahrain in recent years. For example, Al-Alawi and Al-Marzooqi (2019a, b) conducted a study of successful e-commerce companies in Bahrain and found that these companies tended to have strong brand identities, high-quality products, and effective online marketing strategies. They suggest that these factors are important for the success of e-commerce entrepreneurship ventures in Bahrain.

Another study by Al-Mudimigh and Al-Tamimi (2016a, b) conducted a case study of successful e-commerce ventures in Bahrain and found that these ventures tended to be innovative, customer-focused, and flexible in their approach to e-commerce. They suggest that these factors are important for the success of e-commerce entrepreneurship ventures in Bahrain.

## ***2.9 The Role of E-commerce Platforms in Supporting Entrepreneurship in Bahrain***

E-commerce platforms have become an essential tool for entrepreneurs in the Kingdom of Bahrain, providing a range of services to support the development and growth of new businesses. In recent years, platforms such as Amazon, eBay, and Shopify have become increasingly popular among entrepreneurs in Bahrain, as they offer a range of features and tools that enable businesses to sell their products and services online.

One study by Al-Mudimigh and Al-Tamimi (2015) found that e-commerce platforms can play a critical role in supporting entrepreneurship in Bahrain by providing SMEs with access to new markets and customers. The authors suggest that SMEs can use e-commerce platforms to reach a wider audience and generate more revenue, thereby creating new opportunities for entrepreneurship.

Another study by Al-Alawi and Al-Marzooqi (2019a, b) examined the factors that contribute to the success of e-commerce entrepreneurship ventures in Bahrain. The authors found that successful e-commerce ventures tend to have strong brand identities and effective online marketing strategies, which enable them to stand out in a crowded marketplace. They also found that e-commerce platforms such as Shopify can be particularly effective for small businesses, as they offer a range of tools for building online storefronts, managing inventory, and processing payments (Hamdan et al. 2020).

However, some researchers have also noted that e-commerce platforms can pose challenges for entrepreneurs in Bahrain. For example, Al-Somali et al. (2009a, b) suggest that there are issues related to trust and security in online transactions, which can limit consumer adoption of e-commerce platforms. They recommend that entrepreneurs in Bahrain need to develop effective strategies for building trust with customers and ensuring the security of e-commerce transactions.

## ***2.10 The Impact of E-commerce on Innovation and Creativity in Bahraini Entrepreneurship***

E-commerce has had a significant impact on entrepreneurship in the Kingdom of Bahrain, enabling entrepreneurs to develop new products and services, reach new customers, and create more efficient business processes. In recent years, e-commerce has become increasingly popular among entrepreneurs in Bahrain, as it provides a range of tools and platforms for developing new business opportunities.

One study by Al-Qirim (2011a, b) found that e-commerce has the potential to enhance innovation and creativity in Bahraini entrepreneurship by reducing barriers to entry and enabling SMEs to compete more effectively with larger firms. The author suggests that e-commerce can also help to overcome some of the challenges associated with traditional brick-and-mortar businesses, such as high overhead costs and limited geographic reach (Balawi and Ayoub 2022; Mary Josephine and Muninarayanappa 2023).

Another study by Al-Mudimigh and Al-Tamimi (2016a, b) conducted a case study of successful e-commerce ventures in Bahrain and found that these ventures tended to be innovative, customer-focused, and flexible in their approach to e-commerce. The authors suggest that these factors are important for the success of e-commerce entrepreneurship ventures in Bahrain.

However, other researchers have noted that there are also potential challenges associated with e-commerce and innovation in Bahraini entrepreneurship. For example, Wang and Lin (2017a, b) found that e-commerce adoption can be a double-edged sword for entrepreneurship, as it can lead to increased competition and higher levels of market saturation. The authors suggest that entrepreneurs in Bahrain need to develop effective strategies for differentiating themselves from their competitors and creating new opportunities for innovation and creativity (Ghura et al. 2020; Harraf et al. 2021).

## ***2.11 Future of E-commerce and Entrepreneurship in Bahrain: Implications and Recommendations for Policy and Practice***

Al-Alawi and Al-Marzooqi (2020a, b) note that the increasing prevalence of mobile devices and social media is likely to drive further e-commerce adoption in Bahrain, as businesses seek to engage with customers through these platforms. They suggest that policymakers and entrepreneurs in Bahrain need to develop effective strategies for leveraging these platforms to create new opportunities for entrepreneurship.

Another study by Al-Qirim (2011a, b) suggests that Bahraini policymakers and entrepreneurs need to focus on developing a supportive ecosystem for e-commerce entrepreneurship, including access to funding, training programs, and networking

opportunities. The author suggests that this could help to overcome some of the challenges associated with e-commerce adoption and enable more SMEs to take advantage of these opportunities.

### 3 Conclusion

In recent years, Bahrain has made significant progress in the development of e-commerce, with the government taking an active role in promoting and supporting entrepreneurship. However, challenges remain, including a lack of appropriate infrastructure and issues related to trust and security in online transactions that must be addressed to increase consumer confidence in e-commerce.

Despite these challenges, e-commerce platforms have the potential to support entrepreneurship by providing SMEs with access to new markets and customers, promoting innovation and creativity, and improving business processes. Policy-makers and entrepreneurs must develop effective strategies for overcoming these challenges and leveraging the opportunities presented by e-commerce.

The literature suggests that the government's launch of the National E-commerce Strategy in 2019 has been a positive step in promoting e-commerce in Bahrain. However, more support is needed for SMEs in the sector, particularly in terms of access to finance and human resources. Entrepreneurs must also develop effective marketing and branding strategies to ensure the success of their e-commerce ventures.

In conclusion, Bahrain's future economic growth and success will depend on the continued development and effective utilization of e-commerce. By addressing the challenges associated with e-commerce adoption and leveraging its potential benefits, Bahrain can support entrepreneurship, promote innovation and creativity, and improve business processes.

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# The Challenges Face E-Commerce Business by Using ChatGPT



Abdulsadek Hassan

**Abstract** The study aimed to investigate ChatGPT and its powerful artificial intelligence program in natural language processing which considered as one of its most impressive capabilities is generating human-like output after analyzing human inputs, starting from language translation and text summarization to search and automation. The results indicated that the application works on responding quickly to customer inquiries and requests, the more satisfied they are and the more likely they will choose the brand again and again. ChatGPT has a much higher response rate than some traditional marketing tools with a rate of interaction with customers, and it is always easier and faster to respond to customers in their mother tongues, and for this reason the developers of ChatGPT worked on training the application in several languages in order to be able to respond to users in their mother tongues and provide A more personalized and efficient customer experience.

**Keywords** E-commerce-business · ChatGPT-artificial intelligence

## 1 Introduction

Chatbots have been increasingly popular in e-commerce in recent years (Rathore 2023). Chatbots are computer programs that replicate human-to-human discussion, often via a message interface (Chui et al. 2022). The GPT (Generative Pre-trained Transformer) chatbot is one sort of chatbot that has received a lot of interest (Alexopoulos et al. 2023). GPT chatbots are constructed with deep learning algorithms and can respond to user inquiries in natural language (Zhang 2023). This makes them excellent for e-commerce applications, as customers frequently have product and service inquiries (Rivas and Zhao 2023). One of the primary benefits of utilizing GPT chatbots in e-commerce is their capacity to make customized suggestions based

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on client data (Shahriar and Hayawi 2023). GPT chatbots can recommend items based on a customer's purchasing history, browsing behavior, and other variables.

The usage of GPT chatbots in e-commerce has the potential to improve the customer experience and drive sales (Cribben and Zeinali 2023). As the technology continues to develop, we can expect to see more companies adopting GPT chatbots as a key component of their e-commerce strategy (Adiguzel et al. 2023).

Chatbots have a long history in e-commerce, dating back to the early days of online shopping (Ivanov and Soliman 2023). However, the use of GPT-based chatbots like ChatGPT is a more recent development, driven by advances in natural language processing and machine learning (Rivas and Zhao 2023). The first chatbots in e-commerce were relatively simple and rule-based, responding to customer inquiries with pre-programmed scripts (Alafnan et al. 2023). These early chatbots were often frustrating for customers, as they were unable to understand nuanced inquiries or provide personalized responses (Hariri 2023). Over time, chatbots became more sophisticated, incorporating natural language processing and machine learning to better understand and respond to customer inquiries (George and George 2023). In recent years, the development of GPT-based language models has enabled chatbots to generate human-like responses to text-based inputs, further improving their ability to provide customer support and assistance (Verma 2023). Today, GPT-based chatbots like ChatGPT are used by a wide range of e-commerce businesses, from small online retailers to large multinational corporations (Dash and Sharma 2023). These chatbots provide customers with 24/7 support and assistance, helping to improve customer satisfaction and reduce the workload on human customer service representatives (Alexopoulos et al. 2023). Looking to the future, it is likely that chatbots will continue to play an important role in e-commerce, as businesses seek to provide more personalized and efficient customer support (Hariri 2023). Advances in natural language processing and machine learning will likely enable chatbots to become even more sophisticated and capable of handling complex inquiries and tasks (Shahriar and Hayawi 2023).

## 2 What is ChatGPT?

ChatGPT is a type of chatbot that is powered by the GPT (Generative Pre-trained Transformer) language model (Cribben and Zeinali 2023). GPT is a state-of-the-art language model developed by Open AI, which is capable of generating human-like responses to text-based inputs (Haleem et al. 2022). In order to use ChatGPT in e-commerce, businesses would need to integrate the chatbot software into their website or messaging platform 24/7 support. This can be done through the use of APIs (Application Programming Interfaces) that allow the chatbot to communicate with the e-commerce platform (Subagja et al. 2023). There are a variety of software tools and platforms available for creating and deploying chatbots, including Dialogflow, Botpress, and Microsoft Bot Framework (George and George 2023).

These tools typically provide a user-friendly interface for creating and training chatbots, as well as tools for integrating them into existing e-commerce platforms (Singh 2023). In addition to the chatbot software itself, businesses may also need to use natural language processing (NLP) tools to help the chatbot understand and respond to customer inquiries (Taecharungroj 2023). NLP tools can help the chatbot recognize the intent behind a customer's message and generate an appropriate response (Javaid et al. 2023). Overall, the software used in ChatGPT in e-commerce is a combination of chatbot software, NLP tools, and APIs for integration with e-commerce platforms (Gozalo-Brizuela and Garrido-Merchan 2023).

### 3 The History of Chat GPT

The use of chatbots powered by GPT (Generative Pre-trained Transformer) models in e-commerce is a relatively recent development. The origins of GPT can be traced back to 2018, when Open AI introduced the first version of the GPT model (Chui et al. 2022). GPT is a type of deep learning model that is pre-trained on large amounts of text data, allowing it to generate human-like responses to natural language input (Koubaa et al. 2023). The use of chatbots in e-commerce predates the use of GPT models (Singh 2023). Chatbots have been used in e-commerce for several years, primarily to provide automated customer support and improve the overall customer experience (Zhang 2023). However, traditional chatbots are often limited in their ability to understand natural language and provide personalized responses (Kalla and Smith 2023). The introduction of GPT models has greatly improved the capabilities of chatbots in e-commerce (Adiguzel et al. 2023). GPT-powered chatbots can understand natural language input, generate human-like responses, and provide personalized recommendations and support (Rathore 2023). This has led to increased customer satisfaction and higher conversions for e-commerce businesses (Burger et al. 2023). Today, many e-commerce businesses are using GPT-powered chatbots to provide personalized customer support, improve the shopping experience, and increase customer loyalty (Shahriar and Hayawi 2023). As the technology continues to evolve, it is likely that we will see even more advanced chatbots in e-commerce in the future (Alexopoulos et al. 2023).

Chatbots powered by GPT (Generative Pre-trained Transformer) models, such as ChatGPT, are becoming increasingly popular in the e-commerce industry (Shahriar and Hayawi 2023). These models are trained on large amounts of text data, which allows them to learn patterns and generate human-like responses to user queries (Paul et al. 2023).

Big companies in the e-commerce industry are using chatbots powered by GPT models for a variety of purposes, including:

#### 1. Customer service

Chatbots may provide customer service 24 hours a day, seven days a week, answering frequent queries regarding items, order status, shipping details, and more (Cribben

and Zeinali 2023). This can improve the customer experience while also reducing the workload of human customer service representatives (Hariri 2023).

## 2. Sales and marketing

Chatbots may also assist increase sales by proposing items based on a customer's interests and past purchases (Ausat et al. 2023). They can also offer clients targeted promos and discounts, improving the possibility of a purchase (Haleem et al. 2022).

## 3. Data collection

Chatbots may gather useful information about client preferences, purchasing history, and other metrics (Zhang 2023). This information may be utilized to improve product offers, marketing tactics, and the overall consumer experience (Ivanov and Soliman 2023). Overall, ChatGPT and other GPT-powered chatbots can assist e-commerce businesses in providing better customer care.

## 4. Product suggestions

Chatbots may give customized product recommendations based on user data such as surfing history, purchase history, and preferences (Alexopoulos et al. 2023). Natural language may also be used by GPT-powered chatbots to identify client tastes and preferences, making suggestions more accurate and effective (Paul et al. 2023).

## 5. Sales support

Chatbots may help customers with the sales process by answering inquiries, giving product information, and offering discounts or promotions (Ausat et al. 2023). Customers may engage in natural language discussions with GPT-powered chatbots, making the experience more engaging and memorable (Ivanov and Soliman 2023).

## 6. Order tracking

Chatbots may assist clients in tracking their orders and providing shipment status information. GPT-powered chatbots can interpret natural language inquiries and respond in a fast and correct manner (Haleem et al. 2022).

## 7. Feedback collection

Chatbots can be used to collect customer feedback on products, services, and the overall shopping experience (Noy and Zhang 2023). GPT-powered chatbots can understand natural language feedback and provide insights to help improve the customer experience (Chui et al. 2022).

Chatbots powered by GPT can provide a more personalized and engaging customer experience, leading to higher conversions and increased customer loyalty (Subagja et al. 2023).

## 4 The Use of the GBT Application in E-Commerce Worldwide

### 1. Professional blogging

The cost of building a blog range from \$200 to \$350, and this budget will cover the costs of hosting the website, template and plugins (Shahriar and Hayawi 2023). The problem that most bloggers faced was operating costs, which mainly consisted of having a monthly budget to publish high-quality content or doing it manually (Singh 2023). Writing articles is not an easy task, so the majority tended to use Freelancers services to write content (Rathore 2023). The financial barrier is now overcome because ChatGPT helps generate high-quality and exclusive content for free, which will open the door wide for anyone who wants to work online (Chen 2023).

Let's imagine that a professional article can be written without bothering with research, drafting or proofreading, ChatGPT bot will do the job perfectly (Zhang 2023). For example, writing a professional post usually costs between \$20 and \$50, depending on the writer's experience and field of specialization, and completing it requires waiting at least 3 days (Shahriar and Hayawi 2023). It is also expensive to buy the rights to images to incorporate into the article, and designing and editing them takes a lot of time (Hariri 2023). The ChatGPT bot can also produce exclusive, royalty-free images as per user commands, and its software is used on all AI graphic websites (Burger et al. 2023). This means the ability to produce several professional and exclusive articles to be published on the blog, and Google's robots will be unable to detect or track any plagiarism (Rathore 2023). Cleverly exploiting the GPT chat bot will ensure that you publish high-quality articles with an intense daily publishing rate, thus quickly reaching thousands of visitors per day (Kalla and Smith 2023).

### 2. Create YouTube channels

Everyone knows that creating content is the most important thing for building a successful online project, so it is the most consuming component of effort and money. Most YouTubers focus only on the gaming niche, vlogging and cooking, which requires a bare face while dedicating a lot of time to a channel project (Chui et al. 2022). On the other hand, there are tens of thousands of silent YouTubers, most of whom post content that only includes audio, images, and voiceovers. Don't underestimate the idea, most of these channels have a large fan base and only target profitable keywords (Gozalo-Brizuela and Garrido-Merchan 2023). They also occupy a privileged position when browsing product review videos, which translates to better income compared to regular YouTubers (Rivas and Zhao 2023).

ChatGPT application offers a great opportunity to create a profitable YouTube channel at the lowest cost. The application can be used to edit the text (script), and then extract the audio using a voice-over robot (Cribben and Zeinali 2023). The last stage is to use free videos without rights, or why not rely again on artificial intelligence bots to generate images or make effective edits to the video (Verma 2023). Having a YouTube channel with exclusive and frequently updated videos will

make you eligible to make good income from AdSense ads (Ivanov and Soliman 2023). Also, the increase in the number of subscribers and the increase in the volume of interaction, you can exploit it to achieve additional profits using some additional methods, which are explained in detail in the YouTube Profit Guide (Taecharungroj 2023).

### **3. Ad campaign management**

The most important stage before launching advertising campaigns is designing landing pages, but it is not an easy task (AlAfnan et al. 2023). Preparing a professional landing page requires dealing with a professional copywriter, whose services range from \$150 to \$800 per 1000 words. It may cost more in the case of dealing with a specialized advertising office, but the cost is definitely justified and deserved (Hariri 2023). Kobe Writer's job is not limited to describing the product or service, but he must study the market to choose the appropriate and influential words for the target audience (Subagja et al. 2023). When formulating any advertisement, no word or its center is chosen in vain, but the description is written to achieve the highest conversion rate. Equipped with sensors, ChatGPT bots produce semi-human and interactive content (Ausat et al. 2023). All you have to do is provide the content of the ad, and the bot will generate a copy with the same objectives and using different phrases (Koubaa et al. 2023). This does not negate the need to make some adjustments to get the perfect ad copy (Rivas and Zhao 2023). Also, you can use the ChatGPT bot to write content or landing pages automatically, and then resell them on freelancing platforms (Burger et al. 2023).

### **4. Customer service automation via ChatGPT**

The merchant can use ChatGPT to answer common and thorny customer questions, such as privacy policy, shipping and return policies, product information and other information that you can provide you written and ready to send to customers (Burger et al. 2023), and this will of course help you save your resources and shorten your time with quick, accurate and intelligent responses that mimic human responses (Dash and Sharma 2023).

### **5. Writing product descriptions via ChatGPT**

As any merchant can use me to write detailed and attractive descriptions of their products, I promise to accurately convey in each description the features and benefits of each product that helps improve the product's ranking in search engines and increases the conversion rate of potential customers into actual buyers (Koubaa et al. 2023).

### **6. Data analysis via ChatGPT**

Also, everyone related to e-commerce can use me to analyze customer data and identify customer trends, which they can use to make informed decisions in their project, take, for example, that you can help the merchant identify the best-selling products and those that no one buys, and campaigns effective marketing and those that do not lead to any tangible results (Cribben and Zeinali 2023).

### **7. Marketing content writing**

I'm not done yet, as the merchant can use me to write marketing content for social media sites, ads, or through various marketing channels, and this will save you time, and multiply your marketing efforts from your place and without the need to depend on anyone because I can do all this at a glance (Taecharungroj [2023](#)).

### **8. Writing blogs**

Whether you want to write your blogs, newsletters, or some other kind of content you prefer, in a way that fuels customer engagement and makes your online presence effective and impactful, with results that will amaze you (Alexopoulos et al. [2023](#)).

### **9. Writing email campaigns**

Do you want to get started with email marketing? I can help you with this too by creating automated email campaigns for you, such as welcome messages, reminders to customers to purchase products they have left in their cart, and other campaigns that can increase your conversion rate and your customer retention rate (Chui et al. [2022](#)).

## **5 Mechanisms of Using GBT Chat in Companies to Support E-Commerce**

### **1. Responding to questions and inquiries**

People can use GBT chat to get instant answers to any question that comes to their mind, whether it is related to a specific topic or something else (Burger et al. [2023](#)).

### **2. Improving user experience**

GBT Chat can be used to improve user experience in websites and applications, by providing them with a personal assistant to answer their inquiries and direct them to the required information (Gozalo-Brizuela and Garrido-Merchan [2023](#)).

### **3. Marketing for brands and companies**

GBT chat can be used to market your brand, by interacting with customers and responding to their inquiries (AlAfnan et al. [2023](#)).

## **6 How ChatGPT Writes Product Descriptions for E-Commerce Websites**

ChatGPT starts by researching the product to collect all the necessary information about its features, specifications, benefits and unique selling points (Burger et al. [2023](#)).

ChatGPT analyzes the target audience and identifies their needs, wants and preferences. This helps write descriptions that resonate with customers (Adiguzel et al. 2023).

ChatGPT uses an engaging and persuasive tone to highlight the benefits of the product and how it solves customer problems (George and George 2023).

ChatGPT focuses on using descriptive words and sensory language to create a vivid image of the product in the minds of customers (Singh 2023).

ChatGPT ensures that descriptions are easy to read and understand with short sentences, bullet points, and headings (Haleem et al. 2022).

ChatGPT uses keywords, product-related phrases, and customer search queries to improve product visibility in search engines (AlAfnan et al. 2023).

ChatGPT follows a consistent format for all product descriptions, including product name, features, specifications, benefits, and call-to-action (Haleem et al. 2022).

ChatGPT double-checks descriptions for spelling or grammatical errors and makes sure they are error-free (Chen 2023).

ChatGPT constantly reviews and updates descriptions based on customer feedback, product updates, and industry trends to ensure they remain relevant and effective (Koubaa et al. 2023).

ChatGPT product descriptions aim to inform, engage and convince customers to make a purchase and have a positive shopping experience on an e-commerce site (Shahriar and Hayawi 2023).

### **How ChatGPT makes sure product data is accurate**

As an AI language model, ChatGPT relies on the accuracy of the data provided to it to write product descriptions (Burger et al. 2023). To ensure product specifications are correct, here are a few ways ChatGPT can verify that product information is accurate:

#### **Use trusted sources**

ChatGPT can use reliable sources of information such as the manufacturer's website or product manual to obtain accurate product specifications (Rathore 2023).

#### **Comprehensive check information**

ChatGPT can check product specifications from different e-commerce websites to identify any inconsistencies or inconsistencies (Gozalo-Brizuela and Garrido-Merchan 2023). In the event of discrepancies, ChatGPT can use the manufacturer's website or product manual as a reference to determine the correct specification (Koubaa et al. 2023).

#### **Check with the seller**

ChatGPT can communicate with the seller or e-commerce platform to check the product specifications (Cribben and Zeinali 2023). This can be done through a chatbot or email support system (Ivanov and Soliman 2023).

Using Artificial Intelligence Algorithms: ChatGPT can use natural language processing and machine learning algorithms to select the most accurate and relevant product information from a large data set (AlAfnan et al. 2023).

In short, ChatGPT can verify the accuracy of product specifications by using reliable sources, verifying information, checking with the seller, and using artificial intelligence algorithms. This helps ensure that product descriptions written with ChatGPT are accurate and consistent with the actual product (Adiguzel et al. 2023).

## 7 Digital Marketing Strategies Using ChatGPT

There are some of the digital marketing strategies that can be implemented using ChatGPT:

### 1. Create interactive and responsive content

ChatGPT can be used to create interactive and responsive content targeted to your target audience (George and George 2023). Users can interact with ChatGPT to get information and answers to their questions in real time (Dash and Sharma 2023). ChatGPT can also be used to create responsive content that adapts to each user's needs (Burger et al. 2023).

### 2. Sales guidance and customer support

ChatGPT can direct sales and customer support by providing information about products, services, and prices (Rivas and Zhao 2023). Customers can inquire about product details and get personalized guidance to make purchasing decisions (Adiguzel et al. 2023). ChatGPT can also be used to provide technical support and respond to customer needs effectively (Dergaa et al. 2023).

### 3. Launching marketing campaigns based on artificial intelligence

ChatGPT can be used to launch AI-based marketing campaigns (Gozalo-Brizuela and Garrido-Merchan 2023). ChatGPT can create effective and engaging marketing messages and send them to potential customers personally (Dash and Sharma 2023). ChatGPT can also be used to conduct market studies and user analyzes to define target audience and improve marketing strategies (Javaid et al. 2023).

## 8 Advantages of ChatGPT in E-commerce

ChatGPT, or Generative Pre-trained Transformer, can provide several advantages in e-commerce. Some of these advantages include:



### 1. Improved customer engagement

ChatGPT can provide personalized and relevant responses to customer queries, which can increase customer engagement and satisfaction (AlAfnan et al. 2023).

### 2. Increased efficiency

ChatGPT can handle multiple customer queries simultaneously, which can reduce the workload on human customer support agents and improve efficiency (Chui et al. 2022).

### 3. Cost savings

By reducing the workload on human customer support agents, ChatGPT can help e-commerce businesses save on labor costs (Taecharunroj 2023).

### 4. Specialization of the target being searched for

GBT Chat has been specially trained to conduct conversations between people, while Google is mainly used for searching and other inquiries over the Internet (Javaid et al. 2023). You are in GBT Chat as if you are having a conversation between two parties, one of which is you and the other is artificial intelligence (Chui et al. 2022).

### 5. The broad scope

GBT chat is characterized by its ability to respond directly to a variety of questions and topics, while Google services focus on searching the Internet and providing direct answers, and you may not find what you want, so you search among the answers to get the answer that suits you (Koubaa et al. 2023). ChatGPT can provide several advantages for e-commerce businesses, including improved customer engagement, 24/7 customer support, increased efficiency, cost savings, and data collection and analysis (Noy and Zhang 2023).

Chatbots powered by GPT can be used in e-commerce in the Gulf region to provide personalized customer support, improve conversions, and enhance the overall customer experience (Shahriar and Hayawi 2023). The Gulf region is home to a large and growing e-commerce market, with consumers increasingly turning to online shopping for convenience and variety (Adiguzel et al. 2023).

## 9 Examples of Chat GPT Used in e-commerce in the World

Here are some examples of how chatbots powered by GPT can be used in e-commerce in the Gulf region:

1. **Multilingual support:** The region is home to a diverse population with varying language preferences (Alexopoulos et al. 2023). Chatbots powered by GPT can provide multilingual support in Arabic, English, and other languages, helping to reach a wider customer base and improve customer satisfaction (Cribben and Zeinali 2023).
2. **Personalized product recommendations:** Chatbots can use customer data such as browsing history, purchase history, and preferences to make personalized product recommendations (Haleem et al. 2022). GPT-powered chatbots can also use natural language to understand customer tastes and preferences, making the recommendations more accurate and effective (Chui et al. 2022).
3. **Support for local payment methods:** E-commerce in the Gulf region often involves unique payment methods such as cash on delivery and mobile payments. Chatbots can provide support for these payment methods and help customers navigate the payment process (Paul et al. 2023).
4. **Cultural sensitivity:** Chatbots powered by GPT can be trained to understand and respond to cultural nuances and sensitivities in the Gulf region. This can help to build trust and improve the overall customer experience (Chen 2023).

Also, some researchers suggested some examples of how chatbots powered by GPT can be used in e-commerce, including:

1. **Product recommendations:** A chatbot can ask customers about their preferences and suggest relevant products based on their responses (Shahriar and Hayawi 2023).
2. **Personalized marketing:** A chatbot can send personalized messages to customers based on their past purchases, browsing history, and other data (George and George 2023).
3. **Virtual shopping assistant:** A chatbot can guide customers through the shopping experience, providing information about products, making recommendations, and answering questions (Singh 2023).
4. **Order tracking:** A chatbot can provide customers with real-time updates on the status of their order, including tracking information and estimated delivery times (Chui et al. 2022).
5. **Upselling and cross-selling:** A chatbot can suggest related products or accessories to customers, increasing the likelihood of additional purchases. Overall, chatbots powered by GPT can help e-commerce businesses improve customer engagement, increase sales, and streamline customer service processes (Alexopoulos et al. 2023).

## 10 Personalized Shopping Experiences with ChatGPT-4 in E-Commerce

In today's fast-paced digital world, the e-commerce and online retail industries are constantly evolving to meet the ever-changing needs and preferences of consumers (Kalla and Smith 2023). One of the most significant developments in recent years has been the incorporation of artificial intelligence (AI) and machine learning technologies into various aspects of the online shopping experience (Dash and Sharma 2023). Among these innovations, ChatGPT-4, the latest version of Open Ai's powerful language model, is revolutionizing customer service in the online e-commerce and retail sectors (Rivas and Zhao 2023).

ChatGPT-4 has the potential to change the way businesses interact with their customers by providing personalized shopping experiences that cater to individual preferences and requirements (Hariri 2023). This cutting-edge AI technology can understand and respond to customer inquiries in real time, providing immediate and accurate assistance (Burger et al. 2023). By doing so, it not only improves customer satisfaction but also helps companies save time and resources that would otherwise be spent on manual customer support (Taecharungroj 2023).

One of the most important advantages of ChatGPT-4 in online retail is its ability to provide personalized product recommendations based on customers' preferences, needs, and previous purchases (Ausat et al. 2023). By analyzing user data and understanding their preferences, AI can suggest relevant products that a customer might be interested in, ultimately increasing the likelihood of a purchase (Shahriar and Hayawi 2023). This personalized approach to shopping not only enhances customer experience but also helps businesses increase their sales and revenue (Noy and Zhang 2023).

Moreover, ChatGPT-4 can help customers make informed decisions by providing detailed product information and comparisons (AlAfnan et al. 2023). This can be especially useful for customers who are not sure about the product to choose or are looking for certain features (Burger et al. 2023). By answering questions and providing comparisons between different products, ChatGPT-4 can help customers make the right decision, resulting in increased satisfaction and decreased returns (Subagja et al. 2023).

In addition to providing personalized product recommendations and information, ChatGPT-4 can also be used to streamline the checkout process (Haleem et al. 2022). For example, it can help customers fill in their shipping and payment information, making the process faster and more convenient (Chui et al. 2022). Moreover, AI can also help customers track their orders and provide updates on shipment status, ensuring a smooth and hassle-free shopping experience (Adiguzel et al. 2023).

Another area where ChatGPT-4 makes a big impact is handling customer complaints and resolving issues (Ivanov and Soliman 2023). Traditionally, customers have to wait for a response from a customer service representative, which can take hours or even days (AlAfnan et al. 2023). With ChatGPT-4, customers can get instant help, as the AI can understand the problem and provide an appropriate solution or

escalate the matter to a human representative if needed (Kalla and Smith 2023). This quick and effective problem-solving leads to increased customer satisfaction and loyalty (Alexopoulos et al. 2023).

As the e-commerce and online retail industries continue to grow, the importance of providing exceptional customer service cannot be overstated (Chen 2023). Companies that invest in advanced AI technologies such as ChatGPT-4 will undoubtedly have a competitive advantage in the market (Zhang 2023). By offering personalized shopping experiences, accurate product information, and effective customer support, these companies can attract and retain customers, which ultimately leads to increased sales and revenue (Hariri 2023).

## 11 The Impact of ChatGPT-4 on E-Commerce Customer Service

In today's fast-paced world, e-commerce and the online retail industry have become an important part of our daily lives. As the industry continues to grow, the need for effective and efficient customer service becomes increasingly important (Javaid et al. 2023). Enter ChatGPT-4, a revolutionary artificial intelligence (AI) language model that is changing the way e-commerce and online retailers approach customer service (Rivas and Zhao 2023). By significantly reducing response times, ChatGPT-4 not only improves customer experience, but also helps companies save valuable time and resources (Javaid et al. 2023).

One of the most common weaknesses for customers when dealing with online retailers is the slow and often frustrating process of getting their questions answered or problems resolved (Alexopoulos et al. 2023). This can lead to a negative customer experience, which in turn can lead to lost sales and damage to the company's reputation (Cribben and Zeinali 2023). However, ChatGPT-4 is poised to change this scenario by providing instant, accurate and relevant responses to customer inquiries (AlAfnan et al. 2023).

Developed by Open AI, ChatGPT-4 is a modern AI language model that uses advanced machine learning algorithms to understand and generate human-like text (Chen 2023). This technology enables it to provide real-time support to customers, addressing their concerns and answering their questions with remarkable speed and accuracy (Adiguzel et al. 2023). In doing so, ChatGPT-4 helps companies streamline their customer service processes and ensure that customers get the help they need without delay (Dergaa et al. 2023).

## 12 Difficulties Facing the Use of GBT Chat in Electronic Commerce

Chatbots have become increasingly popular in e-commerce because they can offer customers 24/7 support and assistance, while reducing the workload on human customer service representatives (Shahriar and Hayawi 2023). However, there are also some disadvantages to using chatbots in e-commerce, including:

### 1. Lack of personalization

Chatbots may not be able to provide the same level of personalized service as a human customer service representative (Koubaa et al. 2023). They may struggle to understand the nuances of a customer's inquiry or provide tailored responses (Chui et al. 2022).

### 2. Limited understanding

While chatbots are becoming more sophisticated, they may still struggle to understand complex or nuanced inquiries (Alexopoulos et al. 2023). This can lead to frustration for customers when their questions are not answered correctly (Haleem et al. 2022).

### 3. Inability to handle complex issues

Chatbots are designed to handle simple inquiries and tasks but may struggle with more complex issues that require human intervention (Gozalo-Brizuela and Garrido-Merchan 2023). This can lead to customers becoming frustrated or dissatisfied with the level of support provided (Burger et al. 2023).

### 4. Lack of empathy

Chatbots may struggle to convey empathy or understanding in the same way that a human customer service representative can (Subagja et al. 2023). This can lead to customers feeling like they are not being heard or understood (Haleem et al. 2022).

### 5. Technical issues

Chatbots rely on technology, which can sometimes fail or malfunction (Haleem et al. 2022). If a chatbot experiences technical issues, it may not be able to provide assistance to customers, which can lead to frustration and dissatisfaction (Hariri 2023).

Finally, while chatbots can provide many benefits to e-commerce businesses, it is important to understand their limitations and ensure that they are not being used in a way that negatively impacts the customer experience (Alexopoulos et al. 2023).

### **13 ChatGPT-4 and the Future of Virtual Shopping Assistants**

The world of e-commerce and online retail has undergone rapid transformation in recent years, with technological developments playing a significant role in shaping the way businesses interact with their customers (Shahriar and Hayawi 2023). One of these pioneering innovations is ChatGPT-4, an advanced language paradigm that has revolutionized customer service in the online retail industry (Koubaa et al. 2023). This state-of-the-art Artificial Intelligence (AI) technology not only enhances the shopping experience for consumers but also streamlines operations for businesses (George and George 2023).

ChatGPT-4, the latest iteration of the ChatGPT series, is a powerful AI language model developed by Open AI. It is designed to understand and generate human-like text based on the context provided (Taecharungroj 2023). This cutting-edge technology is able to understand complex queries, provide accurate answers, and engage in meaningful conversations with users (Gozalo-Brizuela and Garrido-Merchan 2023). As a result, it has the potential to transform the way companies approach customer service in the online e-commerce and retail sectors (Taecharungroj 2023).

One of the most important advantages of ChatGPT-4 is its ability to act as a virtual shopping assistant (Dergaa et al. 2023). As online shopping continues to grow in popularity, consumers often find themselves overwhelmed with the wide range of products and services available. ChatGPT-4 can step in to provide personalized recommendations based on individual preferences, making your shopping experience more enjoyable and efficient (Chui et al. 2022). By analyzing a customer's browsing history, buying patterns, and stated preferences, the AI can make personalized suggestions that meet their unique needs (Adiguzel et al. 2023).

### **14 Conclusion**

There are many hopes placed on the application to the point of pushing heavy investments in the field of chatbots based on artificial intelligence technologies to the extent of challenging some leading technology companies and undertaking some human jobs and businesses. In a counter direction to that, and given its current degree of development, it may be too early to trust the originality, wisdom, and capabilities of the application, which was approved by the company producing it, but it undoubtedly reveals potential features for the future of the content industry, authorship, and creative writing.

Chatbots powered by GPT have become increasingly popular in the e-commerce industry. Here are some key research conclusions about their usage:

### **1. Improved customer engagement**

Chatbots powered by GPT can help e-commerce businesses engage with customers in a more personalized and interactive way, leading to increased customer satisfaction and loyalty.

### **2. Increased sales**

By providing personalized recommendations, guiding customers through the shopping experience, and suggesting related products, chatbots can increase the likelihood of a purchase and drive sales.

### **3. Streamlined customer service**

Chatbots can assist customers with common inquiries and provide real-time updates on order status, reducing the workload of customer service teams and improving the overall customer experience.

### **4. Cost-effective solution**

Compared to traditional customer service methods, chatbots powered by GPT can be a cost-effective solution for e-commerce businesses, as they require less manpower and can handle a larger volume of inquiries.

### **5. Challenges with accuracy and training**

Chatbots powered by GPT may struggle with accuracy and require ongoing training to improve their responses and recommendations. Overall, the usage of chatbots powered by GPT in e-commerce has shown significant potential for improving customer engagement, increasing sales, and streamlining customer service processes.

However, businesses should carefully consider the challenges and limitations associated with these technologies to ensure that they are implemented effectively and provide value to customers.

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# The Role of Modern Communication Technology in Developing Digital Commercial Advertisements



Abdulsadek Hassan

**Abstract** One of the essential elements of a successful business is advertising. This study aims to obtain evidence that field studies of commercial advertising will continue in recent years. To answer this question, we have successfully obtained a series of data and information searches on several publication databases in academic scientific publications, books, and media websites that discuss advertising issues. The results of the study indicated that commercial advertising, especially on social networking sites, has become an essential part of any marketing plan on the Internet today, and that the advantages of marketing through social networking sites are so many that not using this effective means to promote products and services at the lowest cost fits the budget of new companies. It is also indicated that the most marketing means that results in an increase in the number of customers who make purchases and thus increases sales and profits.

**Keywords** Commercial advertising · Social media · Internet

## 1 Introduction

Contemporary media in our time represent a great importance in influencing the public's trends and determining its positions and opinions towards various issues, as it is a main axis that is relied upon to reach the masses and deliver different messages to them of different nature, whether political, social, commercial or otherwise (Kang et al. 2020). It is noticeable that advertisements play a large and effective role in our lives as individuals, as they are highly relied upon in obtaining information (commercial—service), which brings great benefit to individuals in addition to its contribution to economic development and achieving commercial popularity, and this is in addition to its vital role as a source of funding for the means of communication in its various forms (Chen and Wang 2019). Advertising is a major activity in the field of

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marketing goods and services in the modern era, as it is an effective way to convey ideas and information to the consumer because of the power it has on the consumer's mentality (Minton 2020), so it is relied upon as part of the marketing strategy with the aim of creating interest, attracting attention and increasing awareness towards a brand or commodity (Khan et al. 2021). Certain because of its effectiveness in converting purchasing power into effective demand and creating a purchasing decision (Baqai and Qureshi 2020). Therefore, advertising is a means of introducing goods and services used by every society in accordance with its customs, traditions and culture (Watkins et al. 2016). Advertising is the mirror that reflects all the marketing efforts made, which can only reach consumers through advertising (Goel 2020). Accordingly, advertising must be planned on a sound scientific basis, as the success of advertising campaigns is an integral part of the success of the marketing activity as a whole (Trivedi and Teichert 2020). Recent years have witnessed a state of advertising flow due to the tangible developments in advertising practices, both in terms of form and content (Chen and Wang 2019). No one denies the importance of advertising, as it has become one of the most important means that organizations and businesses rely on to achieve their strategic goals (Berthon et al. 2000). Advertising campaigns depend mainly on studying the trends of the masses that are directed to them (Shahid and Qureshi 2022). They focus on the public's attitudes towards the offered goods and services and analyze these trends, which make them act in a negative or positive way towards the offered services (Grau and Zotos 2016), in addition to their contribution to shaping the opinion of the masses towards the service or the provided product as well as towards institutions and bodies provided for those services (Grau and Zotos 2016).

The use of digital commercial advertising has become inevitable at the present time (Baqai and Qureshi 2020). It is inevitable to use this technology for the electronic consumer to obtain the widespread and increasing goods and services through the electronic network (Kang et al. 2020). The continuous increase in technological development has pushed many legislations around the world towards legislative unification to achieve one goal which is to achieve effective safety for the electronic consumer (Arcesati et al. 2020).

Digital advertising is subjected to many criticisms in terms of its social and economic effects, and credibility comes at the forefront of these criticisms (Kietzmann et al. 2018). Credibility means the extent to which the advertisement adheres to the characteristics of the advertised good or service without exaggeration or falsification of reality (Minton 2020). To attract attention and promote goods and convince his idea that the company advertises in pursuit of profit, the advertisement may also mislead the public by publishing advertising claims that contradict the facts, advertisements that come out in the form of non-advertising media materials and publishing incorrect analysis and evaluation of products and services (Hunziker and Blankenagel 2021).

Commercial advertisements have a great impact on the public, as the public is drawn to what the advertisements broadcast by virtue of their nature and their constant desire to obtain knowledge from any way without being armed with the correct knowledge of the values of their society and their civilizational and cultural heritage

(Belanche et al. 2017). Whether it is beneficial or harmful for him, under the slogan of fashion, openness to the other and keeping pace with the developments of the times (Abd Almuhsin Aalman Khudher 2020).

Due to the importance of the role that brand credibility can play in influencing the purchasing decision of consumers on social networking sites, and based on the importance of building a credible, persuasive communication system about all products in light of competition over the public, in addition to what is required to keep pace with everything new in dealing with the public (Khan et al. 2021), especially in relation to the competitive advantages offered by many companies with their products and services, the focus on credibility has become a fundamental principle in influencing the purchasing decision of consumers on the websites of brands (Kietzmann et al. 2018).

## 2 The Definition of Digital Commercial Advertising

Digital commercial advertising is one of the tools that have a great impact on the mentality of consumers, and it has a great impact on various business processes, as it represents a means of communication that depends on the influence it broadcasts on individuals and societies through the use of the available means of promotion to create a connection between products and consumers (Taylor et al. 2017). The advertisement has been described by experts as being a style that the merchant uses to attract the buyer to the commodity, to sell through non-personal means of communication in order to convey offers and ideas and promote products and services by broadcasting a commercial advertisement (Zhang et al. 2018).

Technology has brought about profound changes in advertising, affecting both consumers and businesses, mainly due to new tools that allow us to learn more about consumers, and to target advertisements to them according to their interests, age, and other factors (Shah et al. 2020).

The advertising industry is no longer satisfied with creating a good advertisement and publishing it in the appropriate media for the audience, then waiting in the hope that consumers will see it and succeed in attracting their attention (Kietzmann et al. 2018), and perhaps convincing them with time to buy a good or service, as companies can now form profiles on the behaviors of potential consumers from Internet users (Berthon et al. 2000). and direct its messages to them based on their geographic location, areas of interest, internet browsing history, and demographic characteristics (Lim et al. 2020).

### 3 The Economic Importance of Digital Commercial Advertising to Consumers

It appears that the digital commercial advertisement is of economic importance in achieving the growth of economic establishments through its interest in following up on new and current goods and services, and it also contributes to raising the rates of individual consumption of the company's products, which leads to an increase in production rates and volume (Dodds et al. 2021).

### 4 Business and How It Affects Consumers

**Impact on investment:** This means the support for investment through advertisements and the contribution to inflating the volume of investment and the resulting great benefit to both individual and national income (Bruno et al. 2017).

**The effect of selling prices:** digital commercial advertising supports and achieves stability for the specified prices of goods and products within the local commercial market (Khan et al. 2021).

**Impact on the quality of goods:** It means the assistance provided indirectly in order to raise the quality of products, and it also works to raise the consumer's desire to obtain one of those goods (Trivedi and Teichert 2020).

**Impact on the consumer in the cost of production:** It is one of the most important roles that digital commercial advertising plays, as it contributes to raising the volume of production, and also leads to reducing the general costs incurred by the establishments (Zheng et al. 2019).

**Impact on Marketing Cost:** Digital commercial advertising influences marketing as it is part of its cost (Lim et al. 2020).

**Influence of supply and demand:** it contributes to raising the demand for goods and products and helps maintain the price at a certain level that has been set for it and enhances the purchasing motives of consumers (Borau-Boira et al. 2022).

### 5 The Social Significance of Digital Commercial Advertising

The social importance of digital commercial advertising appears in the effective role, it plays in influencing the mind and thoughts of the individual, which is summarized according to the following:

**Supporting and consolidating relations between individuals and societies:** Digital commercial advertising in this regard creates communication between all members and classes of society as a result of its transfer of different traditions and customs within the same society (McKenzie et al. 2018).

**Introducing new habits:** This means what digital commercial advertising does by giving people an opportunity for members of society to own new traditions and customs as a result of the frequent use of the advertised products (Khan et al. 2021). An example of this is what is done to promote the use of a new type of soap in washing hands (Ambier and Poncin 2020). And then get used to the use of that type of soap later (Arora and Sanni 2019).

**Facilitating life for societies:** This function of digital commercial advertising is represented in the goods and services, it provides to individuals at the lowest prices and the best means, which contributes to saving their efforts by searching for products that suit them (Berthon et al. 2000).

**The educational impact of digital commercial advertising:** This means the contributions made by advertising in strengthening and supporting individuals' convictions towards purchasing a commodity or obtaining a service, as the advertisement depends on logic in order for the information and idea it presents to reach and to achieve its impact on establishments and products (Jain et al. 2019).

## 6 Advantages of Digital Commercial Advertising

The main advantage in which electronic advertising differs is the low financial cost, as there are no costs for printing and production, only what is paid to the advertising company in appreciation of its efforts and service in delivering the advertisement, and it is approximately 40% to 20% less than traditional advertising (Tuchman et al. 2018).

The speed of advertising spread is much less time than in traditional advertising (Prathapan et al. 2019).

**Flexibility in dealing with advertising:** Where the advertisement can be withdrawn and changed if it turns out to be invalid or some errors during the production process (Shahid and Qureshi 2022).

The ability to track the advertisement and conduct opinion polls to measure the extent of its impact and the success of the advertising campaign in reaching the target category, knowing the customer's comments and opinions about the proposed product and the way it is advertised, and controlling the number of times the advertisement appears (Chadhiq et al. 2022).

Ease of directing the advertisement to the target group than in traditional advertisements (Singh et al. 2021).

There are many methods of advertising design, including promotional images, video and audio presentations, and other available methods (Wu and Chang 2019).

The ease of promoting the product and its exit outside the borders of the country from which it was launched, as the followers of the Web are not from the same geographical area, which ensures rapid spread and influence (Khan et al. 2022).

Ease of access to the details of the offered products with obtaining more of them and the ability to inquire about them without the need for physical effort and waste

of time, which helps the customer to quickly make his decision about the product (Ambier and Poncin 2020).

It is highly dependent on the efficiency of the product more than the size of the company (Ciurel 2022). Any small start-up company can promote its products and quickly gain profit as long as the standards of efficiency, professionalism of the displayed advertisement, and its attractiveness to the target group are met (Baqai et al. 2021).

## **7 How Digital Commercials Work?**

### ***7.1 Publishing Digital Commercials***

How digital ads are published is determined by the specific ad type (Borau-Boira et al. 2022). With some ads, you can buy ad inventory—the ad space on a particular website, or the publisher—directly from the publisher (Arcesati et al. 2020). For example, ads for Sponsored brands and Sponsored Products are ads that only appear on Amazon (Yakob 2021).

Digital advertising can also be purchased programmatically (Tuchman et al. 2018). Programmatic advertising is the automatic buying and selling of digital advertising inventory, including display ads and video ads (Khan et al. 2021). You can use the Demand Platform (DSP), a software that automates the purchase and management of digital advertising inventory from multiple publishers (Grau and Zotos 2016). A sourcing display platform or Selling Display Platform (SSP) is software that publishers use to automate the sale and management of their ad inventory (Yakob 2021).

### ***7.2 Digital Commercial Advertising Cost***

The cost of digital advertising also varies by format (Abd Almuhsin Salman Khudher 2020). A common type of pricing is cost-per-click (CPC), or pay-per-click (PPC), a pricing model in which you pay each time someone clicks on your ad (Minton 2020). Another type is cost per thousand impressions (CPM), which means cost per thousand impressions (Ciurel 2022). This is a pricing model where you pay a certain amount for 1000 impressions, or times your ad appears (Khan et al. 2021).

Payment can also be made using other forms, such as paying each time your ad performs the desired action (e.g someone signs up for your email list or downloads your e-book) (Chen and Wang 2019). Because digital ads can be measured in many different ways—how many times an ad is shown, how many clicks on it, how many times it leads to a sale, and more—pricing can be customized based on the intended function of the ad (Chen and Wang 2019).

### 7.3 Targeting for Digital Commercials

As mentioned above, digital advertising is much more accurate than traditional forms of advertising (Hunziker and Blankenagel 2021). There are a variety of ways that ads are matched to an audience, depending on the type of ad (Bruno et al. 2017). Search ads target specific search terms. Ads can also be matched based on shopping cues, such as an audience that has purchased products related to customers or has shown an interest in the type of product you're selling (Zehra and Minton 2020).

The result of this strong matching ability is that the audience can see ads that are most likely to be of interest to them (Tuchman et al. 2018). Reaching the intended audience boosts the success of your digital ads and prevents you from spending your budget on showing ads to audiences who aren't interested in your product or service (Belanche et al. 2017).

## 8 Types of Digital Commercials

**Web Banner Advertising** is an advertisement displayed on a web page (Dodds et al. 2021). An advertisement consists of an image or multimedia object created using Flash technology (Baqai et al. 2021). Ads can also be static or animated banners, depending on the technology used to make them (Bruno et al. 2017). Digital or online advertising when using the Internet or visiting websites, Likewise, ads can also be seen in search engines (Jain et al. 2019). All of these are basically forms of online advertising or digital advertising (Ambier and Poncin 2020).

**Digital Advertising or Online Advertising:** It is a form of marketing and advertising in the modern era that uses the Internet to deliver promotional marketing messages to consumers (Shahid and Qureshi 2022). The best examples of successful digital advertising are American Express and Master Card (Abd Almuhsin Salman Khudher 2020).

**Mobile advertising:** is a form of advertising conducted via mobile phones or other mobile devices (Watkins et al. 2016). Advertisers buy mobile phone numbers data for their existing customer base as well as a list of potential customers' phone numbers (Baqai et al. 2021). The message rarely goes unnoticed and thus qualifies as an effective marketing or advertising tool (Ambier and Poncin 2020). Although it is quite new, it is undeniable that it dominates the advertising market (Shah et al. 2020). This is primarily due to the fact that there is an increase in the use of mobile devices such as smartphones and tablets, mobile advertising can have a powerful impact when done the right way and quickly become popular for this reason (Shahid and Qureshi 2022). A few examples of companies that have made the most of their mobile marketing campaigns are Ford Motor Company, RedBox, and Starbucks Mobile Payments (Kietzmann et al. 2018).

**Promotional Advertising:** Promotional advertising involves the use of promotional media events or giveaways, which helps to grab the attention of the audience



and is simply an effective way of advertising (Ambier Poncin 2020). The American Express Campaign is an interactive advertising campaign (Borau-Boira et al. 2022).

**Ad pixel:** Ad pixel is a very new type of advertisement in which the cost of advertising is calculated based on the number of pixels it takes up on the internet (Arcesati et al. 2020). **Keyword advertising:** is a form of online advertising where advertisers pay for an ad to appear in a list of relevant results when a person uses a specific search term, through the use of a search engine (Berthon et al. 2000).

**Blog Ads Corporate blogs:** are a very excellent way for businesses to reach their customer base on the Internet (McKenzie et al. 2018). Advertising blogs usually use search engine marketing techniques, which guarantee better results on the web (Taylor et al. 2017). And if you can get good traffic on your blog, you can also try text link ads where you link a piece of text on your site to another page on a different website (Trivedi and Teichert 2020).

## 9 Social Media Advertising Objectives

### 9.1 Increase Brand Awareness

Social media is one of the most cost-effective digital marketing methods used to aggregate content and increase the visibility of business (Kang et al. 2020). Implementing social media strategy will greatly increase brand recognition since you will engage with a wide audience of consumers (Taylor et al. 2017).

### 9.2 More Incoming Traffic

Without business marketing on social media, incoming traffic is limited to regular customers, without social media being used as part of the advertising strategy, it would be more difficult to reach anyone outside the circle of regular customers (Prathapan et al. 2019).

## 10 Improve Search Engine Rankings

Although posting on social media may result in a business getting some site traffic, it takes more effort than that to achieve great success (Berthon et al. 2000). Search engine optimization is very important to achieve higher page rankings and get traffic to your company website (Ambier and Poncin 2020).

## 11 High Conversion Rates

Every blog post, photo, video, or comment can lead viewers to the company's website and increase traffic (Ciurel 2022).

## 12 Measuring Customer Satisfaction

Social media is a platform for communication (McKenzie et al. 2018). Creating a voice for company through these platforms is important in humanizing company, customers appreciate knowing that when they post comments on your pages, they will receive a personalized response rather than automated messages (Chen and Wang 2019).

## 13 Improve Brand Loyalty

One of the main goals of all companies is to develop a loyal customer base (Khan et al. 2022). Customer satisfaction and brand loyalty go hand in hand. It is important to engage regularly with consumers and start developing a relationship with them (Lim et al. 2020).

Social media is not just about offering brand products and promotions (Chadhiq et al. 2022). Customers see these platforms as a service channel where they can communicate directly with the company (Taylor et al. 2017).

## 14 Cost-Effective

Social media marketing is perhaps the most cost-effective part of your advertising strategy (Jain et al. 2019). Cost-effectiveness is an advantage because a greater return on investment can be seen, and a larger budget is kept for marketing and other business expenses (Minton 2020).

## 15 Definition of Advertising on Social Media

Social media advertising is the process of using social media platforms to connect with audience to build a brand and market a company's products and services; This is in order to increase sales and increase website traffic (Grau and Zotos 2016).

These companies have taken advantage of these means and strengthened their presence on social media because these sites are able to change consumer behavior, and the most popular social media platforms at the moment are Facebook, Instagram, Twitter, LinkedIn, TikTok, YouTube and Snapchat (Minton 2020).

Social media sites allow advertisers to use a wide range of tactics and strategies to promote content and get people to interact with it (Ambier and Poncin 2020), and many social networks allow users to provide geographic and demographic information that enables advertisers to tailor their messages to what is likely to impact users (Abd Almuhsin Salman Khudher 2020).

## 16 The Benefit of Digital Commercial Advertising from Social Networking Sites

With the increase in the number of users of social media networks and modern media, globally, as well as the continuous integration between new media and traditional media (Shah et al. 2020). Marketers considered social networks to be a key part of their marketing communications program, as brands take advantage of these networks to meet many of their marketing objectives, promote their brands, serve their customers, and manage relationships between them, as well as conduct marketing research, monitoring and analysis (Goel 2020). The cultural values and appeals that are reflected in the advertisements directed by international companies about their products to the public through social networks (Belanche et al. 2017)

The rapid development witnessed by the media and communication has imposed a clear change in the methods of media work (Ciurel 2022), as there are many media that address the public in the era of communication technology and have become more modern and developed at the technical level (Khan et al. 2022), and the whole world now depends on the information age, the age of digital technology, the age of new media that the old is not allowed (Grau and Zotos 2016). With the growth of individuals on the Internet as a feature of the modern era, social media has emerged, which has brought about a huge information revolution, the effects of which are still present today, including (Facebook—Twitter—YouTube—Xing—Myspace—Live Boon—High Life—Orkut—Tajed (Ciurel 2022). Its users have reached millions of people all over the world, and information and communication technology has helped to communicate between peoples and nations with their different cultures and orientations, transcending all geographical and political borders (Berthon et al. 2000). To be more able to influence others, hence social networking sites are known as sites on the Internet that provide its users are an opportunity for discussion, dialogue, and exchange of opinions, ideas and information through personal files, photo albums, and so on (Singh et al. 2021). Examples of these sites are: Facebook, Twitter, YouTube, and the topic of digital commercial advertising – today – tops the priorities of attention of managers and heads of business organizations, and consultants and decision makers are trying to determine the ways in which through which

social networks such as Facebook, Twitter, YouTube and LinkedIn can be used in a beneficial and profitable way for companies (Borau-Boira et al. 2022), and it can be said that social networking sites are one of the greatest products of the modern technological revolution on the Internet (Khan et al. 2021). At the global level, it also witnessed an unprecedented turnout from segments of society, as the distances between individuals in a virtual electronic space were brought closer, and geographical barriers were broken between humans, until it became a vital part of people's lives (McKenzie et al. 2018), and these networks are no longer just technological tools for exchanging messages only, but have become a means to interact and participate on a global level, and the business environment was not isolated from this progress and development (Arcesati et al. 2020), this development quickly imposed on organizations to go to these situations a reality to introduce them and their services or products to consolidate their brand, manage the relationship with their audiences, and attract more investors, as companies' use of these sites has become inevitable, given the important role of such channels in delivering data to their users in the shortest time and least effort (Arora and Sanni 2019). The business owner has the right to spread his message and communicate with his target audience better and reach a wider segment (Khan et al. 2022), and due to the fact that these sites are not limited to specific working times for work, they can interact through them by simply connecting to the Internet at anytime and anywhere (Baqai and Qureshi 2020). Social networking sites are defined as a group of applications that contribute to increasing social interactions, providing common spaces for cooperation, making social contacts available (Shah et al. 2020), and enhancing and exchanging information tremendously in the Internet environment, and the most important of these sites are: Facebook, Twitter and YouTube (Baqai et al. 2021).

## 17 Facebook Ads

Facebook hosts more than a quarter of the world's population providing advertisers with an unparalleled opportunity to reach any audience (Kang et al. 2020). It offers precise targeting options based on location, function, interests, past activities and other criteria, making it more accurate than any other ad platform at all (Minton 2020).

The most common advertising model on Facebook is to create an ad linked to a powerful landing page that offers attractive offers to potential customers, and then communicate with those customers via an automated response service (Borau-Boira et al. 2022). Here is a set of features for an effective Facebook advertising campaign:

An advertisement must be designed for each audience segment that reflects the interest of this segment and suits its personality (Watkins et al. 2016).

First create prospecting ads to build brand awareness, followed by retargeting ads with powerful offers to convince customers to complete a purchase (Minton 2020).

Use emoji as an effective tool to encourage clicking whenever possible (Baqai and Qureshi 2020).

Don't overuse Lookalike Audiences to avoid the risk of losing your ad exposure to important customers (Taylor et al. 2017).

## 18 Instagram Ads

Instagram marketing is superior to Facebook marketing in terms of audience engagement rates, as its users tend to like a large amount and variety of visual content, which makes its ads outperform those of other social networking sites (Arcesati et al. 2020). Especially those businesses that trade in visually appealing products, or those that are able to produce visual content relevant to their products (Kietzmann et al. 2018).

Instagram is very popular with young people between the ages of 18–34, who make up 65% of the total number of users with a significant increase in the number of females and minorities, which makes it an ideal choice if the previous characteristics match the personality of target audience (Belanche et al. 2017).

Here is a set of features for an effective Instagram advertising campaign:

Focus first on real audiences of followers, email list, etc., and in the next stage target lookalike audiences (Arora and Sanni 2019).

Moving away from stock photos that are free to use in advertising design and replace them with real, exclusive photos (Kang et al. 2020).

The visual nature of Instagram opens up the audience's appetite for purchase, so you should seize it with compelling and irresistible offers (Ambier and Poncin 2020).

Adding relevant Instagram hashtags to your ads is an essential way on Instagram to connect with audiences who are interested in the quality of product (Ambier and Poncin 2020).

## 19 Twitter Ads

As one of the most popular social media platforms, Twitter enables fast and seamless interaction between brands and followers (Hunziker and Blankenagel 2021). Twitter marketing is still an important tool for promotion, especially since 53% of its users are the first to try new products (Shahid and Qureshi 2022).

Companies use Twitter primarily to spread awareness of their brand and promote specific products, and the most common advertising model is Twitter Cards with text accompanied by marketing images or videos (Jain et al. 2019). Here is a set of features for an effective Twitter advertising campaign:

Design a fitting and attractive image that fits your brand and grabs attention (Wu and Chang 2019). Not using interactive images or videos, as they are not appropriate for the Twitter platform (Tuchman et al. 2018).

Focus on the products you are promoting and your target audience and avoid generality in marketing (Grau and Zotos 2016).

Direct customers to the page for the specifically advertised product or promotion offered using a CTA (Bruno et al. 2017).

Twitter is the feed content platform; So, take this into account when marketing via Twitter, whether in the tweet or the landing page to which the ad is directed (Ambier and Poncin 2020).

## 20 Snapchat Ads

The number of Snapchat users is still relatively less than their counterparts on Facebook and Instagram, but its users are the most active and interactive with the content that is published, which distinguishes Snapchat marketing (Jain et al. 2019). Snapchat attracts younger users—under 24 years old—who make up 60% of the user base, nearly half of whom have not yet finished secondary education (Shahid and Qureshi 2022). Here is a set of features for an effective Snapchat advertising campaign:

Snapchat is the platform for fun and innovation, so adopt a playful mindset when thinking about social media ad design on Snapchat (Abd Almuhsin Salman Khudher 2020).

Ads should be short to 6 s, using only one ad message and a strong CTA (Prathapan et al. 2019).

When creating an ad on Snap Stories, be sure to write a strong title that encourages the user to click on the ad and see the rest of the Snaps (Tuchman et al. 2018).

## 21 YouTube Ads

If there was a real competitor that could displace Facebook from the top of the social platform users, it would be YouTube, as the percentages of female and male YouTube users are equal, and the majority of its users are highly educated and from parents, with a good spread in all age groups from 15 to 65 years (Minton 2020).

YouTube marketing is done using different video ad formats that cater to businesses with different goals and budgets (Borau-Boira et al. 2022).

The most popular forms of YouTube ads among advertisers are:

**TrueView Ads:** These ads appear in conjunction with the broadcast with the option to skip the ad after five seconds, and since the majority of users click the skip button, it is important that the first five seconds include the most important elements of the ad (Hunziker and Blankenagel 2021).

**Non-skippable YouTube ads:** With a maximum time, limit of 20 s, these ads appear in the beginning or middle of a video and cannot be skipped, which does not mean that customers will necessarily see it (Minton 2020). It is therefore important to broadcast a compelling audio message that will attract them to the viewer in case they are busy with something else while the ad is running (Singh et al. 2021).

**Bumper ads:** These are also non-skippable ads with a maximum of 6 s, and due to the shortness of the ad it should start with strong visual content, one ad message and enough time for a call to action (Taylor et al. 2017).

## 22 The Difference Between Advertising Via Websites and Social Networking Sites

There is a fundamental difference between advertising on social media and advertising on other digital platforms (Arcesati et al. 2020). This difference is that users who see ads for regular digital platforms, often the reason they see the ad is because they have searched for a relevant keyword, and thus are more likely to buy and convert to real customers (Chen and Wang 2019).

While social media ads often appear in front of targeted audiences, they don't know the brand or don't think about buying the product (Chen and Wang 2019). That's why these ads should take a different perspective when designing content, tone, and user behavior (Baqai and Qureshi 2020). Here are the important considerations to keep in mind when designing social media ads:

Use distinct images with clear contrast and bright colors such as: orange or yellow and red, which is clearly different from, for example, the blue Facebook and Twitter environment (Kang et al. 2020).

Do not overuse filters that reduce image density and quality (Chen and Wang 2019).

Clear design elements so that the texts are easily readable, and there are no logos or texts obscuring important parts of the background image (Khan et al. 2022).

If you offer discounts or offers body in design using the visual method that the user translates into a discount or offer, for example: red for the price before the discount, green for the price after the discount (Singh et al. 2021).

By making sure to be skilled in social media advertising, it needs experience and expertise through which you learn from mistakes and approach practices that give you better results (Shah et al. 2020). In this case, you can use the services of e-marketing services on Fiverr, which are provided by professionals in this field, to design your ads and reap their results successfully (Chadhiq et al. 2022).

## 23 Basic Pillars of Advertising Through Social Media

1. **Strategy:** This step includes defining the goals, social media channels to be used, and the type of content to be shared (Baqai et al. 2021).

A sound social media marketing strategy is the backbone of social media presence and without it you will find it difficult to reach target audience, and we are unlikely to achieve goals (Berthon et al. 2000).

2. **Planning and publishing:** Companies must formulate plans for what their content will look like (how much text will be displayed, will videos be published, or only photos will be published), and the target audience must be known, and the quality of the content provided is no less important than the quantity content, and maintaining a commitment to your brand values (Khan et al. 2021).
3. **Listen and Share:** Monitor what users and customers are saying about publications and brands (Grau and Zotos 2016). Listening and sharing is part of a successful digital transformation, especially if you are going to improve your overall customer experience (Goel 2020).
4. **Analytics and Reports:** Part of being on social media is knowing how far posts are going, so engagement and reach reports are very important (Baqai and Qureshi 2020). The success of any social media marketing campaign depends on analytics to track and collect data (Tuchman et al. 2018). Without this information you cannot understand user behavior, discover the best times to post, analyze your competition, once you have all this information you will be able to determine the decisions you will make for future campaigns that will greatly affect the success rate (Baqai and Qureshi 2020).
5. **Advertising:** Buying ads on social media is a great way to promote and develop a brand, especially with such a huge number of users for example Facebook alone has 2.89 billion monthly active users (Berthon et al. 2000).

## 24 The Disadvantages of Social Networking Sites for Electronic Advertising Are as Follows

1. **Wasting user time:** It is possible for social networking sites to waste users' time through their use of social networking sites, which greatly and negatively affects other aspects of life, as time is spent using the Internet at the expense of self, family time, work and study without feeling by time (Chen and Wang 2019).
2. **Fraud and identity theft:** Social media may lead to a kind of intrusion and electronic encroachment on private information that is published on the Internet through commercial electronic advertising by hackers (Kang et al. 2020).
3. **Addiction:** Daily browsing of social networking sites has become one of the main daily activities in an individual's life, which makes some individuals unable to spend an entire hour without browsing social media platforms, and this leads to addiction to these sites and affects the user and his focus in general and distract his thought (Berthon et al. 2000).
4. **Social isolation and the illusion of virtual communication:** Observing the conditions of others and looking at the manifestations of luxury: Some deliberately show only the positive and ideal side on social media (Ambier and Poncin 2020); Which causes frustration and despair for some from the frequent tracking of celebrities and influencers and their news and the contentment of those who follow them in this virtual world, which may result in social isolation (Khan et al. 2021), as we find a family in one house communicating through social



media, or we find families whose members spend hours using phones without any effective personal communication, such practices result in poor social and professional development of the person due to his inability to interact positively and naturally with different aspects of life (Ciurel 2022).

5. **Privacy hack:** Social media may cause many problems with regard to the privacy of the person using it, and this is caused by the large amount of participation that occurs through these means, such as sharing the geographical location that facilitates access to the user and his location, and the user can also worry about information, which becomes available after publication on these sites (Arora and Sanni 2019).
6. **Psychological problems:** Spending long periods of time using various social media can negatively affect the mood and psychological state of the user, the most prominent of these problems are: isolation, boredom, anxiety, depression and others (Ambier and Poncin 2020).
7. **Information amplification:** Various social media contain a large number of users subscribed to it, and these users interact with these means by publishing and sharing photos, sharing different videos, or by liking or commenting, and this leads to a large amount of information (Goel 2020). And a huge amount of content and news that may be false and incorrect and presented through social media, some of which may be unimportant and necessary for the user of these means and interact with them (Ambier and Poncin 2020).

## 25 Conclusion

The results revealed that commercial advertising has a major role in human life to identify what he wants to acquire and buy, as it is a means through which the public knows the information it needs about the goods and services of interest to it, and for the advertiser, the advertisement is the means by which he reaches the target audience in order to persuade his ideas, goods and services To create a climate of acceptance by influencing attitudes and behavior.

The results also showed that the success of any product depends primarily on choosing the means to promote it and the type of advertising campaigns that vary between visual, audio or read. Ads on social media are considered one of the most important advertising means because they attract the largest number of viewers, and advertisers can choose a time broadcast its advertisements and the number of times to be broadcast.

The results also showed that digital commercial advertising has the opportunity to benefit from the characteristics and advantages of the Internet and social media, as the advertising message can be repeated many times with high-quality visual capabilities, which enhances the chances of its impact on the audience.

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# **Human Resources and Organizational Impact**

# The Impact of Human Capital and Competencies on Startups Business Success: Literature Review



Maryam Isa Aljazeera and Allam Hamdan

**Abstract** This abstract gives an overview of the value of human capital in the Kingdom of Bahrain, with a focus on small and medium-sized firms (SMEs). It highlights the Bahraini government's measures to foster human capital development and entrepreneurship in the country, such as the PM Fellowship Program and the establishment of the SMEs Development Board. The abstract also delves into the concept of human capital and its significance in SME success, focusing on the link between entrepreneurial ability, human capital, and business performance. It also goes over the various components of entrepreneurial competence, such as opportunity competence, relational competence, organizing competence, conceptual competence, strategic capability competence, and entrepreneurial self-efficacy. The abstract closes by underlining the importance of good human resource management in SMEs in order to achieve company objectives and overcome problems in a constantly changing business environment.

**Keywords** Human capital · Entrepreneurial competence · Startup business · Business success · SMEs

## 1 Introduction

With the beginning of the new millennium, it has become increasingly clear how important human capital is and how managing and enhancing it is a key component of the modern economy. In Bahrain his highness King Hamed highlighted how investing in Bahrain youth by developing and caring for them socially, scientifically, cognitively, healthily, culturally, and athletically. Kingdom of Bahrain keen in all the strategies and plans to raise with intellectual and practical framework and it also works to refine the skills and provide them with the latest knowledge and sciences and the best educational system that qualified them to enter and compete in labor market.

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As encourage for the concept of human capital importance and part of firm value is the value of human capital his royal highness prince Salman bin Hamad started PM fellowship program which was launched in 2015 to provide young Bahrainis from government sectors with advanced training to enhance the skills and support the kingdom of Bahrain to grow (Office 2023a, b).

As a part of modern vision which entesis to invest in human capital and innovation and lead to sustainable development, Kingdom of Bahrain promoted in economic growth through small and medium business and to measure it as part of sustainable development goals 2030, therefor the Ministry of Labor and Social Development adopted a number of projects of self-employed business that raise the economic level and always encourage creativity and innovation (SDGs 2023).

His Royal Highness Salman Bin Hamad Al Khalifa, Crown Prince, Prime Minister, and Chair of the Economic Development Board (EDB) established the SMEs Development Board (SDB) in 2017. The purpose of the project is to coordinate the efforts of the Ministry of Industry, Commerce and Tourism, the Economic Development Board (EDB), the Labor Fund Tamkeen, the Bahrain Development Bank (BDB) and the Bahrain Chamber of Commerce and Industry (BCCI) in order to improve competitiveness of startups across local, regional, and international markets. It is also intended to increase the number of SMEs contributing to GDP, SME exports, and employment levels in the private sector at national levels (Commerce 2023).

Human capital development is the process of helping others acquire knowledge. This act according to what an organization continuously and carefully supports its employees in acquiring or improving the skills necessary to perform the various job functions relevant to their current or anticipated future roles, develop general skills as an individual, discover their inner potential and use it for their own and/or organizational development goals and create a corporate culture in which subordinates and managers work together effectively. When evaluating which factors contribute to competitive advantage, the focus was not on external sources, but on internal resources deemed critical to maintaining effectiveness (Alnachef and Alhajar 2015a, b).

The challenges small businesses face throughout their business life require training, expertise, and human motivation to pursue business strategies that lead to business success (Iñaki 2002). As a company expands, numerous issues arise because of things like technological advancement, in this case this requires some changes in strategy, systems and structures. Therefore, the role of human capital should be defined by companies. Start up-stage human capital needs may differ from growth-stage human capital needs in terms of their importance to achieving performance at each stage of the business cycle (Chang and Hsieh 2011). A study by Galabova and McKie (2013) states that small medium business owners value knowledge, skills, and experience as essential elements of human capital, but they often focus on people's soft skills and characteristics (attitudes, willingness and ability to learn and grow, passion for their work) they consider this elements as more important. HC is viewed as a rich resource that offers opportunities for competitive advantage on both an individual and corporate level.

Clarifying the role of human capital management in SMEs provides the most valuable results for achieving business goals in an effective manner. From this perspective, it is essential to better understand the role that entrepreneurial competence and human capital play in the success of small and medium businesses. The purpose of this study is to examine how human capital and capabilities influence the success of small businesses.

Despite the essential role of human capital in modern societies, Many small- to medium-sized businesses (SMEs) are currently unable to reach their full potential due to the international business climate and in some situations, completely stop operating, this is a result of SMEs being satisfied with their current business environment. This threat can be minimized by making effective use of the available resources. The implementation of human resource management by SMEs is encouraged in order to accomplish this (HRM). Given that HRM is recognized for its effect on business performance, it can be argued that it is beneficial for SMEs (Wuen et al. 2020).

## **2 Literature Review**

### ***2.1 Small and Medium Enterprises in Bahrain***

There is various definition for SME's depending on the states. In Bahrain According to Resolution 988 issued by Minster of Industry, Commerce Mr. Zayed bin Rashid Al-Zayani year 2017, he adopted new criteria for classifying micro, small and medium enterprises. Micro-enterprises where the number of workers up to 5 workers, and annual revenues from 1 to 50,000 Bahraini dinars. Small enterprises, the number of workers ranges from 6 to 50, and the revenues range from 50,000 to 1,000,000 Bahraini dinars. Medium enterprises, the number of workers ranges from 51 to 100 workers, and the revenues range from one million to three million Bahraini dinars.

### ***2.2 Entrepreneurship and Business Management***

Entrepreneurial ability and good business management are key factors in small and medium businesses' high competitiveness. This backs up the hypothesis put forward by Man et al. (2002). On the relationship between entrepreneurial characteristics and long-term company success. An entrepreneur's know-how includes knowledge of both internal and external environments. Entrepreneurial creativity determines the competitiveness and success of small businesses. This is possible when entrepreneurs have strong business skills and the ability to think outside the box when meeting customer needs (Suroso et al. 2017).

### **2.3 *The Concept of Human Capital***

A human capital concept implies that persons invest in themselves through education, training, or other activities in exchange for an increased level of income in the future (Woodhall 1987), or can be defined as employee's knowledge, skills, and experiences (Fleischer 2007). When it comes to spending on assets that will generate future income, economists use the term "investment". They contrast this with consumption, which provides immediate gratification or benefit but does not generate money in the future. Generally, capital refers to assets that are expected to generate income in the future. Physical capital, such as machinery, equipment, and buildings, which will generate income in the forthcoming by increasing production capacity, has traditionally been the focus of economic analysis of investments and capital. According to some classical economists, including Adam Smith, an employee's productive capacity can be enhanced by education in the same way that it can be enhanced by the purchase of new equipment and other types of physical capital. increase. As a result, we compared investments in human and physical capital (Woodhall 1987).

Irving Fisher (FISHER 1906) gave a clear and comprehensive view of capital. He stated that capital includes all inventories of tangible goods used to manufacture goods or services that consumers demand. In addition to goods owned by people, governments, and enterprises, Fisher would also include things like land, other natural resources, and replicable goods. He included producer durables and consumed durables which include things like houses. Additionally, he includes items where the proceeds are always in-kind, such as owner-occupied homes, and items where the proceeds are sold for money.

However, the concept was not completely established until the early 1960s, when American economist Theodore Schultz investigated educational expenditure as a sort of investment (Schultz 1961), and when American economist Gary Becker published a book titled Human Capital (BECKER 1975), which developed the theory of human capital formation and examined at investment profitability.

### **2.4 *Human Capital Theory***

According to (Schultz 1961), many economic shields away from the concept of investing human capital because moral and philosophical issues where people find it distasteful to consider investing in people except slavery, which our values and beliefs prevent us from viewing people as capital goods (Mill 1848), among others, formerly argued that a nation's Citizens should not be viewed as wealth because wealth exists only for the benefit of the people. But (Mill 1848) was undoubtedly mistaken; there is nothing in the idea of human wealth that contradicts his claim that it exists solely for the benefit of people. People can increase their range of options by investing in themselves. That is one method that free men can improve their well-being (Nicholson 1891). Even though, they long know People are part of a



nation's wealth, and when measured by what they bring to society, people's productive capacity is now far greater than all other forms of wealth combined (Nicholson 1891). Three notable individuals stand out among the few who have treated people like capital. Adam Smith, a philosopher, and economist made the inspirational claim that capital includes all the acquired and useful skills possessed by all of a nation's citizens.

Most of the consumption is actually an investment in human capital. Direct investments in healthcare, education, and internalization to benefit from better job prospects are all good examples. Human effort may be substantially improved in these and similar ways, and its output can be increased. Schultz argued that the significant increase in real incomes per worker can be largely attributed to such investments in human capital.

Schultz (1961) the concept of capital as a tangible investment is no longer applicable, as human capital skills and knowledge can be a critical investment. We presume that capital has a major impact on entrepreneurship in the context of human capital. According to Schultz (1975), market mechanisms aren't always balanced in the theory of entrepreneurship. Instead, it depends on how various segments respond to out-of-equilibrium occurrences, taking both benefits and costs into consideration and continuously adjusting, this is what is meant by innovation. They anticipated that capital had a significant effect on entrepreneurship in the context of human capital. Entrepreneurship, then, is the ability to change or redistribute various resources to efficiently respond to changing market conditions and an increasingly competitive environment (Burns and Stalker 1961). Entrepreneurial abilities are thus developed through experience, training, and education and can be considered as a sort of human capital (Suroso et al. 2017).

## ***2.5 Entrepreneurial Competence Concept***

Over time, there has been a growing understanding that identifying and pursuing business opportunities is a key and distinctive element of entrepreneurship. One of the most prevalent beliefs about entrepreneurs is that they are born with certain attributes that are difficult, if not impossible, to improve. In the 1990s, this was referred to as the 'trait approach' to entrepreneurship (Gartner 1989). Bird (1995) referred to entrepreneurial competences, as these qualities include personalities, self-images, specialized knowledge, motivations, social positions, and abilities that contribute to the development of a business, ensure its survivability, and promote its expansion and required to start a new firm, but successful entrepreneurs are those who use their competencies to sustain and expand their businesses. Whereas (Khalid and Bhatti 2015) defined entrepreneurial competence as the managerial ability to generate and express a strategic vision for building organizations' systems for improved performance. Entrepreneurship definition expanded to be more than just owning a business and generate your own profit, and exceed taking advantage of market demand and producing goods and services.

Tittel and Terzidis (2020) developing an updated entrepreneurial competence framework, they collect a entrepreneurial competence definition from the year 1995 to 2019 and came up with 3 main categories with a sub components that identify the EC that effect business performance. In this paper we will examen major components of entrepreneurial, skills and attitudes which are the core of competence broadens to include capturing opportunities, contacting skills, organizing, Conceptual management skills, the ability to manage strategic capabilities, and self-efficiency which are the primary performance factors for SMEs (Lans et al. 2014; Kyguolienė and Švipas 2019; Muhammad and Aina 2017).

- *Opportunity competence*

There is no doubt that your ability to spot opportunities is related to your ability as an entrepreneur. In its simplest form, typically, it is a gap in the market, a new technology or invention for which the market has not yet been identified, or a concept for a good product or service that can be considered a real business opportunity. Opportunity competence is more than simply recognizing opportunities. It focuses on systematically creating appropriate solutions to problems and emphasizes a more structured view of opportunities whereby perception, interpretation and construction underlie the identification of opportunities (Jemal 2020; Sakib et al. 2022).

- *Relational or social competence*

This group focuses on interpersonal relationships. Networks are crucial to the creation of opportunities, the growth and development of novel ideas, ability to negotiate and the acquisition of resources and authority. The capacity to develop and maintain relationships, both internally and internationally, it appears to be significant because external interactions and relationships are frequently formed from scratch (Jemal 2020).

- *Organizing competence*

The ability to build, organize, and coordinate management systems is included in the definition of business/management competence. Business competencies focus on exploitation, while Opportunity competencies focus primarily on exploration (finding, experimenting, discovering, etc.) (refinement, selection, implementation, execution). This ability includes establishing, analyzing, and putting into practice firm strategy, as well as managing a variety of internal, external, human, physical, financial, and technical resources. (i.e. planning and control) (Jemal 2020).

- *Conceptual competence*

Different conceptual abilities are required in this field, which the entrepreneurs reflect in their behaviors. such is creativity, risk-taking, ability to make decisions, observation, the ability to make a quick decision when it is necessary, problem solving, creative thinking and understanding of complex information (Jemal 2020; Tehseen and Ramayah 2015).

- *Strategic capability competence*

In connection with defining, evaluating, and implementing company strategy (Sakib et al. 2022; Jemal 2020) Prioritize work in line with business goals, know the impact of anticipated direction and changes on business success, and achieve goals better by redesign the business, connecting or comparing present actions with strategic goals, track progress of strategic goals, assess outcomes related to strategic goals, and defining strategic actions by weighing cost and benefit (Tehseen and Ramayah 2015).

- *Entrepreneurial self-efficacy*

This domain includes a wide range of individual-level constructs known as meta-level competences, which serve to favorably affect other skills rather than actually making up those competencies. This category comprises conceptually related constructs to more motivating psychological constructs. According to a recent meta-analysis, entrepreneurial self-efficacy, or the confidence in one's own entrepreneurial ability, is one of the most significant individual level drivers of entrepreneurial success. Entrepreneurial self-efficacy is more directly concerned with a person's belief in their own (entrepreneurial) talents (Tehseen and Ramayah 2015).

## ***2.6 The Concept of SMEs' Performances Business Success***

Key elements for small and medium-sized firms to attain notable business success are profitability, return on investment, turnover, and product quality. Mann and Kehoe (1994) and Liñán and Santos (2007) propose a more comprehensive method to performance measurement that considers both operational and strategic performance. According to Andriyansah and Zahra (2017), Sulaiman et al. (2017), dimensional measures are divided into four categories: market performance, process performance, human resource performance, and customer relationship performance. Performance is essentially determined by an organization's appropriate selection, which eventually increases the organization's competitive advantage.

## ***2.7 The Impact of Human Capital on Business Performance***

Suroso et al. (2017) state that entrepreneurial human capital is a significant factor in deciding how well small and medium businesses operate commercially. For entrepreneurs with a foundation in business education, expectations, and encouragement to develop business insights are greatly influenced by the management of education and training levels. As well, entrepreneurs who have taken management training find that it is particularly beneficial for setting effective short- and long-term

business goals. In order to help entrepreneurs, use resources wisely, boost production, and maintain a firm, management training is crucial. Working in comparable environments helps to get a better understanding of the products or services that are being promoted, allowing to produce goods and services to operate more quickly and effectively. Entrepreneurs can access network resources and potential clients due to their prior employment expertise.

Studies by Shamsuzzoha and Tanaka (2021), Koo (2019) show that both managers' and employees' human capital is the most important factor for implementing multidimensional innovations and the long-term success of an enterprise.

## ***2.8 The Impact of Entrepreneurial Competence on Business Performance***

Suroso et al. (2017) point out that entrepreneurial competencies influence firm performance only when supported by other factors. A company's performance can only be understood in terms of its human capital, not its entrepreneurial competence.

## **3 Conclusion**

Finally, the Kingdom of Bahrain emphasizes the value of human capital in driving economic growth and supporting long-term development. The government has adopted a number of initiatives and programs to invest in human capital development and enhancement, notably in small and medium-sized firms (SMEs). The formation of the SMEs Development Board intends to boost startup competitiveness and raise their contribution to GDP, exports, and employment levels.

Human capital, defined as an individual's knowledge, abilities, and experiences, has come to be recognized as a key resource for competitive advantage. Small and medium-sized firms confront problems throughout their lifecycle, and human capital plays an important role in overcoming these challenges and attaining success. Entrepreneurial competence, which includes the capacity to recognize possibilities, establish relationships, organize and coordinate, think creatively, and be strategic, is critical to the success of SMEs.

SMEs in Bahrain may efficiently achieve their business goals and prosper in a competitive environment by recognizing the significance of human capital management and entrepreneurial skills. Investing in human capital and implementing good human resource management techniques can assist SMEs in realizing their full potential and contributing to economic growth. Overall, the Kingdom of Bahrain acknowledges the value of human capital in driving innovation, entrepreneurship, and long-term development, and it continues to emphasize its development and management in order to ensure a bright future.

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# Does Electronic Human Resource Management Matter for Workforce Agility? An Empirical Study of the Jordanian Banking Sector



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**Abstract** The current research examined the impact of electronic human resource management on workforce agility in the Jordanian banking sector. The research used experimental data through a survey distributed to 559 employees for Jordanian commercial banks at various administrative levels, which formed a response rate of 78.3%. Structural equation modeling (SEM) was applied as a statistical analysis approach to the collected data. The research concluded that electronic human resources management had a positive impact on workforce agility, as e-recruiting had the greatest effect, while e-performance appraisal had the least effect. Accordingly, the research emphasized the necessity of adopting a change management approach and seamless integration of electronic human resources management through comprehensive training programs and addressing any concerns or resistance to change.

**Keywords** Electronic human resource management · Workforce agility · Banking sector · Jordan

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# 1 Introduction

Organizations encounter persistent challenges and possibilities in today's fast-paced and unpredictable business world as a result of technical breakthroughs, changing market dynamics, and evolving client expectations (Al-Abbadi et al. 2021; Al-Alwan et al. 2022, 2022; Aityassine et al. 2021). To flourish in such a volatile climate, organizations should have employees that are adaptive, flexible, and eager to learn from volatile circumstances (Alhalalmeh et al. 2022; AlHamad et al. 2022; Al-Hawary 2013). Workforce agility has evolved as a vital notion for organizations to maintain competitiveness (Al-Hawary and Abu-Laimon 2013; AlTaweel and Al-Hawary 2021), innovate (Al-Hawary and Harahsheh 2014; Al-Hawary and Nusair 2017), and achieve long-term success (Al-Hawary et al. 2021; Al-Hawary and Al-Syasneh 2020). Workforce agility can be described as an ability to change work methods, jobs, and skills to suit changing needs and promote organizational success. Al-Hawary and Al-Rasheedy (2021) stated that a highly agile workforce anticipates changes, navigates uncertainty, and seizes novel opportunities in an evolving organisational context. Thus, in an era of digital transformation and rapid change, organizations that prioritize worker agility gain a competitive edge sooner than those that rely on regular labour and antiquated organizational structures (Al-khawaldah et al. 2022; Al-Shormana et al. 2021).

As technology continues to shape and redefine various aspects of business operations, human resource management has undergone a transformation with the rise of electronic human resource management, which refers to the incorporation of technology and digital solutions into human resource processes and practices in order to streamline and improve their functions (Al-Hawary and Al-Namlan 2018; Metabis and Al-Hawary 2013). Electronic human resource management can be used to improve the efficiency and effectiveness of human capital management within organizations, where it could improve self-service options, continuously updating of performance evaluations, and allow human resource managers to focus on strategic goals rather than routine work (Mohammad et al. 2020). However, the adoption of electronic HRM necessitates careful planning of investments in technological infrastructure, as well as the resultant issues related to data security and privacy considerations (Tariq et al. 2022; Boudlaie et al. 2022; Mukhlis et al. 2022). Therefore, organizations must ensure that electronic human resource management systems are easy to use, adaptable, and consistent with their specific human resource requirements and organizational culture (Al-Hawary et al. 2022; Mohammad 2020; Al-Rwaidan et al. 2023).



## 2 Literature Review and Hypotheses Development

### 2.1 *Electronic Human Resource Management*

Electronic human resource management enables greater adaptability to changing organizations' requirements and economic conditions. The theory of social exchange suggested that the relationship between individuals and organizations is founded on mutual advantages and reciprocity (Al-Hawary et al. 2023; Pallathadka et al. 2023). Thus, electronic human resource management could encourage beneficial relationships between employees and human resource departments through self-service portals, interactive platforms, and transparent communication channels (MajdyAmiruddin et al. 2023). Employee empowerment, engagement, and happiness are increased as a result of these electronic activities, resulting in a positive dynamic interchange inside the organization.

Electronic human resource management is described as the integration of information technology with traditional human resources methods to simplify and improve the outcomes of operations inside organizations (Al-Alwan et al. 2022). Electronic human resource management involves the use of digital technologies, software programs, and online platforms to handle human resource tasks like recruiting, employee data management, training, performance appraisal, and employee engagement (AlHamad et al. 2022). Several dimensions arising from electronic human resource management contribute substantially to the successful conduct of human resource management operations utilizing digital technology. (a) E-recruitment is a method of investing technological resources which facilitates the acquisition of qualified persons for a job opportunity. (b) E-training, also known as "e-learning", is the adoption of digital technology to provide and promote employees' learning experiences, including formal and informal learning activities, which are frequently aided by online platforms and resources accessible through computers or cell phones (Alshuqairat et al. 2023). (c) Electronic communication refers to taking advantage of digital technology and online networks to facilitate and enhance interaction among human resources departments and employees, as well as amongst employees themselves (Al-Hawary and Al-Namlan 2018). (d) Electronic performance appraisal indicates the implementation of electronic means to automate and improve the employee performance evaluation procedure within organizations.

### 2.2 *Workforce Agility*

Workforce agility defines as an organization's capability to adjust rapidly and effectively to modify strategic situations and trends through its workforce which leads to meeting customers' requirements. It means possessing flexible and adaptable employees that can immediately modify and adapt their skills, capabilities, and

organizational resources to meet evolving demands and gain new possibilities (Al-Khasswneh et al. 2023). Workforce agility represents an organization's capacity to predict changes in the outside context and adapt appropriately to them by using its human abilities, skills, and experience (Ashura et al. 2023). Al-Hawajreh et al. (2023) Considered that it is based on creating a dynamic workforce capable of swiftly pivoting and embracing new technologies, aligning its efforts toward strategic goals, and therefore driving organizational success and competitive advantage (Al-hawajreh et al. 2023). Additionally, workforce agility assists with advancing organizational resilience theory, which indicates an organization's capabilities to rebound from adversity and adapt to business environment troubles. Thus, the workforce's agility allows an organization to swiftly rearrange its roles, responsibilities, and competencies in order to deal with unanticipated problems and sustain organizational performance excellence (Al-Husban et al. 2023). Al-Armeti et al. (2023) mentioned that dynamic leadership style, flexibility, adaptation, collaboration, and empowerment are the core characteristics of workforce agility.

### ***2.3 Electronic Human Resource Management and Workforce Agility***

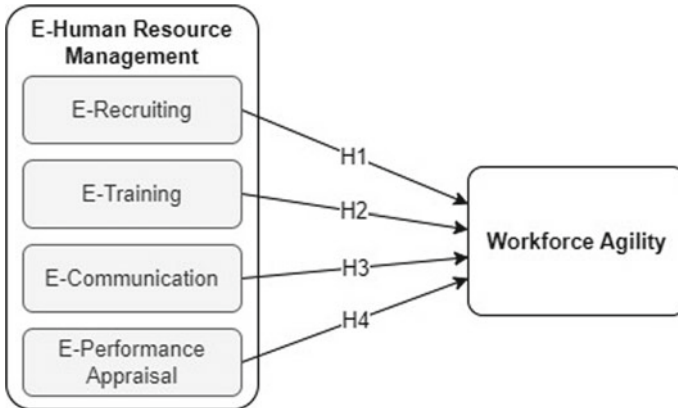
The researchers believe that electronic human resource management is associated with workforce agility. Al-Armeti et al. (2023) sought to ascertain the empirical relationship between electronic human resource management and organizational performance in the presence of organizational agility. A descriptive correlational analysis was used to perform this study on a sample of 40 Sri Lankan institutions. According to the findings of the study, electronic human resource management had a considerable and beneficial impact on organizational performance, whereas organizational agility mediates the relationship between electronic human resource management practices and organizational performance. Accordingly, the current research suggested the following hypotheses:

*H1: Electronic human resource management has a significant impact on workforce agility.*

Figure 1 depicts the impact of electronic human resource management, i.e., e-recruiting, e-training, e-communication, and e-performance appraisal, on workforce agility that form the research hypotheses.

## **3 Methodology**

The primary sources were gathered from a survey sent to Jordanian commercial banks' employees. It was not possible to use a comprehensive approach to collect data. Hence, a convenience sample was used through a Google Forms survey



**Fig. 1** Research model and hypotheses

distributed via social media and e-mail to those employees. The study survey received 714 replies; however, 155 replies were removed from the statistical analysis as a result of recurring patterns or incomplete surveys. Accordingly, 559 replies. An internet-based survey was used to obtain data on the impact of electronic human resource management on workforce agility. The survey was divided into three sections: an introduction that stated the research's goals, a section for collecting demographic information on respondents.

The independent variable of the research was electronic human resource management, which was measured using 18 items borrowed from (AlHamad et al. 2022). This variable was a second-order construct that was divided into four first-order constructs. e-recruiting was measured using five items (ER1–ER5), e-training was measured using four items (ET1–ET4), e-communication was measured using four items (EC1–EC4), and e-performance appraisal was measured by five items (EPA1–EPA4). On the other hand, the dependent variable of the research was workforce agility, which was a first-order construct measured using seven items (WFA1–WFA7) according to AlBrakat et al. (2023).

## 4 Results

Structural equation modeling (SEM) is a flexible statistical method to evaluating both quantitative and qualitative data. Confirmatory factor analysis (CFA) is a type of SEM used in management research to determine the validity and reliability of research instruments (Dwijendra et al. 2023). The fundamental purpose of CFA is to establish how well latent construct measurements match the researcher's initial understanding of those components and their latent factors. CFA was utilized in this

study to create the indicator values displayed in Table 1, which are used to evaluate the research instrument's validity and reliability.

Table 1 results indicated that all items had loadings of more than 0.5 on their latent constructs, ranging from 0.671 to 0.811, showing that they were maintained since they surpassed the minimum limit (Zahran et al. 2023). The average variance extracted (AVE) values were above the minimum permissible value of 0.5, indicating that the measurement model had convergent validity (Al-Alwan et al. 2022). Moreover,

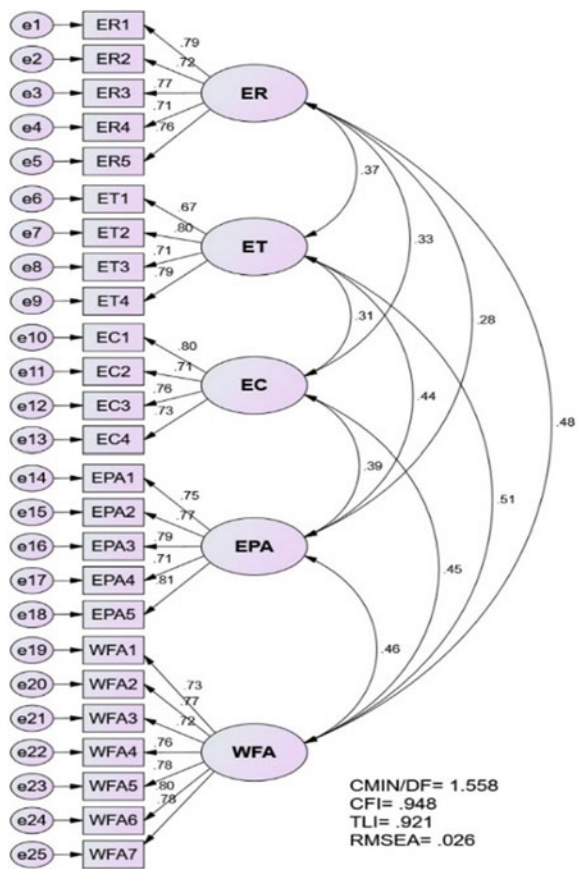
**Table 1** Validity and reliability of measurement model

Construct	Loadings	AVE	MSV	$\sqrt{\text{AVE}}$	CR
<i>E-recruiting</i>		0.569	0.464	0.754	0.868
ER1	0.792				
ER2	0.725				
ER3	0.774				
ER4	0.713				
ER5	0.765				
<i>E-training</i>		0.552	0.483	0.743	0.830
ET1	0.671				
ET2	0.797				
ET3	0.706				
ET4	0.789				
<i>E-communication</i>		0.564	0.479	0.751	0.838
EC1	0.802				
EC2	0.711				
EC3	0.758				
EC4	0.729				
<i>E-performance appraisal</i>		0.587	0.491	0.766	0.877
EPA1	0.752				
EPA2	0.769				
EPA3	0.788				
EPA4	0.708				
EPA5	0.811				
<i>Workforce agility</i>		0.585	0.493	0.765	0.908
WFA1	0.734				
WFA2	0.772				
WFA3	0.719				
WFA4	0.764				
WFA5	0.785				
WFA6	0.799				
WFA7	0.777				

maximum shared variance (MSV) values were lower than AVE values, and the square root of AVE values surpassed the correlation between the other latent variables. These findings indicated that the measurement model had discriminatory validity (Al-Hawary 2013). On the other hand, the composite reliability (CR) of the measurement model was examined using McDonald’s omega coefficient, which was more than the minimal criterion of 0.70. Therefore, the model fit indices were derived and shown in Fig. 2.

According to Fig. 2, the measurement model produced adequate goodness of fit indicators. The chi-squared ratio to degrees of freedom was 1.558, which was less than the highest limit of 3 (Muda et al. 2022). The comparative fit index (CFI) and Tucker-Lewis’ index (TLI) were both 0.948 and 0.921, respectively, above the minimum allowable value of 0.90 (Harahap et al. 2022). The findings for the root mean square error of approximation (RMSEA) revealed that it did not approach the highest limit of 0.08 (Attiany et al. 2023).

Fig. 2 The results of confirmatory factor analysis



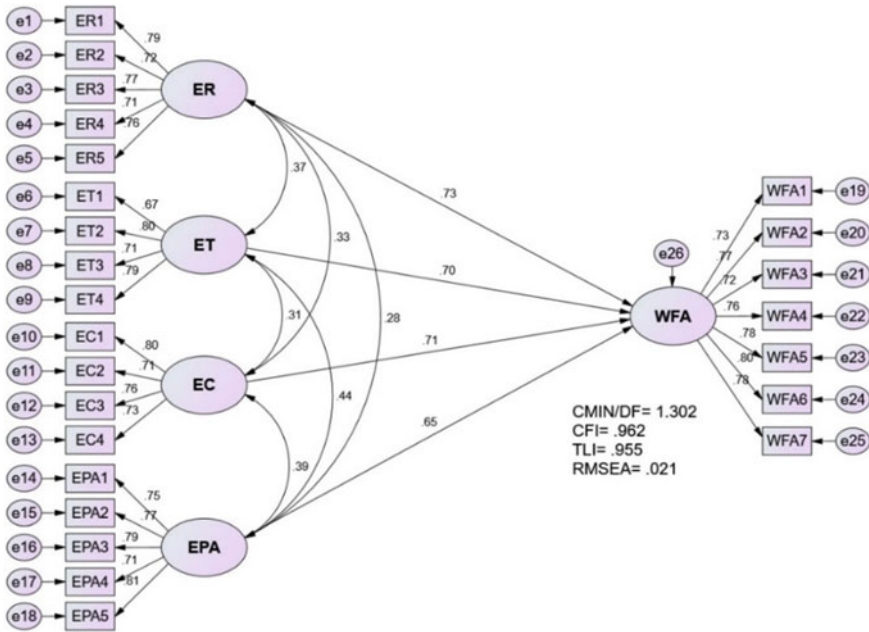


Fig. 3 SEM for testing the impact of E-HRM on WFA

Structural equation modeling (SEM) was used to test the researcher’s hypotheses. Researchers could apply SEM to examine the appropriateness of their models and analyse associations between observable variables and latent variables with the maximum likelihood approach (Rahman et al. 2023). The structural model used to investigate the influence of electronic human resource management on workforce agility is illustrated in Fig. 3.

According to the results of Fig. 3, the structural model obtained appropriate values of the goodness of fit. The chi-squared ratio to degrees of freedom is 1.302, therefore it was lower than the upper threshold of 3 (Mohammad 2019). The comparative fit index (CFI) and the Tucker–Lewis’s index (TLI) were 0.962 and 0.955, respectively, thus they exceeded the minimum allowed value of 0.90 (Mohammad et al. 2022; Al-Awamleh et al. 2022). As for the root mean square error of approximation (RMSEA), the results showed that it did not reach the upper value of 0.08 (AL-Zyadat et al. 2022; Alolayyan et al. 2022). Accordingly, path coefficients for the impact of electronic human resource management on workforce agility were extracted and included in Table 3. This table includes five columns, each representing the relationship of anelectronic human resource management practice to workforce agility.

According to the findings in Table 3, the four paths of electronic human resource management had a statistically significant favourable impact on workforce agility. Path coefficients (B) vary from 0.718 to 0.812, with e-recruiting having the highest coefficient, suggesting that it had the most positive impact on workforce agility.

**Table 3** Path coefficient for the impact of E-HRM on WFA

Path			B	S.E.	$\beta$	t	p
E-recruiting	→	Workforce agility	0.812	0.062	0.733	13.09	0.000
E-training	→	Workforce agility	0.737	0.066	0.698	11.16	0.000
E-communication	→	Workforce agility	0.784	0.064	0.710	12.25	0.000
E-performance appraisal	→	Workforce agility	0.718	0.069	0.648	10.40	0.002

The standard regression coefficients ( $\beta$ ) were in the (0.648–0.733) range, indicating that raising the standard deviation in any combination of electronic human resource management had a significant impact on workforce agility. The *t* values were substantially greater than the crucial value of 2.05 (at a 0.05 significance level). Furthermore, all of the paths had a *p*-value of less than 0.05, indicating that the relationships between electronic human resource management dimensions and workforce agility were statistically significant.

## 5 Discussion

The findings revealed that electronic human resource management has significant effects on worker agility. Therefore, electronic human resource management enables employees' self-service selections and online platforms through which they may access and update personal information, manage their work schedules, and seek time off or other benefits. According to many studies, allowing workers to handle duties connected to their human resources, such as electronic human resource management, increases employee adaptability and minimizes administrative requirements on human resources staff. Employees may make timely changes to their work arrangements, allowing the firm to adapt rapidly to changing demands.

Furthermore, cooperation and communication are vital for an agile workforce, where electronic human resource management is essential in this context. Employees may collaborate on projects, exchange information and expertise, and work together regardless of physical location using digital platforms and tools including, including intranets, collaboration software, and social media. These findings are congruent with (Kumar and Kumar 2022), which found that immediate interaction through features like instant messaging, video conferencing, and discussion boards allows for seamless cooperation and information sharing across departments. Although electronic human resource management provides major advantages for workforce agility, it is necessary to evaluate possible issues and constraints. Setiawan and Gunawan (2023)

suggested that organizations should have data security and privacy measures to safeguard key employee information. Furthermore, strong change management techniques and training programs are required for the successful deployment of e-HRM to ensure employee acceptance and engagement in the transformation process.

In conclusion, the effects of electronic human resource management on workforce agility matter for organizations. Major results to consider include increased employee autonomy, empowerment, improved performance management, more interaction and organizational cooperation, and the requirement for adaptive human resource management practices. Organizations may improve workforce agility, react to changing business environments, and maintain a competitive advantage in today's dynamic world by efficiently deploying electronic human resource management systems. To fully realize the promise of electronic HRM for workforce agility, organizations should also address the issues of synchronizing human resource strategy, data security, and privacy.

## 6 Implications

The research revealed multiple implications associated with the positive impact of electronic human resource management on workforce agility. First, emphasizing on excellent change management and smooth electronic human resource management integration to optimize the impact of electronic human resource management on worker agility. thus, Organizations should provide thorough training programs and address any concerns or resistance to change by proactively managing the transition process. Second, continuous learning and growth are advantages of electronic human resource management. Therefore, organizations should use electronic human resource management to provide tailored learning paths, online training modules, and access to educational resources, resulting in the development of an agile workforce capable of adapting to changing demands. Finally, an electronic human resource management strategy could improve employee engagement by allowing self-service, real-time feedback and evaluation, and open communication. Hence, organizations ought to utilize electronic human resource management to generate an engaging employee experience, stimulate collaboration and knowledge sharing, and develop a feeling of belonging and purpose, because engaged people are more adaptive, inventive, and agile at work.

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# Does Entrepreneurial Orientation Matter in Corporate Ambidexterity: A Study of the Banking Sector in Jordan



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**Abstract** This manuscript investigates the impact of entrepreneurial orientation on corporate ambidexterity. The research relied on primary data gathered from 374 responses from commercial bank managers in Jordan. Structured equation modeling (SEM) was used to examine data and test hypotheses. According to the findings, the dimensions of entrepreneurial orientation, which were innovativeness, risk-taking, and proactiveness, positively impacted the corporate ambidexterity of commercial banks in Jordan. Hence, the manuscript provided a set of recommendations for bank managers that include encouraging a culture that values innovation and supports it on a large scale, including building an internal climate in which workers feel free to put forward and discuss new ideas, as well as experiment with modern methods to deal with the status quo.

**Keywords** Entrepreneurial orientation · Corporate ambidexterity · Banking sector · Jordan

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## 1 Introduction

Organizations are under constant pressure to innovate, adapt to change, and grab novel opportunities in the current rapid and aggressive economy. Entrepreneurial orientation has grown as a vital useful idea for efficiently overcoming these problems (Al-Abbadi et al. 2021; Al-Alwan et al. 2022a, b; Aityassine et al. 2021). Entrepreneurial orientation describes a company's strategic philosophy and set of processes that encourage entrepreneurial activity and encourage innovation (Alhalalmeh et al. 2022; AlHamad et al. 2022; Al-Hawary 2013a, b). Al-Hawary and Al-Syasneh (2020) stated that organizations with an emphasis on entrepreneurship have numerous benefits (Al-Hawary and Al-Syasneh 2020), including the ability to recognize emerging market trends, provide products and services that align with those trends, and respond quickly and flexibly to customer desires in order to stay ahead of the competition (Al-Hawary and Abu-Laimon 2013; AlTaweel and Al-Hawary 2021).

Corporate ambidexterity has arisen in the strategic context as an approach to addressing a business's ability to discover and invest in potential opportunities within a dynamic business environment by striking an appropriate balance between exploration and exploitation operations (Al-Hawary and Harahsheh 2014; Al-Hawary and Nusair 2017). Corporate ambidexterity acknowledges that companies must seek new paths for growth and creativity while maximizing the use of their present resources and competencies to sustain operational excellence (Al-Hawary et al. 2020; Al-Hawary and Al-Rasheedy 2021). However, as cited by Tariq et al. (2022), achieving corporate ambidexterity entails overcoming challenges such as silo structures, competing goals, and a reluctance to accept change.

Consequently, the purpose of this paper is to answer the question that follows: What effect does entrepreneurial orientation have on corporate ambidexterity in Jordanian commercial banks? This study attempts to give insight into the relevance of cultivating an entrepreneurial mentality inside commercial banks and its implications for their long-term performance by studying the connection between entrepreneurial orientation and corporate ambidexterity. By investigating this research problem, we may acquire useful insights into how commercial banks in Jordan might use entrepreneurial orientation to improve their flexibility, creative capabilities, and competitiveness. This knowledge will assist in the development of strategies and procedures that will enable banks to prosper in the dynamic banking landscape, putting them at the forefront of industry transformation.

## 2 Literature Review

### 2.1 *Entrepreneurial Orientation*

The fundamental concept of the entrepreneurial approach is reflected in the organization's strategy, including its morals and behaviour, that drive the exploration of new opportunities. Entrepreneurial orientation as a sequence of decision-making processes and actions that eventually lead to accessing new markets (Al-khawaldah et al. 2022; Al-Shormana et al. 2021). According to Al-Hawary and Al-Syasneh (2020), entrepreneurial orientation relies on the enterprise's readiness to execute novel initiatives and its effort to promote proactive habits that contribute to coping with the state of uncertainty (Al-Hawary and Al-Syasneh 2020). Moreover, entrepreneurial orientation is "a collection of strategic decisions that holistically represent the company's proactive position in the dynamic environment" (Al-Hawary and Al-Namlan 2018; Metabis and Al-Hawary 2013).

The majority of the researchers stated that entrepreneurial orientation could be measured through innovativeness, risk-taking, and proactiveness (Tariq et al. 2022; Boudlaie et al. 2022; Mukhlis et al. 2022). Innovativeness indicates the degree to which a company prioritizes and appreciates the process of developing, launching, and implementing new ideas for goods, services, or business models based on the investment of new technology (Al-Hawary et al. 2022; Mohammad 2020; Al-Rwaidan et al. 2023). It is a mental process that attempts to give new and improved solutions to changing consumer requirements, market opportunities, and internal challenges (Al-Hawary et al. 2023; Pallathadka et al. 2023). Risk-taking demonstrates the desire associated with the people's ability or organizations' willingness to embark on undertakings with unclear and perhaps counterproductive outcomes in pursuit of opportunities or strategic goals (MajdyAmiruddin et al. 2023). It entails making decisions with a high level of ambiguity, risk of loss, or exposure to unexpected occurrences or repercussions. Proactiveness is the tendency of people or organizations to take the initiative, predict potential opportunities or challenges, and take action in advance rather than just reacting to events or situations (Al-Alwan et al. 2022a; AlHamad et al. 2022; Alshuqairat et al. 2023). It includes actively searching for and generating chances rather than passively waiting for them to present themselves (Al-Hawary and Al-Namlan 2018).

### 2.2 *Corporate Ambidexterity*

Organizational ambidexterity is a strategic concept with roots in various managerial theories, including but not limiting organizational learning, disruptive innovation, and structural contextual theory (Tariq et al. 2022). Al-Khasswneh et al. (2023) defined corporate ambidexterity as a willingness to align and take advantage of an

enterprise's existing resources and skills while also investigating new opportunities and developing differentiated resources and capabilities (Al-Khasswneh et al. 2023). Corporate ambidexterity is essential for businesses operating in dynamic and uncertain contexts because it helps them to avoid the traps of focusing primarily on exploitation or exploration. Al-hawajreh et al. (2023) described corporate ambidexterity as "the ability to simultaneously manage two types of activities: those that involve the refinement and expansion of existing competencies (exploitation) and those that involve the exploration of new opportunities (exploration)" (Al-hawajreh et al. 2023). In this context, exploration is the quest for new possibilities, information, or ideas (Al-Husban et al. 2023). It comprises actions aiming at uncovering new markets, technologies, merchandise, or processes, as well as investigating unknown territory to produce fresh insights and opportunities (Al-Armeti et al. 2023). Exploitation involves the process of utilizing and maximizing existing resources, talents, expertise, and competitive advantage. It includes initiatives targeted at increasing the value and efficiency of existing operations, goods, services, or processes.

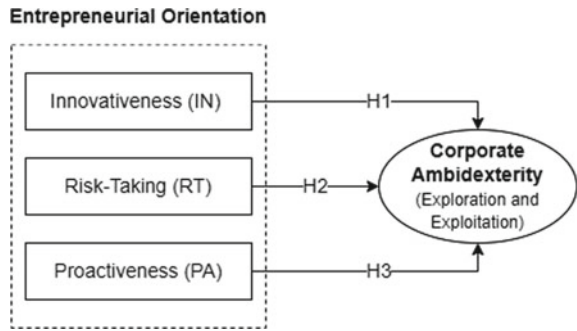
### ***2.3 Entrepreneurial Orientation and Corporate Ambidexterity***

Entrepreneurial orientation and corporate ambidexterity are notions that are closely connected since they may have a significant impact on a company's competitiveness and assure its survival in extremely turbulent circumstances. Al-Armeti et al. (2023) used data from 101 hotels to demonstrate the influence of entrepreneurial and market orientation on ambidexterity in the Jordanian hospitality business (Al-Armeti et al. 2023). The results of structural equation modeling revealed that entrepreneurial and market orientations influenced ambidexterity, with the entrepreneurial orientation having a greater impact on the exploitation dimension than the exploration dimension. Al-Husban et al. (2023) discovered by studying data from American manufacturing companies that entrepreneurial orientation affects the balance of exploration and exploitation within customer management and new product development in distinct ways (Al-Husban et al. 2023). Furthermore, when there is a greater combined proficiency in both customer management and new product creation, performance increases. Accordingly, the three research hypotheses that express the impact of entrepreneurial orientation dimensions on corporate ambidexterity could be proposed as follows:

*H1: Entrepreneurial orientation has a positive impact on corporate ambidexterity.*

Figure 1 demonstrates the proposed theoretical framework for the research and the hypotheses it seeks to verify.

Fig. 1 Proposed model



### 3 Methodology

#### 3.1 Population and Sample Selection

The current study follows a cross-sectional design based on a quantitative approach to collect primary data on the impact of entrepreneurial orientation on corporate ambidexterity of commercial banks in Jordan. Accordingly, the study population was determined, which consisted of managers of seven commercial banks listed on the ASE. Hence, the study instrument was disseminated simultaneously to a random sample of 418 managers via electronic means. At the end of the data collection process, 374 responses were obtained that fit the requirements of the statistical analysis. These responses accounted for 89.5% of the response rate, which indicates a fair representation of the target population and achieves the criteria for adequacy of sampling (AlBrakat et al. 2023).

#### 3.2 Research Tool

The electronic questionnaire was the main tool for collecting the primary data for this study. This tool consisted of an introduction that confirms the following research ethics and demonstrates the core objectives of the study. Besides, it contained a section for collecting demographic data of the respondents, along with two sections for its major variables. In the sections related to major variables, respondents were required to rate the items on the basis of a five-point Likert scale, which ranged from a minimum of 1 “strongly disagree” to a maximum of 5 “strongly agree”. A section was allocated to the independent variable, i.e., entrepreneurial orientation (EO), which contained (15) items taken from Al-Hawary and Al-Syasneh (2020). These items formed three dimensions: five items related to innovativeness (IN), five items related to risk-taking (RT), and five items related to proactiveness (PA). On the other hand, the last section of the study instrument contained the measures of the dependent variable, i.e., corporate ambidexterity (CA), which were evaluated using



eight items drawn from Tariq et al. (2022). The items of corporate ambidexterity formed two dimensions: exploration (ER) and exploitation (EL), with four items for each.

## 4 Findings

### 4.1 Measurement Model Evaluation

To evaluate the impact of entrepreneurial orientation on corporate ambidexterity, structural equation modeling (SEM) was relied upon as a modern approach to examine the interaction between latent constructs measured by observing variables (Dwijendra et al. 2023). The application of this statistical method requires subjecting the study instrument to a test of validity and reliability before conducting an evaluation of the effect size. Accordingly, confirmatory factor analysis (CFA), which is one of the SEM procedures using the AMOS software, was applied to extract the validity and reliability of a measurement model, which were reported in Table 1.

The loadings of entrepreneurial orientation and corporate ambidexterity items were between 0.664 and 0.846, indicating that they were all retained as they were above the lower threshold of 0.50 (Al-Lozi et al. 2018; Zahran et al. 2023). The average variance extracted (AVE) values for the research latent constructs were greater than 0.50, which means that they met the convergent validity condition (Al-Zyadat et al. 2022; Alolayyan et al. 2022). Moreover, the comparison results confirmed that the values of AVE were greater than the maximum shared variance (MSV), also, it indicated that the values of the square root of AVE (bold fonts in the table) were superior to the correlation coefficients between the other constructs in the

**Table 1** Results of validity and reliability tests

Constructs	1	2	3	4	5
1. Innovativeness	0.767				
2. Risk-taking	0.415	0.741			
3. Proactiveness	0.449	0.433	0.791		
4. Exploration	0.531	0.528	0.561	0.722	
5. Exploitation	0.502	0.516	0.588	0.564	0.757
VIF	1.627	1.395	1.524	–	–
Loadings range	0.664–0.824	0.702–0.771	0.751–0.846	0.684–0.758	0.733–0.792
AVE	0.589	0.549	0.626	0.522	0.573
MSV	0.415	0.436	0.462	0.458	0.411
Internal consistency	0.875	0.856	0.890	0.811	0.841
Composite reliability	0.877	0.859	0.893	0.813	0.843

model. These results are evidence of achieving discriminant validity according to the Fornell-Larcker criteria (Attiany et al. 2023). On the other hand, the reliability of the measurement model constructs was verified by using Cronbach alpha coefficients ( $\alpha$ ) for internal consistency and McDonald’s omega coefficients ( $\omega$ ) for composite reliability with a minimum of 0.70 for both measurements. According to the results in Table 1, the values of Cronbach’s alpha coefficients (0.811–0.890) and McDonald’s omega coefficients (0.813–0.893) were greater than 0.70, which indicates that the model constructs were reliable (Al-Alwan et al. 2022a).

### 4.2 Structural Model

Based on the results of Table 1, it became clear that there was no multicollinearity between the dimensions of entrepreneurial orientation, where the values of variance inflation factor (VIF) for those constructs were less than 5 (Muda et al. 2022; Harahap et al. 2022; Ashura et al. 2023). In this context, it is possible to continue testing the hypotheses through SEM shown in Fig. 2.

The results of Fig. 2 confirm that the structural model for examining the impact of entrepreneurial orientation on corporate ambidexterity of commercial banks in Jordan gained appropriate values of the goodness of fit. CMIN/DF was less than 3, the values of CFI and TLI were greater than 0.90, along with the value of RMSEA which was smaller than 0.08 (Rahman et al. 2023; Mohammad 2019; Mohammad et al. 2022, 2020; Al-Awamleh et al. 2022). Accordingly, the standardized and unstandardized effect parameters were extracted and listed in Table 1.

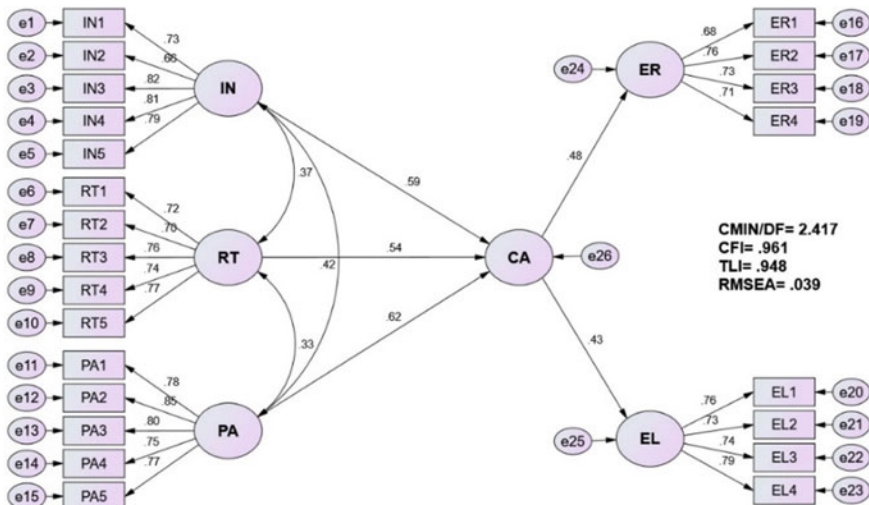


Fig. 2 SEM results of the entrepreneurial orientation and corporate ambidexterity

**Table 2** Hypothesis testing

Hypothesis	Relation	Standard Beta	<i>t</i> value	<i>p</i> value
H1	IN → CA	0.588	9.88	0.000
H2	RT → CA	0.541	8.86	0.000
H3	PA → CA	0.624	11.29	0.000

The results demonstrated in Table 2 show that that the highest impact was for proactiveness ( $\beta = 0.624$ ,  $t = 11.29$ ,  $p = 0.000$ ), followed by innovativeness ( $\beta = 0.588$ ,  $t = 9.88$ ,  $p = 0.000$ ), and finally the lowest impact was for perceived risk-taking ( $\beta = 0.541$ ,  $t = 8.86$ ,  $p = 0.000$ ). Thus, all the minor hypotheses of the study were supported based on these results.

## 5 Conclusion

The experimental evidence generated by this research revealed that the components of entrepreneurial orientation, i.e., innovativeness, risk-taking, and proactiveness, had a favorable influence on corporate ambidexterity in Jordanian commercial banks, which is compatible with (Ghantous and Alnawas 2020). As a result, the findings confirmed that banks with a strong orientation toward adopting initiative strategies may have a greater ability to attain harmony by offering innovative products and services, modifying to market evolves, and effectively responding to customer demands within the dynamic business landscape. Banks that encourage an autonomous culture and empower employees to make decisions might offer distinctive banking products by increasing creative capabilities and improving systematic thinking skills to analyse the business environment, whether internal or external, to extract opportunities and new ideas. Additionally, qualified banks that are suited to the highly competitive business climate and can adapt to estimated risks are more likely to monitor opportunities and invest in them through complex business models based on aggressive strategies for expanding their markets.

Based on the positive impact of entrepreneurial orientation on the corporate ambidexterity of Jordanian commercial banks, a variety of suggestions and recommendations were made to banks' managers in order to maximize the potential of entrepreneurial orientation activities. First, a culture that appreciates and supports innovation must be extensively encouraged, which includes building an internal climate in which workers feel free to bring up and discuss new ideas, as well as experimenting with modern approaches to cope with the status quo. Second, offering chances to employees for ongoing learning and development to sustain substantial levels of entrepreneurship, such as training courses, workshops, and access to industry insights and trends, equips workers with the skills and information required to remain nimble in a fast-changing banking sector. Finally, they should prioritize

recognizing their consumers' requirements and preferences, actively soliciting input, and incorporating it into their product and service development processes.

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# Impact of Electronic Human Resources Management Practices on Employee Commitment in Five Stars' Hotels in Jordan



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**Abstract** The aim of this reaearch was to examine the impact of electronic human resource management practices on employee commitment in five stars' hotels in Jordan. The study's population was comprised of employees of several hotels. 385 surveys were gathered, with 373 of them being valid for analysis. Multi-regression was employed to test hypotheses. The study findings indicated that there is an impact of E-HRM practices on employee commitment in Jordan's five-star hotels. In light of the findings, the researcher proposes that managers increase their investment in E-HRM and improve e-compensation.

**Keywords** Electronic human resources management practices · Employee commitment · Five-stars hotels · Jordan

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## 1 Introduction

The world's complexity has been increasing in recent years because of ongoing developments. Some changes are beneficial, while others are detrimental, in the business world, contemporary theoretical philosophy agrees that the human factor must be considered. The reason for this is that this factor is more significant than any others in the corporate world, such as information. In the business world, it is recognized that the extent to which human resources management is taken care of is a metric of success for organizations and institutions. An important element of the success of any organization's performance is human resource management (HRM). Senior leaders, in particular, have become increasingly conscious of the critical role that human resources play (Al-Lozi et al. 2018; Alqahtani et al. 2023; Dwijendra et al. 2023; Shamaileh et al. 2023). Therefore, HR professionals need to adjust to the increased competition, shifting employee attitudes, and quickening technological advances in HR (Al-Abbadi et al. 2021; Al-Hawary and Abu-Laimon 2013; Al-Hawary and Obiadat 2021; Khalayleh and Al-Hawary 2022; Mohammad 2019). The rise of electronic human resources management idea has been affected by HRM functions. In the study literature, it's referred to as electronic HRM, although it's more commonly referred to as electronic HRM in the application. Electronic human resources management might be briefly described as the managerial support of the Human Resource activity in firms using technology, according to experts (AlBrakat et al. 2023a, b; Al-Rwaidan et al. 2023; Attiany et al. 2023; Zour and Al-Moula 2021).

It was a widely held belief, according to AlTaweel and Al-Hawary (2021), Al-Awamleh et al. (2022), Al-Hawary and Alhajri (2020), Al-khawaldah et al. (2022), that insufficient pay, fewer benefits, fewer opportunities for advancement had caused them to become emotionally and psychologically disconnected from the organization. As a result, the staff is unmotivated, resulting in the department's poor performance (Al-Armeti et al. 2023; Al-Hawary and Al-Rasheedy 2021).

Employee commitment, therefore, is critical in establishing the organization's development, it can be argued that it is an extremely significant as well as a non-material asset that every company should possess in order to succeed. As a result, it is critical for every organization's management to improve it, since it is part of the variables that determine a company's success, and employee commitment to the organization is critical in the hotel sector to make sure people receive effective and efficient care. As a result, this study on E-HRM practices and their impact on employee commitment in five stars' hotels in Amman, Jordan is required (Alhalalmeh et al. 2022; Al-Hawary 2013b; Al-Hawary et al. 2020b; Eldahamsheh et al. 2021; Mohammad et al. 2020). Primarily, the hospitality business is heavily reliant on the human aspect and the definition of HRM led to a clearer understanding of the contribution that the staff can provide to an organization's overall objectives, as well as how it can be nurtured and developed to achieve the greatest worth for competitive advantage (Alhalalmeh et al. 2022; Al-Hawary et al. 2017; Al-Nawafah et al. 2022;



Metabis and Al-Hawary 2013). The goal of this study was to investigate the impact of e-HRM practices on employee commitment in five stars' hotels in Amman, Jordan.

## 2 Literature Review and Hypotheses Development

### 2.1 Human Resources Management (HRM)

HR is recognized as critical to any organization's success, which cannot be duplicated by rivals and has an impact on efficiency (Aldaihani et al. 2023b; Al-Hawary et al. 2020b; Mohammad et al. 2023; Rahamneh et al. 2023). Since human resources is a support department responsible for handling the human resources of an organization, its procedures and regulations affect employee satisfaction, which subsequently in turn impacts performance (Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2022). Due to a shortage of the latter capabilities inside HR activities, the HR team will most likely be unable to offer the necessary enhancements in service delivery to effect the reforms (Alolayyan et al. 2018, 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021).

E-HRM is a new strategy for lowering expenses and increasing the organization's sufficiency and productivity, resulting in the organization's survival and success. According to Alkhawaldeh et al. (2023), the use of e-human resources management activities has a favourable influence and is very important in reducing expenses and enhancing the employees' productiveness (Al-Adamat et al. 2023b; Al-Alwan et al. 2022b; AlHamad et al. 2022; Alkhlifat et al. 2023), Electronic-HRM concentrates on any and all business and operational processes and all material of common HRM throughout technology, according to Al-Hawary et al. (2020a) to make HRM processes unique, stable, effective, and of great quality, establishing lengthy chances inside institutions. The term "EHRM" has several definitions, including an internet system that delivers services for the EHRM when you really need them using the latest website technology (Al-Armeti et al. 2023; Al-Shormana et al. 2021) (Table 1).

With the huge number of studies on e-HRM practices, many researchers identified e-HR management practices dimensions in order to fit the nature and types of their

**Table 1** EHRM definitions

Study	EHRM
Al-Saidi and Ala'a (2020)	"e-HR is the use of digital technologies in the form of web applications including computers, software, technologies, cloud, automated chat software, social media, smartphones and a series of processes that help provide HR services"
Shaqrah et al. (2023)	"e-HRM is a method of executing HR techniques, arrangements, and practices in associations through a cognizant and coordinated help of and additionally with the full utilization of technology-based channels"

study. Table 2 demonstrates the electronic human resources management dimension according to the author's perspective.

According to Table 2, the researcher adopted these dimensions under electronic human resources management.

**E-recruitment:** E-recruitment, often referred to as virtual recruiting, is the process of using the internet to find suitable candidates for available positions in an organization (Al-Hawary and Aldaihani 2016; Al-Hawary and Obiadat 2021). Also, the posting of job openings on a company's website or on an online recruitment website is known as online recruitment (Al-Abbadi et al. 2022). **E-training:** E-training contributes to determining and recognising an organization's capabilities, as well as the establishment of training initiatives for employees, including the ability to distribute and re-distribute jobs depending upon their abilities and knowledge (Al-Lozi et al. 2018).

**E-compensation:** It incorporates all workers' payment data in the business, whether employees working on internally or externally arrangements such as experts, and workers working on daily or any other method the institution used (Al-Abbadi et al. 2021; Alhalalmeh et al. 2022; Al-Hawary and Al-Rasheedy 2021; Alolayyan et al. 2023; AlTaweel et al. 2023; AlTaweel et al. 2023). **E-performance appraisal:** According to Al-Hawary and Al-Syasneh (2020) and Alshuqairat et al. (2023) it's a web-based assessment software can be characterized as a platform that evaluates workers' abilities, experience, and performance using the web (AlHamad et al. 2022).

**E-communication:** E-Communication is defined by Alkhawaldeh et al. (2022) as communication that is carried out using electronic methods. Under other circumstances, e-Communication, particularly e-mail, has become the dominant mode of communication, with e-mail being the preferred mode of communication. In businesses, e-mail usage is estimated to be around 75% (Al-Hawary and Abu-Laimon 2013).

## 2.2 *Employee Commitment*

Due to rising and evolving needs, practical technological development has resulted in the creation of new jobs and positions. Therefore, it can be difficult to find people who are committed and knowledgeable enough for these newly available positions. These factors have led to a requirement for employee commitment to be included in crucial centralized objectives and raised the aspect of fulfilment needed to retain employees (Al-Hawary and Al-Syasneh 2020; Alshura et al. 2023a). Employee commitment, according to Al-Hawary and Al-Rasheedy (2021) entails an organizational individual's loyalty and readiness to exert greater efforts on behalf of a certain organization. Employee commitment, Some authors deemed how engaged individuals were in their jobs and how devoted they were to the Alhalalmeh et al. (2022), and it is defined as a staff's ability to acknowledge within an organization by defining success factors along with a firm belief in the organization's aims and principles, and their recognition to be a tenacious part of that organization.

**Table 2** EHRM

Authors	E-learning	E-recruitment	E-selection	E-communication	E-compensation	E-training	E-performance	E-job analysis	E-advertising	E-leave	E-personal profile	E-planning	E-development
Khashman and Al-Ryalat (2015)	*	*	*	*	*	*	*						
Islam and Azid (2018)	*	*	*	*	*	*	*		*	*	*		
Kamble (2018)	*	*	*	*	*		*	*			*		

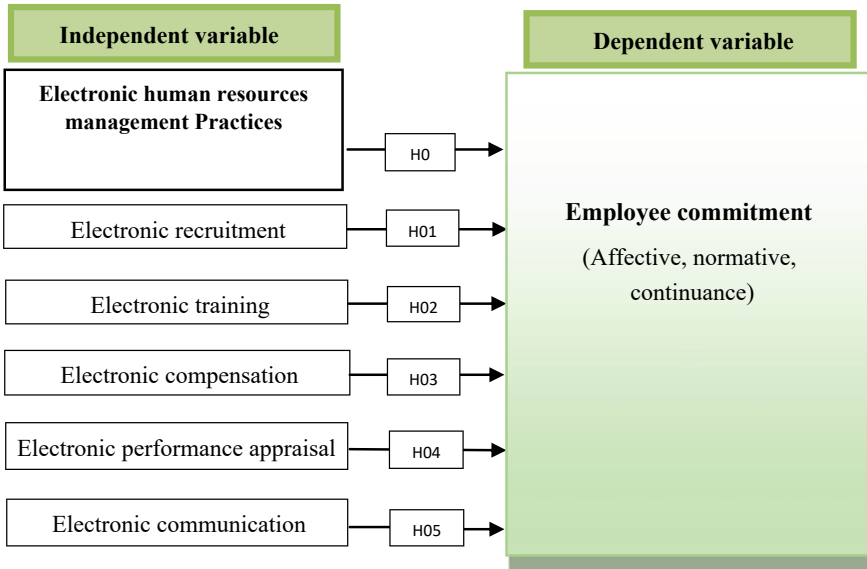
Employee commitment is critical as extremely high levels of commitment result in a small number of notable hierarchical consequences. It demonstrates the degree to which employees identify with the organization and adhere to its objectives (Al-Hawary and Al-Rasheedy 2021). Moreover, if an employee receives what he wishes from the company, his willingness to work will rise, but he will also experience unhappiness because the labour is monotonous and the pay is insufficient to cover his needs (Al-Abbadi et al. 2021). Meyer and Allen have accomplished pioneering commitment research in the literature (Al-Hawary and Al-Rasheedy 2021), They separated employee commitment into three categories which are affective, continuance, and normative (Meyer and Allen 1991).

**Affective Commitment:** It is the most familiar type Employees' feelings of affective commitment are defined as liking what they do as well as aligning with the organization's values and aims. So, it refers to an emotional relationship between workers and the organization (Al-Hawary and Al-Syasneh 2020). **Continuance Commitment:** Continuous commitment is the second type of commitment, it is a commitment based on the price associated with leaving a certain organization. The possible cost of leaving a company includes the risk of squandering time and effort learning skills and losing alluring advantages. **Normative Commitment:** The third type which workers demonstrate since they feel it's right or morally correct. Above everything, commitment aids in employee retention inside the company (Rehman et al. 2020). Incentives and perks should be offered by companies to ensure that their staff stays committed.

### 2.3 *EHRM and Employee Commitment*

According to Waheed et al. (2020) the way that employees view the system and the resources that are available within the company have a big impact on how well e-HRM is implemented: human, fiscal, and technological resources. Management must encourage a culture of technology ease of use inside the firm to ascertain end-user commitment and participation in the projects (Kamble 2018), make personnel informed of the objectives and advantages of e-HRM and incorporate them into the project's planning, execution, and development (Kamble 2018). Similar to this, workers should have the right tools as software and technological equipment as well as training and support in case of issues (Al-Hawary and Al-Rasheedy 2021). End-users must experience a decrease in effort, improvement, and simplicity of HRM processes through the use of e-HRM solutions in order to recognize the advantages of this technology (Kamble 2018). Based on literature above, the study hypotheses can be formulated as:

**H1: There is an impact of electronic human resources management practices on employee commitment in five stars' hotels in Jordan**



**Fig. 1** Study model

### 3 Study Model

See Fig. 1.

## 4 Methodology

### 4.1 Study Sample

The study's population comprised employees from five-star hotels, and the data was collected using a convenience sample approach. It is a sort of non-probability sampling approach that collects data from members of the population who are conveniently accessible to engage in the study during the data collection period, and every person was invited to participate in the study. Where (450) questionnaires were handed out to employees of five-star hotels in Amman, 385 questionnaires were gathered, and 373 of them were valid for analysis.

## 4.2 Study Instruments

The questionnaire was split into three parts:

- (i) Demographic section which includes (Gender, Age, Experience, Educational level, and Employment level).
- (ii) Independent variable dimensions representing five dimensions;
  - **Electronic recruitment** (ER) Q1-4
  - **Electronic training** (ET) Q5-8
  - **Electronic compensation** (EC) Q9-12
  - **Electronic performance appraisal** (EPA) Q13-16
  - **Electronic communication** (Eco) Q17-20
- (iii) Dependent variable, includes;
  - **Employee commitment** (EmC) Q21-32

## 4.3 Validity

The study instrument was tested after being created by a group of experts in the field, since the questionnaire was given to numerous subject-matter experts after the researcher created it, and they were distributed among the universities. The committee reviews the questionnaire and makes notes on its suitability for the study's objectives, the degree to which the paragraphs relate to the dimensions the researcher has addressed, where the paragraphs should be added, deleted, or modified, and more. The committee then sends the researcher the notes so they can prepare a final copy before testing the questionnaires' validity from the point of construction (Majdy et al. 2023; Zahran et al. 2023).

## 4.4 Reliability Test

The reliability of the study tool (instrument) was evaluated using the Cronbach Alpha test. According to Table 3, the alpha value ranged from (0.7 to 0.834), indicating that the study instrument is appropriate for use in scientific research since it is greater than (0.6) (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Harahap et al. 2022; Zikmund et al. 2010).

**Table 3** Reliability test

Variable	Cronbach's alpha	No. of items
Electronic recruitment (ER)	0.7	4
Electronic training (ET)	0.802	4
Electronic compensation (EC)	0.710	4
Electronic performance appraisal (EPA)	0.743	4
Electronic communication (Eco)	0.717	4
Employee commitment (EmC)	0.834	12
All	0.916	32

## 4.5 Normality

The distribution of study variables has been tested using the normality test for skewness and kurtosis indicators. The findings demonstrate that the study variables are regularly distributed because all Skewness and Kurtosis values were between ( $-3$  to  $3$ ) (Table 4).

**Table 4** Normality test

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig	Statistic	df	Sig
Electronic recruitment (ER)	0.224	235	0.098	0.943	235	0.122
Electronic training (ET)	0.213	235	0.112	0.933	235	0.356
Electronic compensation (EC)	0.232	235	0.107	0.914	235	0.174
Electronic performance appraisal (EPA)	0.252	235	0.087	0.926	235	0.114
Electronic communication (Eco)	0.218	235	0.118	0.931	235	0.311
Employee commitment (EmC)	0.227	235	0.102	0.911	235	0.155

<sup>a</sup> signifies less than or equal 0.01

**Table 5** Multi-collinearity test

Variables	Tolerance	VIF
Electronic recruitment (ER)	0.565	1.770
Electronic training (ET)	0.463	2.161
Electronic compensation (EC)	0.473	2.113
Electronic performance appraisal (EPA)	0.409	2.444
Electronic communication (Eco)	0.697	1.434

## 4.6 Multicollinearity

A multi-collinearity test should be taken into account while evaluating multiple regression analyses (AL-Zyadat et al. 2022; Dwijendra et al. 2023; Mukhlis et al. 2022; Rahamneh et al. 2023). In multiple regression analysis, multi-collinearity is a statistical phenomenon that occurs when there is a strong correlation between one or more independent variables and one or more other independent variables. High levels of correlation (either positive or negative) among two or more independent variables are a sign of multi-collinearity (Al-Adamat et al. 2023a, b; Al-Hawary and Al-Smeran 2017; Saraireh et al. 2022; Shaqrah et al. 2023).

The most often utilized metrics to evaluate multi-collinearity are the Variance Inflation Factor (VIF) and measurement of the tolerance in this (Al-Rwaidan et al. 2023; Mohammad 2019). As shown in Table 5 indicates that the tolerance for all independent variables is larger than 0.10, and VIF values are less than 2.5, so it concluded that multi-collinearity is not a cause of concern in the regression analysis within collected data.

## 5 Hypotheses Test

Multiple regressions were used since they are thought to be a method that aids in predicting the value of the dependent variable or outcome from the independent ones. This was done in order to evaluate the primary research hypothesis (H0).

Table 6 indicates that R values = (0.0.607) which refers to the correlations of the independent variable electronic human resources management practices (ER, ET, EC, EPA, Eco) and the dependent variable employee commitment. According to the table, the association between these factors is considerably positive. The goodness of fit of the model was then determined. The coefficient of determination, often known as R square, is the percentage of the variation in the dependent variable that may be explained by changes in the independent variable. The R<sup>2</sup> was (0.369), indicating that electronic human resource management methods (ER, ET, EC, EPA, Eco) may explain and foresee 36.9% of the variation in the employee commitment variable. However, we can see from the table above that the significant value equals (0.00), therefore it is less than 0.05, which means that there is a significant impact of EHRM



**Table 6** Multiple regression

Model	Standardized coefficients beta		t	Sig	R	R2	F	Sig (P value)
1	ER	0.107	1.966	0.050	0.607	0.369	42.9	0.00
2	ET	0.190	3.123	0.002				
3	EC	- 0.012	- 0.193	0.847				
4	EPA	0.230	3.549	0.000				
5	Eco	0.232	4.670	0.000				

(ER, ET, EC, EPA, Eco) on employee commitment in five stars hotels’ in Jordan at level ( $\alpha \leq 0.05$ ).

## 6 Discussion

Several research has confirmed the concept that E-HRM has a considerable and favourable impact on other characteristics. Khashman and Al-Ryalat (2015) examined the impact of E-HRM dimensions on business performance and found an impact of E-HRM on operational performance. It is also indicated that Electronic HRM has a substantial favourable link with the technological and strategic effectiveness of Human Resources. According to the findings of the study, electronic recruiting has a wide and beneficial impact on employee commitment. This signifies that the hotel’s services exceed employee expectations. The present study’s high level of e-recruitment may be explained by looking at the measure of employee commitment to the service. Previous research such as AlHamad et al. (2022) and Wege et al. (2019) have validated this finding. This may be due to the fact that the aim of electronic training is to enable working people at various levels of employment and administration to complete their tasks and adhere to job criteria using some ingenuity and imagination.

Numerous earlier research have demonstrated the key impact of e-training on a variety of aspects. A study conducted by AlHamad et al. (2022) within the telecommunications sector, found that these companies achieved a global competitive advantage through their application of e-training and gives the employee the required skills. Unlike other studies where was found a significant value of e-compensation, such as Zour and Al-Moula (2021) indicated the most result of the researcher that the Iraqi Ministry of Health is implementing various e-HRM methods, including e-compensation. Another finding of the study is that electronic performance appraisal of HR can significantly and favourably impact employee commitment. The result is consistent with those of earlier studies. Researchers such as AlTaweel and Al-Hawary (2021) have discovered in their research that performance evaluation and other activities enhances the electronic connectivity of integration in performance

and achievement. Performance evaluation of employees is a crucial issue in this regard and the importance of e-performance appraisal, on the other hand, cannot be overstated, particularly in large organizations with a huge workforce such as hotels. Employee commitment is significantly and positively impacted by e-communication. This means the services that the hotel provides highly meets employee expectation. The finding is consistent with the results of previous studies. Researchers concluded in their researches that e-communications should be incorporated into the working method for employees to have a strong knowledge of the function of leaders in prevailing mental ability and favourable working results (job satisfaction, organizational commitment, and job performance). Also Karunarathna (2020) found that e-communication has a positive impact on employee job performance.

## 7 Recommendations

Considering its findings, it is possible to recommend managers and decision makers of five-star hotels to enhance their investment in the E-HRM system since it is crucial to improving performance and will give them a competitive advantage in the rapid change in the business environment, and to promote greater use of E-HRM applications, workers of five-star hotels should be made fully aware of E-HRM results in terms of effective HRM procedures, improved service delivery, and strategic contribution, as well as the actual use of E-HRM systems. Technology must be used to give comprehensive and sufficient information about compensation in order to improve e-compensation at five-star hotels. Moreover, creating and distributing a pamphlet on the pay system that explains employee pay and perks. Human resource e-communication is a significant factor in this study. Hence, it is advised that managers of five-star hotels create conducive conditions for e-communication in order to improve the hotel's connections and the ability for staff members to share training materials.

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# Impact of Human Resources Practices on Employees Organizational Commitment at Jordanian Private Hospitals



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**Abstract** The objective of this research is to test the effect of human resource management practices on organizational commitment. The study population consisted of doctors working at Jordanian private hospitals, which are located in the capital of Jordan (Amman) that provide healthcare services. Structural equation modeling (PLS-SEM) was used to analyze the hypotheses. The results of the study showed a significant impact of human resource management practices on organizational commitment. The researchers recommend managers to provide training for employees as a form of support for them by management, which makes them more committed to their organizations.

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**Keywords** Human resource management practices · Organizational commitment · Private hospitals · Jordan

## 1 Introduction

Organizations are living these days through the struggles of the technological revolution and the introduction of many administrative concepts that have become operational. With the developments taking place in the fields of technology, such as the entry and spread of the Internet and the development in communication, organizations became faced with the option of digital transformation, which contributed to reducing the size of the human resource and required organizations to work to pay attention to the human element by improving its capabilities and working to raise the level of loyalty towards the organization (Alkhlifat et al. 2023; Alqahtani et al. 2023; Dwijendra et al. 2023; Shamaileh et al. 2023).

All sectors' development and advancement need to focus on human resources since human capital is seen as a competitive advantage due to the skills, experience, and abilities it possesses (Al-Hawary and Obiadat 2021; Al-Hawary 2013a; Khalayleh and Al-Hawary 2022; Mohammad 2019). Improving organizational commitment, especially among human resources, advocates them to be imaginative and differentiated for achievement of organizational commitment is critical in influencing worker behaviour that leads to improving productivity and thus accomplishing its goals (AlBrakat et al. 2023; Al-Rwaidan et al. 2023; Attiany et al. 2023; Zahran et al. 2023).

Organizational commitment is represented by the employee's reaction to the goals of the organization to which he relates, as well as the employee's sense of adherence to the organization's or institution's goals and values, and the role he plays in achieving these goals, and commitment to job values for the sake of the organization rather than his own interests (Aityassine et al. 2022; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-khawaldah et al. 2022; AlTaweel and Al-Hawary 2021). The worker who believes in the importance of the organization's goals often generates a positive sense of loyalty to him and a strong desire to stay in the business (Al-Armeti et al. 2023; Al-Hawary and Al-Rasheedy 2021). He also looks at organizational commitment as a multi-dimensional concept with which various factors, outputs, and contents of human resource management are linked (Alhalalmeh et al. 2022; Al-Hawary 2013b).

Organizations must focus on the issue of organizational commitment, given the strength of its association with achieving the goals of the organization and improving performance. Improving performance and achieving sustainability are the challenges facing organizations, regardless of their commodity or service activities or whether their markets are local or global (Alhalalmeh et al. 2020; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Metabis and Al-Hawary 2013). Hence, organizational commitment includes three pillars: belief in organizational goals, desire to do more, and

loyalty to the organization (Eldahamsheh et al. 2021; Mohammad 2020; Tariq et al. 2022).

## 2 Theoretical Literature and Building Study Hypotheses

### 2.1 HR Practices

In order to identify HRMP that were used in previous studies, a review of the theoretical literature shows that there are many studies that have been concerned with studying the relationship between HRMP and other variables such as organizational commitment, organizational performance, and productivity in particular (Aldaihani et al. 2023b; Al-Hawary et al. 2023; Mohammad et al. 2023; Rahamneh et al. 2023). HRMP, which may be represented in the systems of incentives and rewards, appointment and selection, the formation of work teams, the provision of job security, training, and development (Harahap et al. 2022; Mohammad 2020; Mohammad et al. 2022). HRMP, including training and learning, employee participation in decision-making, work analysis, and employee performance evaluation (Alolayyan et al. 2018, 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021). The practices used in the study include:

**Human resource planning:** This practice is one of the practices that contribute to enhancing innovation and organizational creativity (Al-Adamat et al. 2023b; Al-Alwan et al. 2022a, b; AlHamad et al. 2022; Al-Hawary et al. 2020). **Recruitment and selection:** In conducting this practice, informing the candidates of the results of the selection process, and the appropriateness of selection tests to measure the knowledge and experience of job candidates, in addition to the diversity of the selection tools used such as interviews and tests (Al-Armeti et al. 2023; Al-Shormana et al. 2021). **Compensation and incentives:** This practice is represented by the employee obtaining fair compensation, wages, additional incentives, bonuses, and promotions (Al-Hawary and Obiadat 2021; Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016) used paragraphs related to the following: designing pay systems, designing incentive systems, designing promotion and transfer systems, and designing employee performance appraisal systems, in addition to setting rules of order and behavior (Alolayyan et al. 2023; AlTaweel et al. 2023). **Performance appraisal:** performance appraisal results in employee development plans, bonuses, and job promotions, and the extent to which the performance appraisal process is conducted periodically (Al-Abbadi et al. 2021; Alhalalmeh et al. 2022; AlTaweel et al. 2023; Mohammad et al. 2020). **Training and development:** Metabis and Al-Hawary (2013) argue that training is a type of investment in the employee to enhance the level of skills and experience. The role of training is not limited to improving individual performance but will be reflected in the performance and productivity of the organization as a whole (AlHamad et al. 2022; Al-Hawary and Obiadat 2021; Al-Hawary and Abu-Laimon 2013; Alshuqairat et al. 2023).

## 2.2 *Organizational Commitment*

Barney states that researchers focus on the way in which the employees of the organization are able to form together a distinctive source of competition that cannot be imitated by competing. The consequences of an organization with low-commitment employees are costly, and therefore this matter requires attention from the organization's management (Al-Hawary and Al-Syasneh 2020; Alshura et al. 2023a, b).

The concept of organizational commitment is based on the reciprocal relationship that binds the organization to its members, as each party requests something from the other and offers it in return (Al-Hawary and Al-Rasheedy 2021; Al-Lozi et al. 2018). The organization provides the right environment for its members to practice their skills and abilities and satisfy their needs. The natural result of this is an increase in trust between the organization and individuals, which in turn leads to an increase in their organizational commitment, their level of trust, and thus a decrease in their level of organizational commitment (Al-Abbadi et al. 2021; Al-Hawary and Al-Rasheedy 2021).

Al-Hindawi (2023) defines organizational commitment as "belief in the cause for which the organization dedicates itself, in the goals it takes, and in the perceptions of reaching these goals, which is the complete readiness to join the organization in accordance with this belief and bear all the consequences and responsibilities resulting from that, and to carry out all the required tasks and duties and adhere to political positions, and the basic system and the decisions taken in accordance with the rules of the organization". Meyer and Allen (1991) have noted that many definitions of organizational commitment converge in being "a psychological situation that characterizes the employee's relationship with his organization and has implications for his decision to continue with the organization." Meyer and Allen (1991) indicated that it is possible to understand the employee's relationship with the organization by analyzing the three types mentioned together. The two scholars also believe that the distinction between the concepts of emotional, continuity, and habitual refers to completely different causes in addition to the different trends and behavioral results of the three components (Alhalalmeh et al. 2022; Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017). Meyer and Allen has developed a measure of organizational commitment with its three dimensions through an emotional commitment scale (ACS), a normative scale (NCS), and a continuous scale (CCS) in order to measure complex commitment.

### 2.3 HR Practices and Organizational Commitment

Alhalalmeh et al. (2020) concluded that compensation and moral appreciation systems, as well as assigning the employee additional tasks that include great challenges (challenging assignments), in addition to training and development, significantly affect organizational commitment. While the study of Al-Abbadi et al. (2021) indicated that perceived organizational support affects the achievement of emotional and functional organizational commitment, Alshura et al. (2023a) also conducted a study with the aim of identifying the factors influencing organizational commitment, which were represented by bank employees in Pakistan, and concluded that material and moral rewards are among the most important factors influencing organizational commitment, in addition to opportunities for career development and special support for balancing work and family. Based on above literature review, the study hypotheses can be as:

*H1: There is an impact of HRP on organizational commitment (OC) in Jordanian private hospitals.*

### 3 Study Model

See Fig. 1.

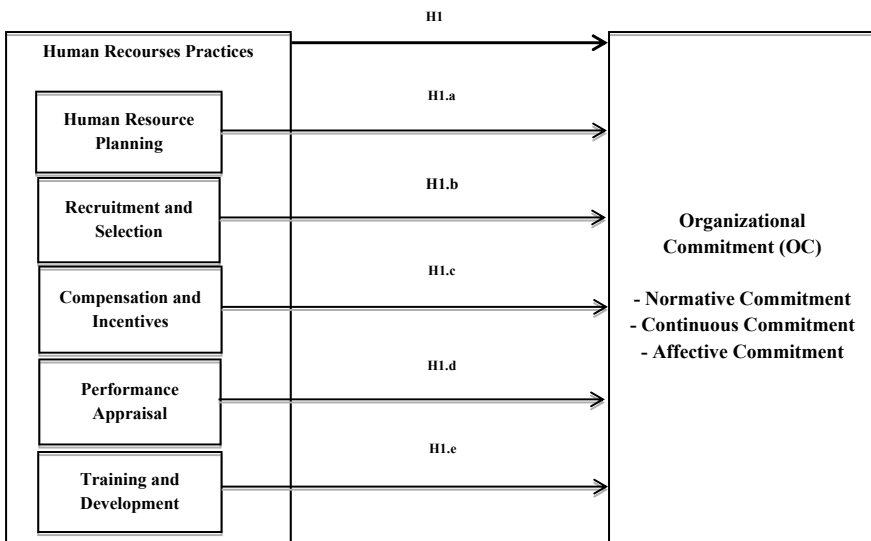


Fig. 1 Proposed model

## 4 Methodology

### 4.1 *Sample and Population*

The target population was the employees of Jordanian private hospitals located in the capital of Jordan. A final sample consisting of (424) valid responses for analysis, whereby they had obtained appropriate indicators after preliminary tests were conducted on it. To test the hypotheses, partial least squares structural equation modeling (PLS-SEM) was applied via the software SMART-PLS.

### 4.2 *Measurement*

The electronic questionnaire of the current study included items distributed into two parts, In general, the questionnaire contained 35 items formed the measurement model to test the impact of human recourses practices on organizational commitment, which was borrowed from relevant literature. Human recourses practices (HRP) formed the first part of the questionnaire with 20 items that were taken from the study (Al-Hawary and Al-Rasheedy 2021). Items for human recourses practices deployed on five dimensions as follows: four items for human resource planning (HP), four items for recruitment and selection (RS), four items for compensation and incentives (CI), four items for performance appraisal (PA), and four items for training and development (TD). On the other hand, the second section included 15 items for measuring organizational commitment (OC), which correspond to Alhalalmeh et al. (2022). These items were distributed into three dimensions: five items for normative commitment (NC), five items related to continuous commitment (CC), and five items related to affective commitment (AC).

## 5 Results

### 5.1 *Measurement Model Analysis*

The constructs of the measurement model were ascertained by indicators of validity and reliability (Al-Zyadat et al. 2022; Boudlaie et al. 2022; Hair et al. 2011). To retain items within the measurement model, loading values must exceed 0.60 (Al-Adamat et al. 2023a, b; Al-Hawary and Al-Smeran 2017; Shaqrah et al. 2023; Tan et al. 2017). Composite reliability (CR) was used to evaluate the reliability of the combinations with a minimum score of 0.70 (Hair et al. 2010, 2017, 2021). Convergent validity is applied to determine whether a given item expects a latent variable other than the one to which it belongs (Tan et al. 2017; Urbach and Ahlemann 2010). On the

other hand, it evaluates the measure of change achieved by the constructs as a result of the variance of the determinant related to the estimation error. The convergent validity of this measurement model was assessed by the average variance extracted (AVE) with a minimum threshold of 0.50 (Fornell and Larcker 1981; Henseler et al. 2015; Tan et al. 2017). Table 1 lists the results of convergent validity and reliability for evaluating a measurement model for examining the impact of human recourse practices on organizational commitment.

Table 1 results show that the items (RS34, PA4, NC5, and AC5) were cancelled from the measurement model as a result their loadings values did not meet the required condition, whilst the rest items were retained as their loadings exceed 0.60, which is the minimum required limit. The composite reliability values were within the range of (0.867–0.938), which means that they were higher than 0.70 and confirm the reliability of the current study's measurement model (Al-Rwaidan et al. 2023; Hair et al. 2017; Muda et al. 2022). On the other hand, the results showed that the values of AVE ranged from 0.648 to 0.792. This result indicates support for instrument convergent validity as a result of its superiority over the lower threshold of 0.50 (Hair et al. 2017; Saraireh et al. 2022). The researchers also implemented a discriminant validity analysis based on comparing the square root of the AVE value for each variable with the correlation coefficients between others (Barclay and Lloyd 1996; Fornell and Larcker 1981; Harahap et al. 2022). Table 2 indicates the results of evaluating the discriminant validity of the measurement model according to the Fornell-Larcker criterion.

The results in Table 2 demonstrated that the values of the square root of AVE were greater than 0.70, and they exceeded all correlation coefficients between the rest of the variables. This result fulfills the Fornell-Larcker criteria. Indeed, evaluating the discriminant validity of the measurement model using the PLS-SEM approach in addition to the previous technique entails extracting a matrix Heterotrait-Monotrait Ratio (HTMT) (Table 3).

The values of HTMT for all measurement model constructs were between 0.109 and 0.846, therefore, they were less than the threshold value of 0.85 (Franke and Sarstedt 2019; Hair et al. 2017; Pallathadka et al. 2023), which necessitates considering the measurement model to have appropriate discriminant validity (Henseler et al. 2015).

## 5.2 Structural Model Analysis

The structural model of the studies consists of latent constructs, i.e., variables, and the paths that link them, which indicate the size of the effect between those constructs (Hair et al. 2017). Figure 2 reveals the standard estimation of the structural model of the study. It presents the effect between human recourse practices on organizational commitment, along with an explanation of the impact of each dimension of human recourse practices on organizational commitment within the limits of path

**Table 1** Reflective measurements model—a summary

Constructs	Indicators	Convergent validity			Internal consistency reliability	
		Loading	Rho_A	(AV)	Composite reliability (CR)	Cronbach's alpha (CA)
		> 0.60	> 0.50	> 0.50	0.70–0.90	0.60–0.90
<i>Human Recourses Practices (HRP)</i>						
Human Resource Planning (HP)	HP1	0.862	0.899	0.768	0.930	0.899
	HP2	0.890				
	HP3	0.889				
	HP4	0.863				
Recruitment and Selection (RS)	RS1	0.806	0.817	0.710	0.880	0.800
	RS2	0.857				
	RS3	0.864				
Compensation and Incentives (CI)	CI1	0.905	0.913	0.792	0.938	0.912
	CI2	0.890				
	CI3	0.880				
	CI4	0.883				
Performance Appraisal (PA)	PA1	0.853	0.811	0.687	0.867	0.771
	PA2	0.901				
	PA3	0.722				
Training and Development (TD)	TD1	0.926	0.909	0.762	0.927	0.895
	TD2	0.884				
	TD3	0.871				
	TD4	0.804				
<i>Organizational Commitment (OC)</i>						
Normative Commitment (NC)	NC1	0.870	0.840	0.678	0.893	0.839
	NC2	0.857				
	NC3	0.836				
	NC4	0.721				
Continuous Commitment (CC)	CC1	0.826	0.905	0.722	0.929	0.904
	CC2	0.811				
	CC3	0.869				
	CC4	0.868				
	CC5	0.872				
Affective Commitment (AC)	AC1	0.799	0.803	0.648	0.880	0.867
	AC2	0.768				
	AC3	0.745				
	AC4	0.900				

**Table 2** Fornell-Larcker criterion

Construct	AC	CI	CC	HP	NC	PA	RS	TD
Affective commitment	<b>0.805</b>							
Compensation and incentives	0.296	<b>0.890</b>						
Continuous commitment	0.205	0.619	<b>0.850</b>					
Human resource planning	0.193	0.675	0.689	<b>0.876</b>				
Normative commitment	0.227	0.695	0.652	0.679	<b>0.823</b>			
Performance appraisal	0.024	0.087	-0.029	0.191	0.119	<b>0.829</b>		
Recruitment and selection	0.015	0.029	0.042	0.072	0.108	0.530	<b>0.843</b>	
Training and development	0.118	0.267	0.165	0.234	0.343	0.132	0.162	<b>0.873</b>

**Table 3** The HTMT criterion

Construct	AC	CI	CC	HP	NC	PA	RS	TD
<i>Affective commitment</i>								
Compensation and incentives	0.189							
Continuous commitment	0.166	0.679						
Human resource Planning	0.156	0.743	0.762					
Normative commitment	0.192	0.789	0.741	0.773				
Performance appraisal	0.160	0.110	0.067	0.230	0.158			
Recruitment and selection	0.066	0.075	0.048	0.095	0.157	0.668		
Training and development	0.109	0.287	0.182	0.253	0.389	0.170	0.197	

coefficient values ranging from - 1 to + 1 in order to express the relationship depth between any two constructs.

Ramayah et al. (2016) established the crucial values for significance in 2-tailed tests as follows: p 10% (1.64), p 5% (1.96), and p 1 (2.58). Similarly, marketing researchers used the p 5% significant threshold. The structural model outcomes for this study are shown in Table 4.



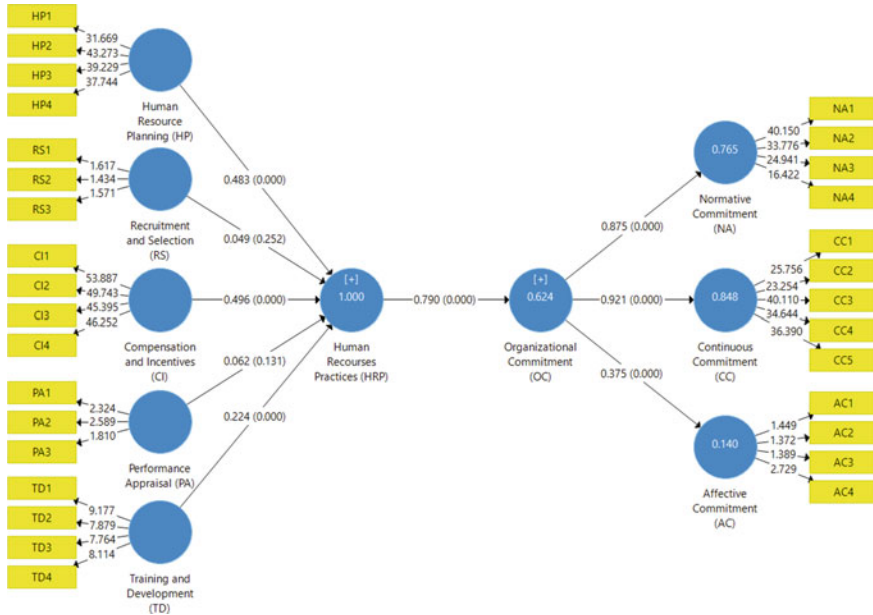


Fig. 2 Structural model results

Table 4 Summary of the structural model results

Hypothesis	Relationship	Indirect effect (β)	S. Error	t-Statistic	P values	Confidence interval (BC)		Decision
						LL	UL	
H1	HRP → OC	0.790	0.036	22.109	0.000	0.707	0.848	Supported*
H1.a	HP → OC	0.382	0.033	11.537	0.000	0.322	0.447	Supported*
H1.b	RS → OC	0.039	0.033	1.171	0.242	- 0.046	0.099	Not supported
H1.c	CI → OC	0.392	0.035	11.306	0.000	0.326	0.457	Supported*
H1.d	PA → OC	0.049	0.031	1.557	0.119	- 0.004	0.105	Not supported
H1.e	TD → OC	0.134	0.035	3.795	0.000	0.081	0.246	Supported*

Note Significance level at \*  $p < 0.01$ , (two-tailed). *UL* upper limit at 95% confidence interval, *LL* lower limit at 5%, *BC* bias corrected

The path coefficients of HRP were found to have an impact on OC; the result indicated that (HRP → OC,  $\beta = 0.790$ ; t-value of 22.109). In addition, the results showed that this impact is significant at  $p < 0.01$ . Consequently, the results showed an impact of RS and OC was insignificant at  $p > 0.05$ . Thereby, the bootstrap results of the H1.c for this study, indicated that the direct effect (CI → OC,  $\beta = 0.392$ , t-value of 11.306) was significant at  $p < 0.01$ . The results also showed that there was

insignificant effect of H1.d on OC at a 5% confidence interval (LL = - 0.004, UL = 0.105), which means an estimated path coefficient was included zero in between and that indicates the relationship of PA → OC does not support. In addition, the results showed that the relationship between TD and OC was found statistically significant at  $p < 0.01$  which means H1.e was supported.

## 6 Discussion

The results of the study found that there is an effect of HRMP on organizational commitment, and the researchers attribute this to the fact that the employee's commitment to his organization arises as a result of a reciprocal relationship, and this reciprocal relationship has been studied through the Social Exchange Theory, which is based on the idea that social exchanges lead to the formation of a commitment or pledge among individuals, which results in these individuals performing a service or favor to others with the expectation of obtaining a certain benefit in the future in light of the form and time of obtaining that benefit in most cases. Social exchanges also include the exchange of benefits (reciprocity), which is defined as the custom that is followed in that the individual who obtained a benefit or service from another individual, and from here the relationship between the employee and the organization can be viewed as a kind of social exchange, where the employee works to reward the organization by providing it with benefits and opportunities, which entails that the employee feels committed to the organization. HRMP reflect the employee's sense of gratitude and the organization's level of commitment towards him when he feels the organization's interest in him and his contributions. This naturally leads to the belief that the organization offers material and moral rewards for his efforts and commitment. The organizational commitment of employees is also related to their perception that the organization uses HRMP to attract and retain good employees and to deal with its employees with justice and fairness. Thus, the application of certain HRMP can make employees think about the actual and real motivation of the organization.

## 7 Recommendations

The researchers recommend managers to provide training for employees as a form of support for them by management, which makes them more committed to their organizations; And that management support for training programs affects the attitude of employees and their participation in training processes, and therefore employees view training as support from the organization, and this belief makes them more committed to the organization. The organization's sharing of information with its employees, taking care of their suggestions, and taking the employees' suggestions into consideration makes the employees believe that the organization supports them

and has a commitment towards them, and continuous work to improve the rewards and compensation system in line with developments in the economy and developments that occur in incentive and reward systems in organizations makes the employees believe that the organization supports them and has a commitment towards them, which improves employees' impressions of opportunities for advancement in their organizations.

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# The Impact of Diversity of Human Resource on the Quality of Work-Life



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**Abstract** This research aims to test the effect of managing diversity in human resources on the quality of work life. It was focused on telecommunications companies in Jordan. A random sample of (1066) respondent. Structural equation modeling (SEM) to test hypotheses. The results indicated an effect of the diversity of human resources in the telecommunications companies on the quality of work life. Researchers recommend managers to spread the culture of diversity and difference among employees in telecommunications companies due to the many advantages that these companies obtain as a result of the different experiences, knowledge, and skills.

**Keywords** Diversity in human resources on the quality of work life · Telecommunications companies · Jordan

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## 1 Introduction

The modern management of human resources seeks to bypass all traditional methods and everything that would harm the rights of workers, especially since the qualified and trained human element has a major role in achieving the goals of the organization. The search for distinctive human elements and gaining their loyalty has become a basic requirement for the organization (Alkhlifat et al. 2023; Alqahtani et al. 2023). Therefore, interest in human resources management has emerged due to the role it plays in providing a suitable work environment for employees and the fact that management works to refine their skills and develop their capabilities (Dwijendra et al. 2023; Nida 2018).

Since diversity in human resources is a natural matter and an inevitable fact in different organizations, organizations must pay increased attention to this diversity in order to benefit from it if they want growth, progress, success, and competition in the markets (Al-Hawary 2013a; Al-Hawary and Obiadat 2021; Khalayleh and Al-Hawary 2022; Mohammad 2019). Therefore, we find that one of the strategic objectives of business organizations is to benefit from the diversity of human resources through the adoption of new administrative and organizational philosophies and policies that focus on benefiting from this diversity of human resources (AlBrakat et al. 2023a, b; Al-Rwaidan et al. 2023; Attiany et al. 2023; Zahran et al. 2023). We find diversity within organizations in terms of age, religion, race, experience, educational level, social status, job rank, and gender. These differences affect the behavior and thinking of workers within the organization, which requires management to serve the goals of the organization (Aityassine et al. 2022; AlTaweel and Al-Hawary 2021).

When the organization has diverse and efficient human resources, it is necessary to provide a material and moral work environment that helps them meet their needs, complete their work, and achieve the goals of the organization, so it was necessary to pay attention to the quality of work life, which has also become one of the main goals of organizations, so it must provide them with job stability and security (Al-Armeti et al. 2023; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-Hawary and Al-Rasheedy 2021; Al-khawaldah et al. 2022). Diversity in human resources is one of the inevitable facts and matters in human resources and an important factor for enhancing the capabilities of competitive business organizations, so it is necessary to deal with the diversity of human resources and take into account the personal and functional differences of workers, not to view it narrowly as dealing primarily with issues related to race, origin, or gender differences only, and it is no longer limited to global organizations (Alhalalmeh et al. 2022; Al-Hawary 2013b; Kurdi et al. 2023; Mohammad et al. 2023).

In order to enhance the competitive position of the organization in the business market, focus should be placed on all the activities and efforts made by the organization in order to provide a better work life for its employees and satisfy their needs by providing a good and appropriate work environment, their participation in the decision-making process, and the provision of security requirements and job

stability for them, which has strong repercussions on the level of satisfaction (Alhalmeh et al. 2020; Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Metabis and Al-Hawary 2013). Job performance and improving the performance and productivity of the workers Whenever the work environment is acceptable to the workers, this contributes to the adherence of individuals to their jobs, which leads to positive results, better performance, and the ability to overcome the obstacles facing workers. All this is based on respect and high trust (Al-Hawary et al. 2020b; Eldahamsheh et al. 2021; Mohammad et al. 2020; Rahamneh et al. 2023; Tariq et al. 2022). This study aimed to test the effect of managing diversity in human resources on the quality of work life.

## 2 Theoretical Framework and Hypotheses Development

### 2.1 Diversity Management in Human Resources

As a result of the developments in the diversity of the work force, the direction of diversity management in human resources emerged in the early nineties of the last century, where leaders are considered to be primarily responsible for the success of diversity policies and to ensure their effective implementation in order to achieve two main goals (Aldaihani et al. 2023a, b; Hamouche and Parent-Lamarache 2023; Mohammad 2020; Mohammad et al. 2022) and the desire of these institutions to achieve justice and ensure that none of their members is subjected to discrimination on the basis of race, religion, gender, or disability. Diversity management includes the management of human resources, social environments, and systems, as well as organizational procedures, while benefiting from human differences, recognition, and openness that create a positive and healthy environment for all members of the organization (Alolayyan et al. 2018, 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021).

Alkhawaldeh et al. (2023) indicate that the management of diversity in human resources is an administrative approach aimed at the comprehensive development of the work environment at all levels, whether individual, collective, or organizational, while Al-Alwan et al. (2022a) define it as the actions taken by the organization voluntarily that create sufficient capacity from the integration of workers in the organization and from diverse backgrounds to form the structure of the organization through specific policies and programs. Diversity management in human resources has been defined as voluntary organizational actions that aim to include employees from diverse backgrounds in formal and informal organizational structures through well-thought-out policies and programs (Al-Adamat et al. 2023b; Al-Alwan et al. 2022b; AlHamad et al. 2022; Al-Hawary et al. 2020a; Alkhawaldeh et al. 2023).

It is not easy to limit the dimensions of diversity in human resources due to their differences, and if some people look at it from a narrow perspective, which is race and origin, others look at it from a broad and lose perspective (AlHamad et al. 2022), and

some divide the diversity in human resources for personal factors according to race and color, as in the study (Al-Shormana et al. 2021). While other researchers dealt with gender (male or female) as a basis for the diversity of the workforce (Al-Armeti et al. 2023). The dimensions of diversity in human resources are as follows:

**Age:** It is one of the most important personal factors for diversity in human resources, as the work force is distributed and diversified in different age groups (young, middle-aged, and elderly), as it provides organizations with positive effects in having different sources of ideas, efforts, and capabilities that distinguish the organization from others (Al-Hawary and Abu-Laimon 2013).

**Gender (male, female):** The social gender is considered one of the most important and prominent areas of diversity in human resources, where the capabilities that human resources possess differ due to the social gender (Al-Hawary and Aldaihani 2016; Al-Hawary and Obiadat 2021). Daz-Garca (2013) indicated that there are benefits to social diversity in human resources that are reflected in the organization, represented by creativity, innovation, and speed in transferring knowledge.

**Nationality:** Nationality is one of the most important dimensions of diversity, which prompted some to consider diversity as just a difference in origin and if we look at it at the local and international levels (Alolayyan et al. 2023; AlTaweel et al. 2023).

**Experience:** Experience means a set of attitudes and events that an individual lives in at a specific moment in his life, whether they are attitudes, past events, or current events, provided that they affect his behavior, leave traces on his personality, and make him a different form from others (Mohammad et al. 2020).

**Education level:** The extent of compatibility between education and work requirements is an important matter, as the educational level represents one of the restrictions that limit dealing with the diversity of human resources and the ability to differentiate between the requirements of job levels and the level of education. General and work requirements, as all of the above is a diversification of the workforce (Al-Abbadi et al. 2021; Alhalalmeh et al. 2020; Mohammad et al. 2023).

**Functional level:** There is a close correlation between the functional level and many behavioral issues at work, such as job satisfaction or work pressures as a result of a sense of alienation (Metabis and Al-Hawary 2013). Innovation is an interactive process that often involves communication and interaction between employees in the company and is based on their different job levels (Al-Hawary and Al-Syasneh 2020; Alshuqairat et al. 2023).

## 2.2 *Quality of Work Life*

The quality of work life inside an organization is critical because it adds to employee happiness and distinguishes the business from others by providing a distinct organizational environment. Organizations must improve the quality of life for their

employees in a variety of ways, including psychological, social, and environmental elements. This includes meeting the organization's social and moral commitments to its personnel (AlHamad et al. 2022; Alkhawaldeh et al. 2023). There is diversity and difference between scholars and those interested in defining a specific concept of the quality of work life due to the different angles and points of view adopted by each of them, and therefore we find there are several definitions of the concept of the quality of work life.

AlHamad et al. (2022) see the quality of work life as the maximum extent that employees can reach by meeting their important personal needs at work, while Khosrowpour (Khalayleh and Al-Hawary 2022) defines it as fulfilling human needs at work through harmony between work duties. And a group of health and social needs, which lead to improving the work environment and its impact on improving performance and increasing the profitability and efficiency of the organization. Al-Hawary and Abu-Laimon (2013) added that it is a philosophy adopted by the management through which it emphasizes preserving the dignity of workers, developing the culture of the organization, and improving the moral and physical aspects of workers by providing opportunities for growth and development. Al-Hawary and Al-Syasneh (2020) and Alshura et al. (2023a, b) indicate that the quality of work life is an approach that pays enough attention to employees as one of the most important assets of the organization rather than considering them a cost to it. Al-Hawary and Al-Syasneh (2020) defined it as a set of systems and programs related to the improvement and development of various aspects of the human capital of the organization, which would affect the career of individuals and their social, cultural, and health environment. There is a difference between scientists and researchers in defining the dimensions of the quality of work life, and it is not easy to define the dimensions of the quality of work life. As for the study of Al-Lozi et al. (2018), it defined the dimensions of the quality of work life as:

**Balance between personal life and work:** Al-Hawary and Al-Rasheedy (2021) defined the balance between personal life and work as the ability of the individual to fulfill the role expected of him in the fields of work and the family through negotiation or partnership between him and partners in both fields, the family field and the work field (Al-Abbadi et al. 2021). **Material and non-material working conditions:** it is all that surrounds the worker and affects his behavior and performance in the work environment, in addition to influencing the tendencies with which he works, the management he follows, and the institution to which he belongs (Alhalalmeh et al. 2020; Alshura et al. 2023a, b). **Self-actualization:** It is an individual's desire to articulate himself and achieve what is possible in terms of skills and capabilities (Al-Hawary and Abu-Laimon 2013; Alshuqairat et al. 2023). **Work relations:** The nature of human relations within organizations is essential, as reflected by the administrative leadership's method of dealing with employees (Alhalalmeh et al. 2020). **Reducing work stress:** Work stress is defined as a group of negative factors that have an impact on business performance (AlTaweel et al. 2023). Alshuqairat et al. (2023) define it as an uncomfortable psychological process that occurs in response to environmental influences (Al-Hawary and Abu-Laimon 2013).

### 2.3 Diversity of Human Resources and the Quality of Work Life

The diversity of human resources provides the organization with diverse skills, varying abilities, different viewpoints, and different cultures. This requires that the organization have transformational leadership that accepts the management of diversity, is able to motivate its employees, achieves coexistence among its members, and provides them with a work environment that is characterized by quality, free of conflicts, and dominated by knowledge and creativity. The work environment shall be free from bias, discrimination, and conflicts resulting from diversity. As inspiring transformational leadership is able to melt all forms of diversity into one creative crucible by providing a good work environment free of conflicts and contradictions. Human resources are one of the most important resources of the organization; they are the means to achieve the organizational goals, and this requires the use of modern styles of leadership such as transformational leadership, in which the role of the leader at this stage is to motivate and empower, build bridges of trust between the leadership and the rest of the administrative levels, and provide an appropriate work environment to ensure the quality of work. Work life in pursuit of the goals of the organization (Sandra 2011). So, the study hypotheses can be built as:

*H1: There is an impact of diversity of human resource on the quality of work-life.*

### 3 Study Model

See Fig. 1.

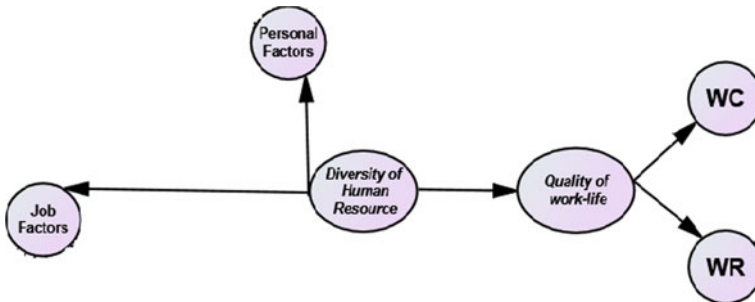


Fig. 1 Research model

## **4 Methodology**

### ***4.1 Population and Sample Selection***

The study population was determined, which consisted of employees in the three companies operating in the Jordanian market. A random sample of 1066 employees via electronic means. At the end of the data collection process, 1025 responses were obtained that fit the requirements of the statistical analysis. These responses accounted for 96% of the response rate, which indicates a fair representation of the target population and achieves the criteria for adequacy of sampling (Sekaran and Bougie 2016).

### ***4.2 Measurement Instrument***

This instrument consisted of demographic data of the respondents, along with two sections for its major variables. Part 2 is independent variable, i.e., the diversity of human resources, which contained (25) items taken from AlHamad et al. (2022); Bohonos 2023; Campos-García and Zúñiga-Vicente 2023; Hamouche and Parent-Lamarche 2023; Sung et al. 2019). These items formed two dimensions for the diversity of human resources, where personal facets consisting of (13) items determining, e.g., age, gender, and nationality, while job factors included (12) items determining, for example, experience, education level, and job level. On the other hand, the last part of the study instrument contained the measures of the dependent variable, i.e., work-life quality, which were evaluated using eight items drawn from Simbolon et al. (2023) and Ogakwu et al. (2023). The items of work-life quality formed two dimensions: working conditions and work relationships with four items for each.

## **5 Findings**

### ***5.1 Measurement Model Evaluation***

To evaluate the impact of human resource diversity on work-life quality, structural equation modeling (SEM) was relied upon as a modern approach to examine the interaction between latent constructs measured by observing variables (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Wang and Rhemtulla 2021). The application of this statistical method requires subjecting the study instrument to a test of validity and reliability before conducting an evaluation of the effect size. Accordingly, confirmatory factor analysis (CFA), which is one of the SEM procedures

using the AMOS software, was applied to extract the validity and reliability of a measurement model, which were reported in Table 1.

The loadings of human resource diversity and work-life quality items were between 0.665 and 0.899, indicating that they were all retained as they were above the lower threshold of 0.50 (Al-Lozi et al. 2018; Ogakwu et al. 2023; Simbolon et al. 2023). The average variance extracted (AVE) values for the research latent constructs were greater than 0.50, which means that they met the convergent validity condition (AL-Zyadat et al. 2022; Boudlaie et al. 2022; Howard 2018; Mukhlis et al. 2022; Rahamneh et al. 2023). Moreover, the comparison results confirmed that the values of AVE were greater than the maximum shared variance (MSV), also, it indicated that the values of the square root of AVE were superior to the correlation coefficients between the other constructs in the model. These results are evidence of achieving discriminant validity according to the Fornell-Larcker criteria (Rimkeviciene et al. 2017). On the other hand, the reliability of the measurement model constructs was verified by using Cronbach alpha coefficients ( $\alpha$ ) for internal consistency and McDonald's omega coefficients ( $\omega$ ) for composite reliability with a minimum of 0.70 for both measurements. According to the results in Table 1, the values of Cronbach's alpha coefficients (0.833–0.869) and McDonald's omega coefficients (0.828–0.912) were greater than 0.70, which indicates that the model constructs were reliable (Al-Adamat et al. 2023a; Al-Hawary and Al-Smeran 2017; Leeuw et al. 2019; Shaqrah et al. 2023).

### Structural Model

Table 1, it became clear that there was no multicollinearity between the dimensions of human resource diversity, where the values of variance inflation factor (VIF) for those constructs were less than 5 (Al-Rwaidan et al. 2023; Hair et al. 2017a, b; Majdy et al. 2023; Muda et al. 2022; Zahran et al. 2023). In this context, it is possible to continue testing the hypotheses through SEM shown in Fig. 2.

The results of Fig. 2 confirm that the structural model for examining the impact of human resource diversity on work-life quality in Jordanian telecommunications companies gained appropriate values of the goodness of fit. CMIN/DF was less than 3, the values of CFI and TLI were greater than 0.90, along with the value of RMSEA which was smaller than 0.08 (AL-Zyadat et al. 2022; Eldahamsheh et al. 2021; Harahap et al. 2022; Shi et al. 2019). Accordingly, the standardized and unstandardized effect parameters were extracted and listed in Table 2.

## 6 Discussion

The results shows an effect of the diversity of human resources in the telecommunications companies on the quality of work life, This means that telecommunications companies can develop the quality of work life by paying attention to diversity in their human resources and, in line with their strategic directions, taking into account the provision of a suitable work environment for workers that helps them in personal



**Table 1** Validity and reliability tests

Constructs	1	2	3	4	5	6
<i>Personal factors</i>						
1. Age	<b>0.812</b>					
2. Gender	0.841	<b>0.721</b>				
3. Nationality	0.745	0.751	<b>0.848</b>			
<i>Job factors</i>						
4. Experience	0.779	0.815	0.793	<b>0.783</b>		
5. Education	0.698	0.733	0.869	0.809	<b>0.700</b>	
6. Joblevel	0.655	0.744	0.887	0.701	0.782	
<i>Quality work-life</i>	0.552	0.698	0.741	0.729	0.698	<b>0.774</b>
VIF	3.522	3.762	3.022	-	-	-
Loadings range	0.778-0.823	0.755-0.843	0.679-0.856	0.781-0.899	0.676-0.829	0.665-0.889
AVE	0.755	0.722	0.742	0.765	0.754	0.759
MSV	0.568	0.669	0.533	0.639	0.598	0.695
Internal consistency	0.866	0.833	0.869	0.859	0.842	0.862
Composite reliability	0.888	0.897	0.828	0.921	0.868	0.895

Bold signifies less than or equal 0.01

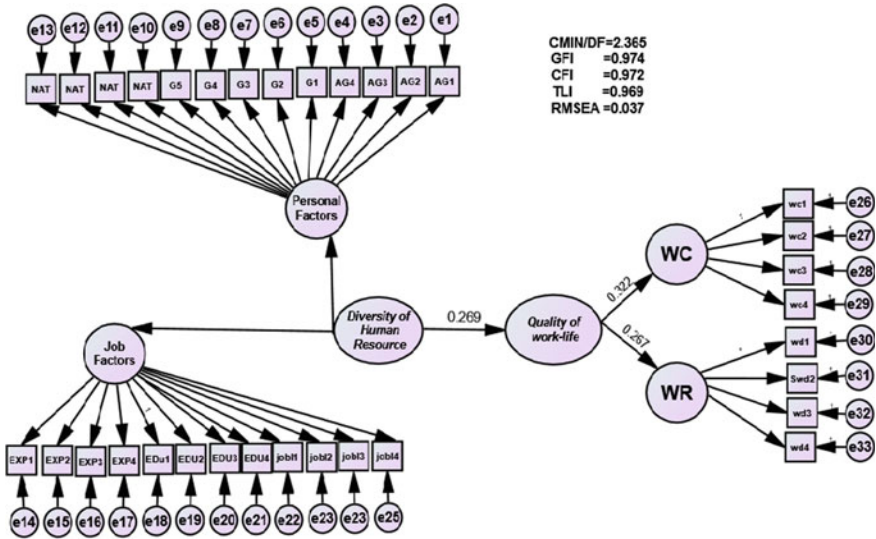


Fig. 2 SEM results of human resource diversity on quality of work-life

Table 2 Hypothesis testing

Hypothesis	Relation	Standard beta	t value	p value
H1	Human resource diversity → quality of work-life	0.269	8.699	0.000
H2	Personal factors → working conditions	0.322	6.622	0.000
H3	Job factors → work’s relationships	0.267	9.637	0.000

Note \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The results shows that diversity of human resource dimensions have an impact relationship on the quality of work-life. However, the results indicated that the highest impact was for personal factors ( $\beta = 0.322$ ,  $t = 3.622$ ,  $p = 0.002$ ), and finally job factors ( $\beta = 0.267$ ,  $t = 9.637$ ,  $p = 0.000$ )

growth and focusing on designing and implementing a rewarding compensation strategy, incentives, and bonuses, enabling them to make decisions, and encouraging them to present innovative and creative ideas. It agreed with the study of Majdy et al. (2023) that the diversity of human resources has created a space for innovation, appreciation, and creativity, which gives workers the opportunity to realize themselves and improve their work environment. And agreed with the study of Josph and Selvaraj (2015) that the diversity of the labor force in terms of (age, gender, and race) and dealing with it properly, it will provide positive benefits in the work environment and improve the quality of work life, and in the same context I agreed with the study of Nida (2018) that diversity in human resources in terms of cultural, linguistic and cognitive diversity have implications for improving the work environment by establishing good relationships at work and teamwork, which is one of the dimensions of the quality of work life and its impact on job satisfaction and commitment, which

provides ample room for creativity and innovation and its impact on raising the level of organizational performance. It also agreed with the study of Al-Rifai et al. (2004) that there is an impact of the diversity of human resources on job satisfaction among workers in the health and educational services sectors in the State of Kuwait.

## 7 Recommendations

The researchers recommend managers in telecommunications companies spread the culture of diversity and difference among employees in telecommunications companies due to the many advantages that these companies obtain as a result of the different experiences, knowledge, and skills. The existence of a clear and appropriate system for promotion and career advancement in the Jordanian telecommunications companies to ensure the achievement of their objectives and the aspirations of their employees.

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# The Impact of Transformational Leadership on Quality of Work-Life



**Amro Adel Abu Lemoun, Hatem Dellagi, Mohammad Motasem Alrfai, Kamel Mohammad Al-hawajreh, Alaa Radwan Al-Nawaiseh, Alaa Fawwaz Dalky, Zeid Naiel Aissa Al-fugaha, and Sulieman Ibraheem Shelash Al-Hawary**

**Abstract** This research aims to examine the impact of transformational leadership style on the quality of work life. It focused on telecommunications companies in Jordan. A random sample of (1066) was drawn. Structural equation modeling (SEM) was used to examine hypotheses. The statistics showed that transformational leadership affects the quality of work life. The researchers recommend that there be an appropriate system to promotion and career advancement in the Jordanian telecommunications companies to ensure the achievement of its goals and the aspirations of its employees.

**Keywords** Transformational leadership · Quality of work-life · Telecommunications companies · Jordan

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# 1 Introduction

Successful management, which is characterized by efficiency and effectiveness, is one of the most important basic pillars for organizations because it enables them to exploit the human and material resources that they possess and direct them in the right direction (Alkhlifat et al. 2023; Alqahtani et al. 2023; Dwijendra et al. 2023; Sekaran and Bougie 2016). Due to the processes of change and its different fields and the intense competition between organizations, scientific and research studies have begun to study these conditions with the aim of achieving survival and continuity for organizations and improving their ability to compete with other organizations (Al-Hawary and Obiadat 2021; Khalayleh and Al-Hawary 2022; Mohammad 2019). The interest in the transformational leadership style came due to its ability to manage the organization properly and meet challenges and developments (Al-Abbadi et al. 2022; AlBrakat et al. 2023a, b; Al-Hawary 2013a; Al-Rwaidan et al. 2023; Attiany et al. 2023; Zahran et al. 2023).

The quality of work life (QWL) is considered as a basic elements of the success of any institution by providing a work atmosphere that is characterized by clarity and transparency in work, stimulating the spirit of cooperation between individuals, working in a team spirit, participating in decision-making and paying attention to their ideas and suggestions (Aldaihani et al. 2023b; Al-Hawary et al. 2020a; Mohammad et al. 2023; Rahamneh et al. 2023). Because achieving organizational objective, it requires first achieving employees objective, the more the work environment is characterized by acceptance and satisfaction on the part of the employees, the greater their loyalty to the work and the organization, which contributes to raising the level of performance.

## 2 Study Variables and Hypotheses Development

### 2.1 Transformational Leadership

In view of the situation of business organizations today and the need to keep abreast of developments, especially in the area of technology, the spread of globalization and the information revolution, which have intensified competition and multiple options for customers by offering products from all over the world, increased complexities in the business environment in all its aspects (Abolnasser et al. 2023; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-khawaldah et al. 2022; AlTaweel and Al-Hawary 2021). The true leadership that business organizations need today is the one that has the ability to inspire, motivate, and persuade subordinates and develop their skills to carry out tasks and duties to their fullest potential in order to ensure the survival of the organization and maintain its existence by improving their performance and productivity (Al-Armeti et al. 2023; Alhalalmeh et al. 2022; Al-Hawary 2013b; Al-Hawary and Al-Rasheedy 2021). Transformational leadership

(TL), according to Burns, is a process in that the leader and his followers strive to elevate one of the highest level of motivation (Eldahamsheh et al. 2021; Mohammad et al. 2020; Tariq et al. 2022). Conger (2002) defines TL as going beyond offering incentives in return for desired outcomes to intellectually and creatively developing and encouraging workers and changing their interests into an essential aspect of the organizational objective. Trofino (2000) defines it as “leadership that establishes a clear vision for its organizations and works to develop new systems that are fully compatible with future requirements.” Some academics, such as Bass (1985) and Bass and Avolio (1994), were successful in developing TL dimensions in four areas:

**Idealized Influence:** The leader’s ability to win the trust, respect, and appreciation of the followers is the concept of idealized influence (Alhalalmeh et al. 2022; Al-Hawary et al. 2020a; Al-Nawafah et al. 2022). **Intellectual Stimulation:** It is the leader’s ability to guide followers and his willingness to have them deal with challenges, in novel ways and to train them to deal with difficulties (Aldaihani et al. 2023b; Al-Hawary et al. 2020a, 2017; Metabis and Al-Hawary 2013; Mohammad et al. 2023; Rahamneh et al. 2023). **Individualized Consideration:** leader’s interest in his followers, as well as his awareness of the principle of different individual differences between persons (Alshawabkeh et al. 2022; Al-Shormana et al. 2021; Harahap et al. 2022; Mohammad et al. 2020, 2022). **Motivation** is the process that focuses on the leader’s actions and behaviors that build a love of challenge in the followers, and these behaviors (Al-Adamat et al. 2023b; Al-Alwan et al. 2022b; AlHamad et al. 2022; Alkhawaldeh et al. 2023). **Empowerment:** The key premise in the empowerment concept is that decision-making power is expected to be assigned to front-line employees in order for them to respond directly to client requests, problems, and wants without referring directly to management (Al-Armeti et al. 2023; Al-Hawary et al. 2020b; Al-Shormana et al. 2021).

## 2.2 *Quality of Work Life*

To enhance the competitive position of the organization in the business market, focus should be placed on all the activities and efforts made by the organization in order to provide a better work life for its employees and satisfy their needs by providing a good and appropriate work environment, their participation in making decision, and the provision of safety requirements and job stability for them, which has strong repercussions on the level of satisfaction and improves the performance and productivity of workers (Al-Hawary and Abu-Laimon 2013; Al-Lozi et al. 2018; Alolayyan et al. 2023; AlTaweel et al. 2023; AlTaweel et al. 2023; Mohammad et al. 2020). Khosrowpour (2001) believes that the QWL represents the achievement of human needs in work through harmony between work duties and a group of health and social needs, which leads to an improvement in the work environment and its impact on improving performance and increasing the profitability and organizational efficiency. Al-Hawary and Al-Syasneh (2020), Alshuqairat et al. (2023) added that it

is a philosophy adopted by the management through which it emphasizes preserving the dignity of workers, developing the culture of the organization, and improving the moral and physical aspects of workers by providing opportunities for growth and development (Al-Hawary and Al-Syasneh 2020; Alshura et al. 2023a, b). Riaz and Haider (2010) identified the dimensions of the QWL in terms of health and safety, job security, job satisfaction, developing competencies through training, providing the individual with new skills, and interest in education in the work environment. While the study (Al-Hawary and Al-Rasheedy 2021) identified the QWL dimensions with fair compensation, healthy and safe working conditions, opportunities for developing human capabilities, job security, flexibility of job tasks, and work schedules The researchers believe that the dimensions of the QWL are the balance between personal life and work, material and non-material working conditions, self-fulfillment, work relations, and a reduction in work stress.

### ***2.3 Transformational Leadership and Quality of Work Life***

The QWL emphasizes the need to meet a healthy and safe work environment by providing suitable working conditions, giving workers all their job rights, and supporting and participating in the decision-making process. The organizational leader has an important role to ensure that the work environment of the workers works well for the organization to achieve its goals (Igbaekemen 2014). When workers feel comfortable within their work, this will push them to work in a better way; their performance exceeds what is expected, and they perform the work more than what is expected, thus achieving the goals that the organization seeks to achieve (Bass 2010). The QWL requires leaders to deal distinguishably and work to develop their skills and contribute to their advancement, as well as designing the job on a social basis so that there is a balance between personal life and work (Ahmadi and Salavati 2012). Ayesha (2012) reached that there an impact of TL on the QWL through JS as a mediating variable. So the hypotheses could be as:

**H1: There is an impact of transformational leadership on the quality of work-life.**

## **3 Study Model**

See Fig. 1.

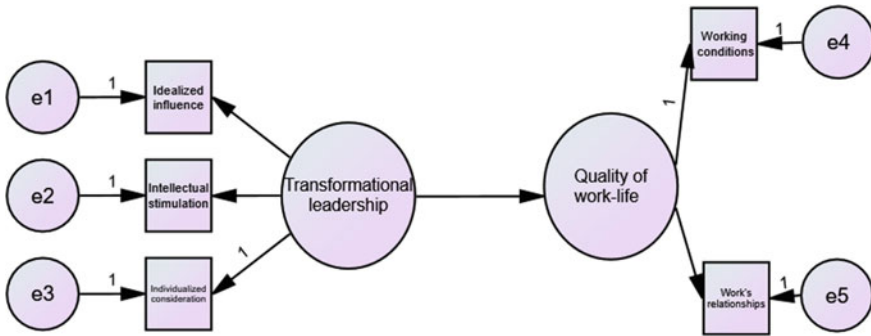


Fig. 1 Research model

## 4 Methodology

### 4.1 Population and Sample

The population of the study was determined, which involves the employees of the three companies operating in the Jordanian market. Hence, the study instrument was disseminated simultaneously to a random sample of 1066 employees via electronic means. At the end of the data collection process, 1025 responses were obtained that fit the requirements of the statistical analysis. These responses accounted for 96% of the response rate, which indicates a fair representation of the target population and achieves the criteria for adequacy of sampling (Sekaran and Bougie 2016).

### 4.2 Measurement Instrument

This instrument consisted of three sections First section contained demographic data of the respondents. Section two was allocated to the independent variable, i.e., transformational leadership, which contained (25) items taken from Abolnasser et al. (2023); Hilton et al. 2023; Juyumaya and Torres 2023; Madi et al. 2023). These items formed three dimensions for the transformational leadership with four items for each: Idealized, Intellectual, and Individualized. On the other hand, the last section of the study instrument contained the measures of the dependent variable, i.e., work-life quality, which were evaluated using eight items drawn from Simbolon et al. (2023) and Ogakwu et al. (2023). The items of work-life quality formed two dimensions: working conditions and work relationships with 4 items for each.

## 5 Findings

### 5.1 Measurement Model Evaluation

Structural equation modeling (SEM) was relied upon as a modern approach to examine the interaction between latent constructs measured by observing variables (AL-Zyadat et al. 2022; Boudlaie et al. 2022; Mukhlis et al. 2022; Rahamneh et al. 2023; Wang and Rhemtulla 2021). The SEM procedures using the AMOS software, was applied to extract the validity and reliability of a measurement model, which were reported in Table 1.

The loadings of TL and WLQ items were between 0.698 and 0.891, indicating that they were all retained as they were above the lower threshold of 0.50 (Al-Adamat et al. 2023a; Al-Hawary and Al-Smeran 2017; Al-Lozi et al. 2018; Shaqrah et al. 2023, Sung et al. 2019). The (AVE) values of the research latent constructs were greater than 0.50, which means that they met the convergent validity condition (Al-Rwaidan et al. 2023; Howard 2018; Muda et al. 2022; Saraireh et al. 2022). Moreover, comparison results confirmed that the values of AVE were greater than the maximum shared variance (MSV), also, it indicated that the values of the square root of AVE were superior to the correlation coefficients between the other constructs in the model. These results are evidence of achieving discriminant validity according to the Fornell-Larcker criteria (Rimkeviciene et al. 2017). The reliability of the measurement model constructs was verified by using Cronbach alpha coefficients ( $\alpha$ ) for internal consistency and McDonald's omega coefficients ( $\omega$ ) for composite reliability with a minimum of 0.70 for both measurements. According to Table 1, the values of Cronbach's alpha coefficients (0.843–0.879) and McDonald's omega coefficients (0.823–0.889) were greater than 0.70, which indicates that the model constructs were reliable (Majdy et al. 2023; Sekaran and Bougie 2016; Zahran et al. 2023).

### 5.2 Structural Model

Based on Table 1, it became clear that there was no multicollinearity between dimensions of TL, where the values of variance inflation factor (VIF) for those constructs were less than 5 (Hair et al. 2017). In this context, it is possible to continue testing the hypotheses through SEM shown in Fig. 2.

Figure 2 confirm that the structural model for examining the impact of TL on the WLQ gained appropriate values of the goodness of fit. CMIN/DF was less than 3, the values of CFI and TLI were greater than 0.90, along with the value of RMSEA which was smaller than 0.08 (Ahmadi and Salavati 2012; Shi et al. 2019). Accordingly, the standardized and unstandardized effect parameters were extracted.

**Table 1** Validity and reliability tests

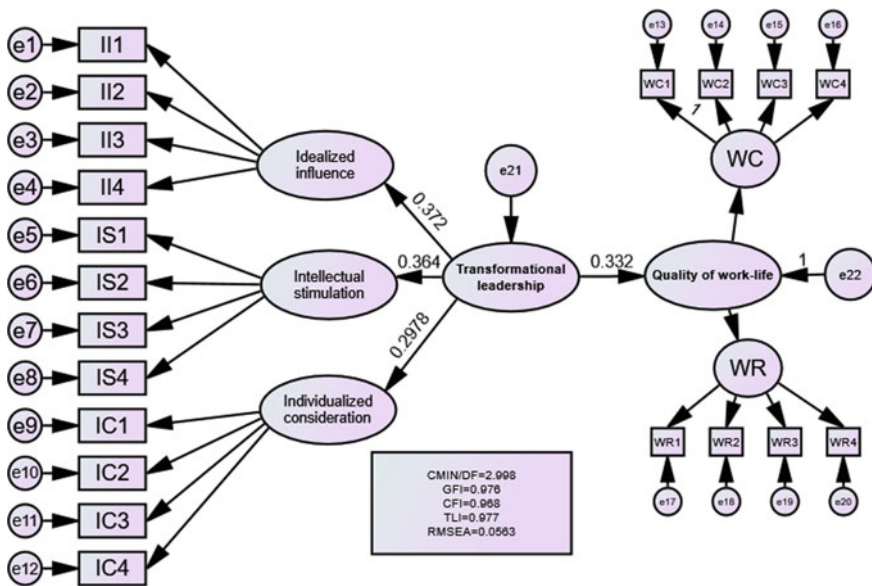
Constructs	1	2	3	4	5	6
<i>Transformational leadership</i>						
1. Idealized	<b>0.874</b>					
2. Intellectual	0.895	<b>0.775</b>				
3. Individualized	0.695	0.769	<b>0.877</b>			
<i>Quality of work-life</i>	0.741	0.675	0.779	0.753	0.742	<b>0.775</b>
VIF	3.274	3.582	3.592	–	–	–
Loadings range	0.708–0.813	0.795–0.843	0.789–0.829	0.767–0.891	0.706–0.844	0.698–0.872
AVE	0.735	0.729	0.762	0.778	0.793	0.791
MSV	0.755	0.729	0.812	0.769	0.798	0.865
Internal consistency	0.876	0.879	0.843	0.849	0.858	0.859
Composite reliability	0.823	0.833	0.840	0.884	0.889	0.872

Bold signifies less than or equal 0.01



**Table 2** Hypothesis testing

Hypothesis	Impact	Beta	<i>t</i>	<i>p</i>
H1	Transformational leadership → quality of work-life	0.332	12.455	0.000
H2	Idealized influence → quality of work-life	0.372	10.878	0.000
H3	Intellectual stimulation → quality of work-life	0.364	19.327	0.000
H4	Individualized consideration → quality of work-life	0.297	16.444	0.000



**Fig. 2** SEM of TL on QWL

The study results show an impact of TL on the WLQ. However, the results indicated that the highest impact was for Idealized influence ( $\beta = 0.372, t = 10.878, p = 0.002$ ), and finally Individualized consideration ( $\beta = 0.297, t = 16.444, p = 0.000$ ).

## 6 Discussion

The results showed an impact of the dimensions of TL on the QWL, and this means that the telecommunications companies under study can increase the QWL, by paying attention to the principles of TL and attracting and preserving distinguished and

creative competencies. The study showed that the TL style enhances QWL, through the direct influence of leaders by providing an appropriate work environment and using motivational methods for employees. This result also agreed with the study of Metwally and El-Bishbishy (2014). The role of the TL appears through his style is giving attention to the workers needs which will achieving the QWL, all of this confirms the role of TL dimensions and their impact on explaining the discrepancy in the QWL among employees of telecommunications companies. Researchers recommend Jordanian telecommunications companies to pay attention to improving wages, rewards and compensation systems within the telecommunications companies and ensuring their fairness to ensure the continuity of employees and raise their level of performance and morale

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# Work Teams and Their Impact on the Success of Entrepreneurial Strategic Projects Study in SME in Jordan



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**Abstract** This research came to test the impact of work teams on achieving success in entrepreneurial projects. A random sample of (850) respondent was choosen. This study was conducted structural equation modeling (SEM) to test hypotheses. The results show that work teams have an impact on the entrepreneurial strategic projects. The researchers recommend strengthening the trend towards increasing the dependence of entrepreneurial projects on work teams in executing tasks.

**Keywords** Work teams · Success in entrepreneurial projects · Karak Governorate · Jordan

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## 1 Introduction

The development of administrative thought led to a focus on the human element, which is the basic building block in building and developing organizations and accomplishing their tasks successfully and efficiently, which require skills, competencies, and capabilities that exceed the capabilities of one individual (Al-khawaldah et al. 2022; Alqahtani et al. 2023; Dwijendra et al. 2023; Shamaileh et al. 2023). Obtaining a leadership personality capable of influencing the behavior of others and coordinating their efforts to achieve its goals within the organizational environment in which the team operates and what it contains of policies, philosophy, goals, plans, and resources, which in turn allows team members to participate and interact through team members attending meetings and allowing them to freely speak to exchange views and information, which in turn develops the individual skills of everyone on the team (Al-Abbadi et al. 2022; Al-Hawary 2013a, b; Al-Hawary and Obiadat 2021; Mohammad 2019).

The success of entrepreneurial projects and the extent of their effective contribution to the development of comprehensive economic development in all developed and developing countries alike, as well as what they also contribute to highlighting creative and new ideas and opening new horizons, are considered the nucleus for the establishment of businesses and large companies, and their access to global markets is based on the performance of their intellectual assets operating in them with their distinction (AlBrakat et al. 2023a; Al-Rwaidan et al. 2023; Attiany et al. 2023; Zahran et al. 2023). With the capabilities, experiences, and competencies that came out of the limits of one individual and became available in work teams that have the ability to initiate and innovate and the ability to take risks, search for opportunities, and invest them in the right ways. This study came to test the effect of work teams on achieving success in entrepreneurial projects.

## 2 Literature Review and Hypotheses Development

### 2.1 Work Teams

Work Teams are not something new, but they are very old and have been associated with religious gatherings and sports games. In recent decades, this concept has taken on a new, necessary meaning in projects and organizations and thus achieved useful and effective results (Aityassine et al. 2022; Al-Awamleh et al. 2022; Al-Hawary and Alhajri 2020; Al-khawaldah et al. 2022; AlTaweel and Al-Hawary 2021). Work Teams have become an important reason for the success and competitiveness of organizations today, and work Teams are present at all organizational levels without exception, permanently and temporarily, as required by the needs and circumstances that the organization is going through (Al-Armeti et al. 2023; Alhalalmeh et al. 2022; Alhalalmeh et al. 2022; Al-Hawary 2013b; Al-Hawary and Al-Rasheedy 2021).

Alhalalmeh et al. (2022) defined it as the small number of individuals who have complementary skills, are committed to performance goals and a common way of working, and consider themselves jointly responsible for it (Al-Hawary et al. 2017; Al-Nawafah et al. 2022; Eldahamsheh et al. 2021; Metabis and Al-Hawary 2013; Mohammad et al. 2020; Tariq et al. 2022). The study dealt with a group of task forces practices, which the study examined as follows:

**Leadership:** Eldahamsheh et al. (2021) define leadership as “a group of behaviors on the part of the boss or manager that are intended to influence followers to cooperate in achieving the required goals” (Aldaihani et al. 2023a, b; Al-Hawary et al. 2020b; Harahap et al. 2022; Kurdi et al. 2023; Mohammad 2020; Mohammad et al. 2023, 2022; Rahamneh et al. 2023). **Organizational environment:** the area which organization lives in and interact with (Alolayyan et al. 2018, 2022; Alshawabkeh et al. 2022; Al-Shormana et al. 2021). **Participation and interaction:** It can be defined as those that represent the interaction or sharing of the opinions of a certain number of individuals working in the institution, so that this reflects the spirit of democratic dealing in teamwork for the institution (Al-Adamat et al. 2023b; Al-Alwan et al. 2022b; AlHamad et al. 2022; Alkhalwaldeh et al. 2023; Alkhalwaldeh et al. 2023). **Developing individual skills:** Individual skills are among the abilities that allow a person to express himself and communicate with others, and they are among the skills that manifest themselves through attitudes and human traits, as these skills are employed in daily life and at work, as good individual skills aid in effective working (Al-Hawary et al. 2020a).

## 2.2 Entrepreneurship

Entrepreneurial business is one of the recent topics in management, where the administrative literature has focused on the fact that entrepreneurial learning for young people in the early stages of life affects creativity positively and extracts the most creative ideas that are directly related to the events of advanced technology (Al-Hawary and Abu-Laimon 2013; Al-Hawary and Aldaihani 2016; Al-Hawary and Obiadat 2021). Entrepreneurship is defined as the ability and desire to organize and manage businesses (Al-Armeti et al. 2023; Al-Shormana et al. 2021). In the entrepreneurial process, the entrepreneur takes into account the extent of the risks and also sheds light on the returns that the project may bring. Entrepreneurial projects include a set of dimensions that the study addressed as follows:

**Initiative and Innovation:** Initiative and innovation is defined as the process of developing new ideas and putting them into action, with the emphasis on the greatest companies coming up with unique ideas and then putting them into action (Al-Abbadi et al. 2021; Alhalalmeh et al. 2022; Alolayyan et al. 2023; AlTaweel et al. 2023; AlTaweel et al. 2023; Mohammad et al. 2020). **Taking risks:** This term refers to an investor’s ability to deal with a drop in the value of his investments (Al-Hawary and Al-Syasneh 2020; Alshuqairat et al. 2023). **Attracting and investing opportunities:**

The opportunities which available in the environment and the organization has the resources to get (Alhalalmeh et al. 2022; Al-Hawary 2013b; Al-khawaldah et al. 2022; Alshura et al. 2023a, b).

### ***2.3 Work Teams and the Success of Entrepreneurial Projects***

The study conducted by Al-Hadrawy et al. (2018) the work teams' strategy has an impact on improving operational performance. According to Al-Nuwayqa's (2014) research, empowering work teams has a favorable impact on improving organizational excellence aspects. A study (Mukhlis et al. 2022) discovered a favorable, non-statistically significant association between Kenyan pupils' creativity and entrepreneurial atmosphere. The study also discovered that political skills have an effect as a mediator of this association in males but not in females. According to Atienza-Sahuquillo and Barba-Sánchez (2017), the style of thinking based on the generation of original ideas is closely related to the opportunities of innovative projects, whereas the style of thinking that prefers comprehensive and systematic methods is related to entrepreneurship. There is a link between the creative thinking style and the nature of entrepreneurial prospects. Based on the foregoing, the following study hypothesis can be developed:

**H1: There is an Impact of Work Teams on the Success of Entrepreneurial Strategic Projects.**

## **3 Study Model**

See Fig. 1.

## **4 Methodology**

### ***4.1 Population and Sample***

The study population was determined, which consisted of employees in 20 SMEs operating in the Jordanian market. Hence, the study instrument was disseminated simultaneously to a random sample of 850 employees via electronic means. At the end of the data collection process, 821 responses were obtained that fit the requirements of the statistical analysis. These responses accounted for 97.5% of the response rate, which indicates a fair representation of the target population and achieves the criteria for adequacy of sampling (Al-Hawary and Harahsheh 2014; Al-Hawary and Hussien 2017; Sekaran and Bougie 2016).

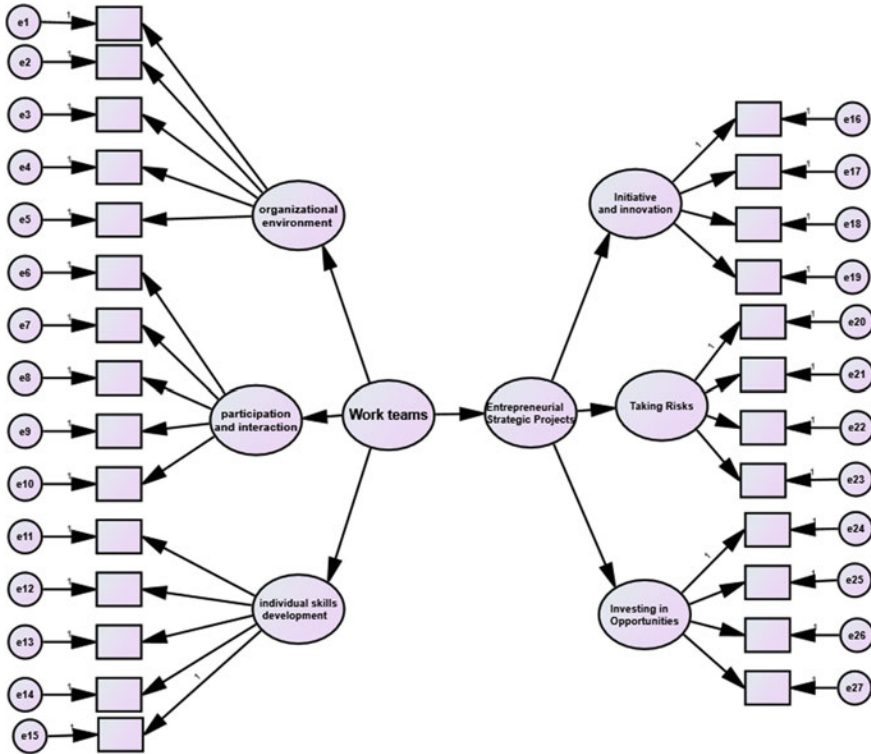


Fig. 1 Research model

### 4.2 Measurement Instrument

The electronic questionnaire was the main instrument for collecting the primary data for this study. This instrument consisted of three sections. Section one for collecting demographic data of the respondents, along with two sections for its major variables.

Section two was allocated to the independent variable, i.e., the work teams, which contained (15) items taken from Kaur et al. (2023). These items formed two dimensions for the work teams: five items for organizational environment, five items for participation and interaction, and five items for individual skills development. On the other hand, the last section of the study instrument contained the measures of the dependent variable, i.e., success of entrepreneurial strategic projects, which were evaluated using 12 items drawn from Jafari-Sadeghi et al. (2023) and Mbiru et al. (2023). The items of success of entrepreneurial strategic projects formed three dimensions with four items for each: Initiative and innovation, taking risks, and investing in opportunities.

## 5 Findings

### 5.1 Measurement Model Evaluation

To evaluate the impact of work teams on the success of entrepreneurial strategic projects, structural equation modeling (SEM) was relied upon as a modern approach to examine the interaction between latent constructs measured by observing variables (AL-Zyadat et al. 2022; Boudlaie et al. 2022; Mukhlis et al. 2022; Rahamneh et al. 2023; Wang and Rhemtulla 2021). The application of this statistical method requires subjecting the study instrument to a test of validity and reliability before conducting an evaluation of the effect size. Accordingly, confirmatory factor analysis (CFA), which is one of the SEM procedures using the AMOS software, was applied to extract the validity and reliability of a measurement model, which were reported in Table 1.

The loadings of work teams and the success of entrepreneurial strategic projects items were between 0.602 to 0.886, indicating that they were all retained as they were above the lower threshold of 0.50 (Al-Adamat et al. 2023b; Al-Hawary and Al-Smeran 2017; Al-Lozi et al. 2018; Shaqrah et al. 2023; Sung et al. 2019). The average variance extracted (AVE) values for the research latent constructs were greater than 0.50, which means that they met the convergent validity condition (Howard 2018). Moreover, the comparison results confirmed that the values of AVE were greater than the maximum shared variance (MSV), also, it indicated that the values of the square

**Table 1** Results of validity and reliability tests

Constructs	1	2	3	4	5	6
<i>Work teams</i>						
1. OE	<b>0.788</b>					
2. PI	0.749	<b>0.791</b>				
3. ISD	0.796	0.722	<b>0.819</b>			
<i>Entrepreneurial strategic projects</i>						
4. II	0.749	0.888	0.703	<b>0.729</b>		
5. TR	0.798	0.762	0.822	0.816	<b>0.708</b>	
6. IO	0.7242	0.768	0.763	0.829	0.601	–
VIF	3.119	3.352	3.859	–	–	–
Loadings range	0.711–0.859	0.729–0.813	0.759–0.886	0.768–0.853	0.602–0.839	0.622–0.878
AVE	0.733	0.744	0.742	0.734	0.744	0.759
MSV	0.528	0.629	0.559	0.739	0.529	0.695
Internal consistency	0.829	0.824	0.878	0.759	0.827	0.862
Composite reliability	0.829	0.882	0.853	0.831	0.873	0.879

root of AVE were superior to the correlation coefficients between the other constructs in the model. These results are evidence of achieving discriminant validity according to the Fornell-Larcker criteria (Rimkeviciene et al. 2017). On the other hand, the reliability of the measurement model constructs was verified by using Cronbach alpha coefficients ( $\alpha$ ) for internal consistency and McDonald's omega coefficients ( $\omega$ ) for composite reliability with a minimum of 0.70 for both measurements. The values of Cronbach's alpha coefficients (0.759–0.878) and McDonald's omega coefficients (0.829–0.882) were greater than 0.70, which indicates that the model constructs were reliable (Al-Rwaidan et al. 2023; de Leeuw et al. 2019; Muda et al. 2022; Saraireh et al. 2022).

## 5.2 Structural Model

Based on the results of Table 1, it became clear that there was no multicollinearity between the dimensions of work teams, where the values of variance inflation factor (VIF) for those constructs were less than 5 (Hair et al. 2017b; Majdy et al. 2023; Pallathadka et al. 2023; Zahran et al. 2023). In this context, it is possible to continue testing the hypotheses through SEM shown in Fig. 2.

The results of Fig. 2 confirm that the structural model for examining the impact of work teams on the success of entrepreneurial strategic projects in SME in Jordan gained appropriate values of the goodness of fit. CMIN/DF was less than 3, the values of CFI and TLI were greater than 0.90, along with the value of RMSEA which was smaller than 0.08 (Shaqrah et al. 2023). Accordingly, the standardized and unstandardized effect parameters were extracted and listed in Table 2.

The results demonstrated in Table 2 show that all work teams dimensions have a positive impact relationship on the entrepreneurial strategic projects. However, the results indicated that the highest impact was for taking risk ( $\beta = 0.366$ ,  $t = 16.459$ ,  $p = 0.00$ ), and finally Initiative and Innovation ( $\beta = 0.259$ ,  $t = 14.227$ ,  $p = 0.000$ ).

## 6 Discussion

The level of availability of work team dimensions in entrepreneurial projects in Karak governorate was high. The leadership dimension ranked first, and this confirms the push and encouragement of individuals towards the achievement of certain goals and the ability of the individual to influence each other. Degrees of adequacy in order to achieve the goals set, followed by the dimension of participation and interaction, and this indicates the importance of integrating individuals mentally and emotionally into the positions of the group, which encourages them to contribute to achieving their goals and shouldering responsibilities.

The organizational environment dimension came in third place, which is logical given that the organizational environment that surrounds the has a direct or indirect

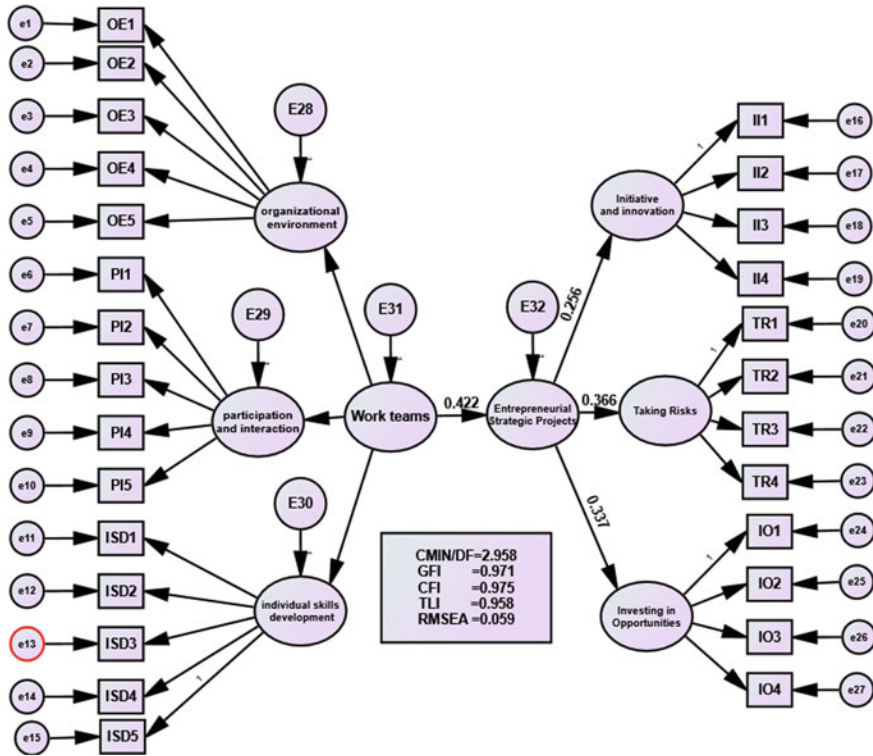


Fig. 2 SEM results of work teams on entrepreneurial strategic projects

Table 2 Hypothesis testing

Hypothesis	Relation	Standard Beta	t value	p value
H1	Work team → entrepreneurial strategic projects	0.422	14.556	0.000
H2	Work team → initiative and Innovation	0.256	14.227	0.000
H3	Work team → taking risk	0.366	16.459	0.000
H4	Work team → investing in opportunities	0.337	13.998	0.000

Note \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

impact on how it operates and affects how it obtains the resources needed to continue its work. While the individual skills development dimension came in last place, the main reason for obtaining the last place may be because the individual skills are not fixed and specific but rather multiple and varied. The administrative skills required for the director of the financial affairs department may not match the skills required for the director of monitoring and follow-up, and the results of this study agreed with what was stated in the study of Al-Hadrawi et al. (2018), and the study of Al-Nuwayqa (2014), whose results showed high levels in work teams.

The results also indicated that the level of success of entrepreneurial projects (initiative and innovation, taking risks, attracting and investing in opportunities) in Karak governorate was high, and the initiative and innovation dimension ranked first, followed by two dimensions, risk tolerance and investment opportunities, and perhaps the emergence of this high level. The level of success of entrepreneurial projects is a positive indicator because the success of the project depends on initiative, innovation, taking risks, and attracting and investing in opportunities. The results showed high levels of entrepreneurial projects, and the results of this study did not agree with what was stated in Mobeedin's (2016) whose results showed high levels of medium success in entrepreneurial projects.

## 7 Recommendations

The study recommends strengthening the trend towards increasing the dependence of entrepreneurial projects on work teams in executing tasks, especially the strategy, which is important for improving the performance and success of projects. And focus on strengthening the practices of work teams, which are important for the success of entrepreneurial projects, in addition to developing comprehensive strategies based on the best practices of work teams that support entrepreneurial projects, working on developing work teams and providing opportunities for all team members in decision-making, and finally supporting and motivating senior management of work teams and providing their needs and requirements for their application, which is important for positive success.

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# Artificial Intelligence, HR Systems and Engage Employees: A Literature Review



Faisal Alasfoor and Allam Hamdan

**Abstract** Artificial Intelligence (AI) has been implemented in HR Operations in different areas which includes employee engagement. Employee Engagement was highlighted to be the positive, loyal, and self-conscience behavior that employees have toward their organizations which helps to boost productivity and operational efficiencies and ultimately increase profits. Through the evolution of many motivation theories such as Theory X and Y, Workplace Generations Theory and Job-Demands Resources Theory, it was observed that employees are moving away from the traditional ways of motivation that are closely represented as carrot and a stick to a more participative approach where people have inputs to their task and duties, making these further motivating them since it helps them achieve their individual needs. Employee engagement was the next evolution in staff motivation and the much-needed adoption of AI in this area meant better and more efficient employee engagement which could help organizations achieve faster, more accurate results and more engaging results for it to maintain its competitive edge. The impact of artificial intelligence on employee engagement have had a positive response that have drastically been noticed in several areas that were highlighted by some of the studies.

**Keywords** Artificial intelligence · Employee engagement · HR systems

## 1 Introduction

With the continuous need for innovation in organizations in a highly competitive and dynamic marketplace, organizations keep facing challenges in improving, innovating, and improving quality of product or a service that is still at the customer requirements which required organizations to think of different solutions such as

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integrating IT solutions in their management strategy and the core of their business (Theodore et al. 2019). Innovation is required for organizations to keep their competitive edge against other organizations in the same industry (Anang et al. 2021). Many organizations tend to allocate assignments and work tasks to machines so that a reduction in cost and improvement in efficiency is observed, this sort of approach first started at the manufacturing industry and assembly lines to change from human resources to act as labor to mechanics that would take care of the repetitive tasks (Dopico et al. 2016; Jay et al. 2018). This has triggered the digital revolution that is also referred to as the 4th industrial revolution which has started transforming industry to being more data dependent in the business world (Wamba-Taguimdje 2020). With the reliance on sensors, artificial intelligence (AI), 3D printing solutions and big data and alternative reality, this sets the foundation of the innovative approach to managing organizations and how organizations choose to invest in financial and non-financial assets to meet its objectives (Álvaro et al. 2021). Without a doubt, AI has stood out to be the most invested, researched and implemented technology by many organizations in the past decade and it is defined as “theories and techniques used to create machines capable of simulating intelligence. AI is a general term that involves using a computer to model intelligent behavior with minimal human intervention” (Attila and Cecília 2009; Michael and Andreas 2019). AI have become the first thing that organizations think when trying to integrate IT applications to increase the efficiency of work and reduce costs as well as reducing repetitive tasks that can be outsourced to machines rather than dedication manual labor to, AI serves to be a replacement alternative for such applications. AI is looked at a way to transform the flow of work and the keeping or outsourcing of tasks to AI, this trend have been noticed in retail and customer facing operations, financial technology, call centers, appointment booking systems as well as voice assistants (Almansour 2023). Another field that AI has tapped into and led many to think of integrating AI with human resources (HR) management functions (Ali et al. 2023). Digitalization and adoption of Artificial Intelligence in the field of HR is the results of global movement toward continuous changes in job demands and the assistance that AI provides the organizations to be able to advance digitally to help in achieving multiple and difficult tasks which can be asked of AI to handle rather than people (Antonio et al. 2021). Studies suggest that AI can help employees’ confidence and self-reliance on outsourcing of some of their tasks to a digital solution which could improve the outcomes and drive productivity further (Maria et al. 2018). AI has aided HR in the improvement of several aspects of HR within an organization, such as recruitment and selection, digital interviews, training and development and managing performance. However, the impact of artificial intelligence on employee engagement and satisfaction remains an area that needs further study to measure the effectiveness and efficiency of employees in the workplace (Dagher et al. 2015).

Organizations are continuously challenged to look for higher levels of employee’s productivity and which required them to focus on the ensuring that they optimize their focus and drive on employee training, managing performance through providing constructive feedback, career progression, compensation, and benefits. Literature and studies have given a great deal of notion for employee engagement and

how it shows positive affect on the organizational performance and that employee engagement constructed from many disciplines such as management, health care, human resources development and overall management (Shuck and Reio 2011). The literature also added that the concept of employee engagement can be coined to Kahn's article which states that it is based on psychological conditions of personal engagement and disengagement in the workplace (William 1990). Highly engaged employees are determined and operate in a high cognitive state, and they create a positive connection toward their work and feel self-driven toward their work and they are enjoying working while being challenged (Vicente et al. 2006) and usually have self-motivation driven in their attitude and commitment toward their work and their company (Hakanen 2006).

## 2 Literature Review

Employee engagement role has long been regarded as the focus and allocated human resources of the business and elevated the levels, drive, and motivation of the talent within the business to excel in the way they achieve work. This statement agrees with Taha and Taha (2023) dimension of engagement (William 1990). Kahn's definition of employee engagement which has been used and cited by many researchers "a positive, fulfilling, work-related state of mind that is characterized by vigour, dedication and absorption." The definition can be understood that employee engagement has three major parts, cognitive which is derived from absorption, emotional which is derived from dedication and physical which is derived from vigour. The movement toward employee engagement and the focus that many organizations value it for, came through moving away from negative reactions toward tasks that the older generations and way of work used by many managers and leaders of organizations that could lead to job burnout and moving to a positive and thoughtful approach that like engagement in which organization can better optimize their workforce to be more productive (Mary 2011). A report by the Institute for Employment Studies indicated that more than 40 h practitioners participate in research in the UK which indicated a conclusive definition simple to understand by others on what defines employee engagement and it "positive employee attitude toward the organizations and its values, involving awareness of the business context, and work to improve job and organizational effectiveness" (Robinson et al. 2004). Kahn's three dimensions to employee engagement can be further understood by a research conducted the Chartered Institute of Personnel and Development in the United Kingdom (CIPD) to suggest that emotional engagement explores the employee emotional involvement toward the organizations and its values, cognitive engagement also suggests undivided attention and focus at work in hand by the employees and finally, the physical engagement is that the employees would go the extra mile and would come through to their organizations and employers (Chartered Institute for Personnel and Development 2006). Employee engagement can also be a result of theory X and more



supportive of theory Y and it is important to have a basis of understanding of the theories before doing a deeper dive of employee engagement role in organizations.

## ***2.1 Employee Engagement Theories***

### **Theory X and Theory Y**

Research shows that there are two theories that have influenced human motivation at work, and they are called, Theory X and Theory Y which were coined by Douglas McGregor at the Sloan School of Management in Massachusetts. Theory X suggests that people are not self-motivated to work and that they treat the workplace as an authoritative, optimized to be one sided communication and instruction, supervisor to subordinate. Employees operating in a Theory X model would naturally take minimal responsibility and prefer secure work environment that allows them to keep going with the minimal expectation. These employees are required to be heavily trained supervised, having strict key performance indicators (KPIs) to achieve and threat of disciplinary in observed in the employer—employee relationship and reward is given only to high performing employees who achieve their productivity quotas (Stephen 2020).

The data also suggests that Theory Y came at a later stage, and it allows for more employee voice to be part of the relation dynamics between the employer and employee. It is suggested that humans are self-driven to achieve their personal needs to be appreciated, recognized for their achievements, which also suggests that there was no need for direct supervision and threats of disciplinary actions. Theory X suggests also that managers focus on motivating their employees to work and be more disciplined through alignment of work duties with the personal needs of the employees that would lead to individual dedication and meeting organizational goals (Stephen 2020).

It is observed that theory X is more of a carrot and stick way of management where people are rewarded for achieving and disciplined for not achieving their KPIs. However, a later theory called Theory Z was started by Douglas McGregor and William Ouchi have completed the theory which suggests that the relationship between employer and employee goes beyond theory Y, and its an additional leap offering more employee focused management approach through different approaches such as offering long term and more secure employment, unique organizational strategies and values, focus on socializing of employees, offering job rotation, suggesting to standardize performance appraisal as a feedback mechanism to the employees, suggesting working in groups, allowing free flow communication, more consultative decision making approach and management would be concerned for employee wellbeing (Stephen 1983).

It is appropriate to suppose that through the generations, there is a clear change in the employee motivation management approach where it does away with the reward

and disciplinary approach to a more participatory approach that is much closer to the employee engagement functions that are practiced in this day of age.

### **The Generations Workforce Theory**

The research suggests that there are many generations that have led the workforce over the years, each generation has distinctive characteristics which allows managers to customize and better manage their approach toward such generation. Generation of traditionalists (1939–1947), generation baby boomers (1948–1963), generation X (1964–1978) and generation Y (1979–1991), generation Y also known as the millennial's generation and generation Z are people born after the year 1996 (Robert and Lauren 2010). In the majority of generational studies, researchers frequently used birth date ranges to establish a generation and a variety of demographic traits to characterize a certain generation (Cogin 2012). Each of the generations will have a set of behaviors and attitudes that shape them in such a generational category:

- Baby Boomers (1948–1963): they are described as having stronger work ethic, devotion, skilled, welcoming others, and trustworthy. They are also known for having specialized skills and value communication and patience. They are dependable and reliable through their life demands but don't consider working at the workplace to be fun (Bown-Wilson 2011).
- Generation X (1964–1978): people born in this generation would be more concerned about their social environment. For people in this generation, work is considered a fundamental requirement to achieve success and hard work is preserved as the way to ensure success (Rosa 2013)
- Generation Y (1979–1991): This generation have distinctive characteristics such as they are ambitious, they like status at work and the roles they fill, expecting fast rewards and upgrades at work and pay raise (Dogan Gursoy 2008). They would have entrepreneurship skills and a good educational background, and they are goal oriented on the professional and personal levels (Wawrzonek 2014). They also wish to lead their own working professionals as they like flexible hours of work, invested in the use of technology and they take a stand to making difference to develop competence in the area they are interested in (Kroenke 2015).

### **Job Demands-Resources Model**

This model states that job resources and employee personal resources would help in acquiring employee engagement at work and it also suggests that positive results on employee engagement can be observed when job demands are high in view of high resources availability (Bakker and Evangelia 2008). Research data shows that when high work engagement is observed, it positively impacted the individual and organizational productivity, such highly engaged employees are having innovative and creative behavior in the workplace and thus organizations are ought to find more people with this attitude toward work trait (Bakker and Evangelia 2008). This model

also suggests that employees with higher work engagement are more likely to be less impacted on their physical and mental health and would result in less probability of the employees having sick notes utilization and would have higher life satisfaction (Bakker and Evangelia 2008). These highly engaged employees would contribute more to the overall company's objectives and performance, they are more loyal and are less likely to misalign themselves from the organization's direction (Jonathon and Anthony 2008). Gallup stated in a report that disengaged employees will be unhappy with their job duties and will experience burnout more frequently and may leave the company, highly engaged employees are profit generators for the company (Gallup 2013).

Work engagement is the subject of two schools of thought. The initial one is by Maslach and Leiter. He believed that burnout and engagement were opposite ends of a continuum of work-related well-being. Engagement is the positive pole, and burnout is the opposite. Another way to put it is that job engagement is the positive opposite of burnout and that the dimensions of engagement and burnout are mutually exclusive. The aspects of work engagement are energy, participation, and efficacy, while the dimensions of burnout are tiredness, cynicism, and inefficacy. According to this perspective, the Maslach Burnout Inventory's engagement dimensions can be assessed using the opposite scores for the burnout dimensions (Helmi et al. 2020).

The second point of view comes from Alkadash and Tamer (2020), who claimed that job engagement is a distinct idea and the opposite of burnout. According to the most popular definition of work engagement, it has three aspects and strives to provide positive, meaningful, and gratifying employment (Helmi et al. 2020):

- Vigor—high levels of energy, mental toughness, and outpouring of efforts.
- Devotion—participation, sense of significance, and excitement at work.
- Absorption—complete attention and emphasis on one's task.

It is understood that each generation comes with characteristics that distinguish itself and therefore suggests a defined way of managing them. It is also noticed that as the generations evolve, they become more achievement oriented, have better educational background and that they are clear about their professional goals and needs, however they don't seem to share the same approach to being motivated. Like the theory X, Y and Z, it is evident that as the generation evolves, the need for focused motivation and engaging strategy is needed to ensure that they operate at their maximum efficiency zone. Generation Z shows a great deal of ambition and impression for fast-tracked career development. It is also evident in the Job Demands Resources Model suggests that highly engaged employees are much more productive and lead to more organizational profits which emphasis on the need for organizations to focus on hiring more of engaged employees and set operational strategies to keep them motivated and engaged for years to come as part of the organizational establishment and succession objectives.

Employee motivation approach have evolved over the years to adopt to each generation and theories from the reward and discipline to employee satisfaction to employee engagement and it is safe to accept that employee engagement have a define presence and effect on the motivation of the current and coming generations where

the more engaged there are, the more organizations expects operational performance to be positive and optimized to the level of available resources.

## ***2.2 The Role of Embedding Artificial Intelligence on HR Systems to Engage Employees***

Through this literature, a brief on artificial intelligence and a detailed review of employee engagement in organizations along with motivation theories review have been established. Further exploration of the impact of AI on employee engagement will be detailed to establish the real impact and how AI plays a bigger part in establishing employee engagement in organizations.

Hughes argues that AI Management Systems could help organizations engage their employees at the workplace by directing monitoring and rewarding desired outcomes from the employees (Hughes et al. 2019). The study conducted by Wamba-Taguimdje (2020) has found evidence that AI will benefit organizations at operational and process level (Wamba-Taguimdje 2020). Das and Chanda (2023) have also shown that AI has a great impact on the work conducted by the employees of the company in terms of flexibility, creativity, innovation, and autonomy which have improved the overall tasks achievement performance (Nishtha et al. 2021).

According to Hughes, the AI management system might offer workers that would participate in labor that was set by direction, supervision, and rewards. Millennials, a generation that is particularly familiar with social-media tools, are shaping employee engagement in the contemporary workplace. The introduction of internal social media platforms or software gives firms the chance to encourage employee cooperation and raise employee engagement. The usage of internal social media by employees increases the perception of corporate transparency and organizational identity, which in turn increases employee engagement (Dewie et al. 2022). As a component of an organization's ecosystem, artificial intelligence (AI) has the potential to have an influence, notably on performance, on the connections between businesses and their customers, prospects, and partners. These interactions are a crucial component in the evolution of processes, as well as the optimization and flexibility of organizational operations. Studies have studied how automatically sensed behavior might forecast work performance and how computer algorithms can provide managers insight into how their people are feeling (Dewie et al. 2022).

AI has already demonstrated its effectiveness in automating tedious and repetitive tasks, typically carried out by specialists like human resources administrators, salespeople, and small contractors. AI is a set or combination of various IT configurations and capabilities in various areas of an organization's business (de Broca 2018). Future companies and their leaders will likely have to contend with an "economy of power" where the pursuit of a market position will direct any organization's action plan to protect its decision autonomy, strategic flexibility, and improved competitive

advantage (Hefu et al. 2014). Such a position suggests a competitive market advantage and the assets necessary to value that advantage. Therefore, it is of importance to companies, academics, and practitioners to investigate how information technology and its capabilities enhance organizational performance (Ali et al. 2013). According to a study by Almaghaslah et al. (2023), leadership time spent on internal online networking platforms and adherence to the online networking code of conduct are both positively correlated with employee engagement. Employee participation in the modern workplace is influenced by Millennials, a group that is highly accustomed to using internet networking tools (Pawel 2015). AI has increased the speed and accuracy with which leaders can make choices. If the processed data or information is extensive, intricate, or dynamic, this is felt more and more. Because the human brain won't be able to handle it in this situation, the necessity for intelligent machine aid is developing. By limiting human judgment as much as possible, technology transforms into a tool that supports human decision-making (Emilia Sari 2020). Gallup research stated that companies that have engaged had many advantages such as lower absenteeism, lower turnover, higher productivity, fewer employee safety incidents, higher sales, fewer quality incidents and higher customer metrics (Emilia Sari 2020).

AI is utilized to identify habits that lead to subpar work performance. AI can recognize actions and circumstances that increase the risk of accidents. A new generation of survey tools may spot stress and unruly behavior trends and inform HR or line supervisors AI also helps in reducing fraud and improve compliance which help the employees reduce their stress and improve their ethical outlook through avoiding unethical pitfalls. Studies show that AI-enabled learning and development management gives the employees the opportunities to learn any shortfalls the AI systems detects which helps the employees in being ideal workers that for the employee, which will also lead to higher employee engagement, Artificial intelligence could also impact employee engagement positively through removing the human bias towards any bias criteria and ensuring being fair and impartial at all times (Ahmed 2018).

### ***2.3 Employee Engagement Drivers and Influencers***

Many HR practitioners focus on bringing better HR practices to help raise the levels of employee engagement and allowing unengaged employees to be interested in their jobs again, have better job satisfaction, then better employee engagement and lower employee turnover (Mishal Raza 2018). Mishal (2018) has focused his research on the drivers of employee engagement and categorized them in the following areas:

- Performance Related Rewards.
- Decision Making.
- Communication.

Bedarkar and Pandita (2014) have also added the following areas to be part of the fundamental drivers of employee engagement (Bedarkar 2014):

- Work-Life Balance.
- Leadership.

### 3 Conclusion

The objective of this literature review is to establish the role of embedding artificial intelligence in HR systems to engage employees and how organizations benefit from the AI-based employee engagement approach to motivate employees to be as efficient as possible to achieve organizational objectives. Through this literature, it was concluded that employee engagement is a crucial part of management of any successful organization. Different researchers define employee engagement to the levels of how emotional do employee feels passionate and are committed toward the organizations objectives and if they are willing to go the extra mile to achieve success. Engaged employees are more productive and satisfied with their work. Several theories were explored to understand human motivation at the workplace, and it was noticed that with the evolutions of the generations of employees, human's motivation then to be geared toward employee engagement which allows the employees to feel as they are an integral part of their organization. The impact of artificial intelligence on employee engagement were reviewed with number of researches and academic papers suggests that there is a direct impact from artificial intelligence on employee engagement as it helped ensuring staff productivity where optimum through adopting mundane tasks to AI, showing how AI influenced employee engagement when there were clear statistical data provided by Gallup that shows that better AI adoption on employee engagement results to improved attendance, reduction in absenteeism and work related incidents and improved overall employee satisfaction.

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# The Role of Coaching in Improving Employee Performance: Literature Review



Fatema Ali Hasan and Allam Hamdan

**Abstract** This paper investigates how coaching impacts employee performance in Bahraini businesses. By looking at coaching creative and motivating intervening strategies that result in improved employee performance, it seeks to close the gap in the Bahrain market. In order to assess the impact of coaching on employee creativity and motivation, and subsequently on employee performance, this study utilized a qualitative case study technique within an exploratory framework. Quantitative research methodology will also be used in this investigation because through this strategy, this research can choose a survey method. The results of this investigation will help managers and scholars to reveal coaching in the Bahrain companies, its effects, and its implications on employee performance.

**Keywords** Coaching · Employees · Employee performance · Skills

## 1 Introduction

Coaching is feedback intervention used to help people develop their professional skills, social awareness, and personal effectiveness. Coaching is a process that provides individuals with the “skills”, “knowledge”, and “chances” they require to advance professionally and become more effective. Coaching is defined as a “directed”, “planned”, and “regularly” evaluated improvement process that moves a participant closer to the optimal performance level for their current position in an organization. (Nuryanti et al. 2019).

Coaching is the procedure of working with an employee to help them learn and develop so that they can reach their full potential and perform at a higher level. Improvements in performance can be attributed to coaching because it is a sort of personal growth that helps people become more self-reliant and self-directed

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(Lyons and Bandura 2022). Coaching may significantly improve employee performance by aiding individuals in recognizing and overcoming difficulties, acquiring new skills, and reaching their professional goals. Effective coaching has the potential to encourage workers to take charge of their development and work towards improving their performance. The initial focus of coaching is based on things like performance evaluation data, changes to the job, and new organizational initiatives.

Coaching can help employees figure out what they do well and where they need to improve. Coaching could help a worker figure out what their strengths and weaknesses are. This information can help them work on their weaknesses and build on their strengths. If a worker knows what they do well and what they need to work on, they can focus on improving certain areas. Coaches can help workers set goals that are clear, measurable, attainable, important, and limited by time. This helps employees stay focused and motivated and gives them a clear path for their professional growth (Pelaez and Salanova 2020).

Coaches can help employees learn new skills and improve the ones they already have. This can be done through on-the-job training, mentoring, and other ways to grow. Coaching can help employees develop the new skills they need to do their jobs better. This could lead to more confidence and better performance. Employees can gain confidence in their skills with the help of coaching. By giving support and encouragement, coaches can help employees get over self-doubt and take on new challenges (Adeosun and Owolabi 2023). A coach can help an employee set goals and understand what is expected of them, so that they know what they are working towards. This can boost motivation and help you focus. Coaching has a clear link to employee growth, job performance, and career opportunities. When an employee's performance isn't up to par, a coach can work with them to find out why and come up with a plan to fix the problem (Achi and Sleilati 2016).

Coaching can help employees understand their roles and responsibilities at work. It can help people align their goals and priorities with the organization's, which can lead to better performance. Coaching can be a good way to get people to work harder. When employees get consistent feedback, praise, and help, they are more likely to feel like their work is valued and to be interested in it. Coaching can help managers solve problems with employee performance. By giving constructive criticism, managers can help employees figure out where they need to improve and come up with ways to fix these problems. Coaching can make it easier for managers and employees to get along well with each other. Managers can show they care about their employee's success by giving them feedback and help on a regular basis. This makes employees happier and better at their jobs (Wahome and Ogolla 2021).

Coaching can assist employees in comprehending what is expected of them and what they must do to satisfy those expectations. Making goals and objectives clear, employees are better able to put their work in order of importance and focus on the most important tasks. Coaching can help employees get the help they need to be successful. By working together with a coach, employees can get advice and help when they face problems or roadblocks. This can help them stay motivated and focused on their goals so they can reach them. Coaching can get employees to think about their performance and find ways to improve. By looking at their strengths and

weaknesses, employees can learn more about themselves and what they can do. This can help them become more aware of themselves and make better decisions about their careers. Employees can acquire mindset through coaching, in which setbacks are viewed as chances to learn and grow rather than as hurdles to their success (Pousa and Mathieu 2014).

By providing them with the necessary support and assistance, coaching can help employees feel more engaged with their work. Coaching can assist individuals in developing their communication skills, leading to increased collaboration with coworkers, client encounters, and leadership. Education can Coaching can help employees accept responsibility for their performance and be more accountable for their actions, leading to enhanced results. Coaching makes employees feel more valued and supported, which can increase their job satisfaction and dedication to their employment.

## 2 Literature Review

Saad (2022) Coaching is a process that aids one in reaching their personal growth. The purpose of this research is to compile evidence for the positive effects of coaching on performance of organization in the “Middle Eastern” healthcare industry, with the hope that this will persuade business leaders to implement coaching strategies. This study has collected responds from 195 respondents from 13 healthcare centers. Almost more than 70% agree or strongly agree that coaching is helpful in reaching personal goals because it improves the ability to identify talents and take action on them. Coaching, according to the study’s participants, helped them think more creatively, felt more encouraged, and had more choices for balancing work, life, and relaxation. The results of this study indicate that coaching is beneficial for a number of reasons, including fostering open communication with managers, helping the company “reach its goals”, “decreasing absenteeism”, “and increasing output”, and “keeping quality” of work high. Coaching methods and a reorganization of the company’s management structure could boost morale and output, leading to better results for the business as a whole.

Zheng et al. (2022) the goal of this article is observe the impact of “managerial coaching” on “employee creative performance” using knowledge transfer theory. A moderated mediation model has developed and tested on 74 “South Chinese” business leaders and 292 workers in a dyadic sample. “Creative Process Engagement” mediates the connection between managerial coaching and creative performance, and innovative climate strengthens the relation among variables. This study adds to the body of knowledge on managerial coaching and innovation by elucidating the role of engagement in transmitting.

Wahome and Ogolla (2021) the performance of employees is a key factor in a company’s ability to stay competitive over time. The goal of this study was to find out how performance coaching affected how well “Tetra Pak Limited”, Kenya, employees did their jobs. This study has used descriptive statistic method and random

sampling technique for collection of data. This study collected respond from 150 respondents. This study analyzes collected data with help of correlation and regression with help of SPSS. The results showed that coaching at work has a good and statistically significant effect on how well employees perform their jobs. The study suggests that “Tetra Pak Limited” strengthen parts of performance coaching, such as programs that help employees figure out their skills and interests and opportunities for employees to find and develop new skills, in order to improve the performance of its employees.

Tri Wijayati et al. (2020) Employees are the most important part of businesses. Whether a company is good or bad is based on how well its workers perform their jobs. The goal of this study is to find out how the effect of coaching on job success is changed by the support of coworkers. This study observes how coworker support affects the link between mentoring and job performance of employees in XYZ organization. The study collect data from 80 respondents and used PLS (Partial least square) method for analyzing data. The study’s results show that coaching has a big effect on how well employees perform their jobs.

Sidhu (2019) the goal of this study is to examine how coaching affects employee performance in “Malaysia” through the medium of reward and recognition. Many previous studies have examined the link between coaching, rewards and recognition, the impact of rewards and recognition on performance. Based on a literature survey, researchers here created a questionnaire with separate sections for measuring dependent, independent, and mediating variables. Here, we use Employee Performance as the dependent variable. Performance of Employee is the “dependent variable”, and coaching is the “independent variable”. The research used a survey approach, with participants responding to a Likert-scale form. Non-probability and choice samples were used to compile these results. Two-hundred questionnaires have sent out to workers in Malaysia who have served as either a teacher or a coachee. This study found a positive and significant relation among variables.

Nuryanti et al. (2019) the goal of this study is to explore how coaching affects performance of employee at “PT. Sari Ater Hotel” & “Resort Subang”. This study has used descriptive statistic and a survey method for collection of data, study has distributed questionnaire among selected 62 respondents sample and study has used saturation sampling method. The data was analyzed using basic linear regression analysis. This study found that coaching has impact on employee performance.

Ali and Ali (2018) HRD (Human resource development) professionals are beginning to place an emphasis on coaching. Researchers in the fields of “HRM”, “organizational psychology”, and related fields have recently started to examine the dynamics and results of managerial coaching. As a tool for improving staff attitudes and behaviors, managerial coaching has gained popularity in the fields of HRM and organizational development. The aim of this article is to observe the impact of “managerial coaching” on “employee performance”. The data has gathered from a Pakistan’s government agency. A total of 183 respondents filled out the surveys. The results of study showed that coaches can improve worker performance by providing them with direction on the job. “Work engagement”, “leader-member exchange quality”, “job satisfaction”, and “desire to quit” all found to be indirect channels through

which managerial counseling influences employee performance. This research put in to the scant literature on the topic of “managerial coaching”, as well as the fields of leadership studies, organizational behavior, employee involvement, and organizational effectiveness. There has also been a lack of research into the mediating roles played by the nature of leader-member exchange and job engagement. Possible future directions for study and application are also addressed.

Raza et al. (2017) this article investigates the “direct & indirect” connections among managerial coaching and employee performance. This study has used self-made questionnaire, and collected data from 280 respondents from a “Pakistani Pharmaceutical industry”. According to the hierarchy regression analysis, coaches who provide guidance to their employees see positive results in terms of “employee engagement”, “productivity”, and “satisfaction on the job”. This study provides empirical evidence regarding the effectiveness of social exchange theory-based managerial counseling in Pakistan.

Achi and Sleilati (2016) Effective HRM is also regarded as a main source of “competitive advantage”. Thus, in order to get better the organization’s performance, HRM invests in its HC (human capital) to improve their skills through the use of contemporary methods such as coaching. The aim of this study is to explore affect of coaching on employee performance in the “Lebanese financial sector”. The aim of this study is to fill the gap in the “Lebanese market” by investigating “creative and motivating” coaching interventions that result in better employee performance. This study uses a qualitative case study method and an exploratory approach to look at how counseling affects employee creativity, motivation, and, in turn, performance. The study’s findings try to help managers and academics comprehend coaching in the Lebanese banking industry for improving employee performance.

Neupane (2015) the goal of this study is to investigate how providing employees with counseling and mentoring can improve their performance in the hotel business in the UK. The study also looked at the impact of coaching and mentoring on business results and the degree to which these initiatives improved employee performance. This research makes use of a cross-sectional, inductive and quantitative approach. The study has collected data from 172 respondents from “22 UK Hotel’s executive and coaches who have coaching or mentoring responsibilities. The survey technique, which involved the use of structured questionnaires, was used to gather information. This study has used “mean”, “correlation”, and “regression” for analyze the data with help of SPSS 20. This study found a positive connection between coaching, employee and organizational performance. This paper has strength because the samples were all taken from lodgings, which are very similar platforms. This makes for a very accurate review. The study was done in a limited amount of time, with limited resources and costs, and without support from outside sources. The data came from only 22 hotels, so it may not be a good representation of the UK hotel business as a whole.

### 3 Conclusion

Given the differences among theories of commitment, it may not be persuasive to use just one theory of commitment to support an experiential learning strategy that a manager in a coaching capacity will use. There has been a lot of study on the transactional/investment theory, but most of it focuses on the quality of relationships rather than employment and work. Some managers may find it challenging to consistently emphasize and support employee investments in the workplace. To put it another way, the design proposed in this paper must put the generation and acknowledgement of investments first. It may be challenging for certain managers to perform consistently because such behavior requires an investment on the manager's behalf. It might be a constraint to restrict the approach to experiential learning. A management may also employ various strategies to aid in developing the investment-learning-commitment nexus. For instance, the effective use of a catastrophic occurrence that is directly related to the employee's position and tasks at work can encourage engagement in learning and changing. When using such a technology, the manager would need to be very clear about what their function is. The model provided in this paper anticipates relationship building between employee and manager as part of learning, growth, and change. There should be no doubt about the financial commitment made by both parties to the experiential learning approach. It is necessary to continuously and consistently acknowledge the investments and maintain their presence. Some participants could find this challenging, therefore both parties must be totally committed. Finally, the provided action plan provides a reference and an illustration of how to increase employee commitment while fostering learning, development, and success. We are aware that committed employees perform better, are more interested in their work, and are more likely to stick with a position and a company.

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# Sustainable Innovative Approaches of Digital Technology in Business Training and Employee Performance: Literature Review



Fatima Ahmed and Allam Hamdan

**Abstract** Since the days of tedious lectures and lengthy PowerPoints, corporate training has come a long way. Innovative approaches and digital technologies are currently revolutionizing the way businesses train their personnel. Companies can make training more interesting, dynamic, and successful by adding new tools and techniques. Despite the potential benefits of such strategies, businesses may confront a number of challenges. One of the issues is determining the best way of learning for personnel who are dealing with frequent changes in information. The purpose of this study is to measure the effectiveness of innovation approaches and digital technology in business training sustainability. This study is considered as explanatory and analytical research which investigate the relationship between innovative approaches and digital technology, and its effectiveness on the staff performance within business training. The data were analyzed using previous journals and articles of the study. The finding revealed that based on reviewed journals there is positive significant relationship between innovative approaches, digital technology and employee's performance.

**Keywords** Innovative approaches · Digital technology · Business training · Employee performance

## 1 Introduction

The concept of education and training for sustainability has been supported since 1992, when it was established as a main issue at the United Nations Conference on Environment and Development (UNCED) in Brazil. The issue has been characterized as urgent, and UNESCO now regards learning as a top priority, strongly tied to fundamental human rights, and a driver of sustainable development. UNESCO is also

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entrusted with directing and organizing the 2030 Agenda for Learning and Development, which seeks to provide individuals with the information, values, skills, understanding, attitudes, and behaviors compatible with a more sustainable way of life. UNESCO is the United Nation's specialized learning and development organization (United Nations 2015).

According to (Amir Mohammad Colabi 2022), the topic of business sustainable development has become relevant and worrisome for many scholars and directors nowadays. Indeed, managers regard the principles of business sustainable development as a contentious issue, owing to a rising awareness of their benefits and favorable effects on firm survival. Furthermore, the necessity to adapt to a dynamic and high-demand environment brought about by globalization and the rapid development of technology is one of an organization's most significant challenges. It is said that in order to build sustainability principles in company, it is necessary to develop the proper sustainability attitude among employees and include sustainability concepts into organizational structure (Amir Mohammad Colabi 2022).

In this Respect, due to training and development ability to enhance skills and competences as well as increase business's competitiveness on the labour market, training and development in the business sector has grown to be one of the most important Human Resource practices (Armstrong 2017). Numerous innovative approaches are beginning to gain popularity as alternatives to conventional methods to ensure successful knowledge transmission, as spending in training is expected to result in a positive return for the employees (Mielniczuk 2017). Furthermore, (Lowood 2023) that in addition to creative techniques, digital technology actively contributes to corporate sustainability training.

Innovative education for a sustainable future is now a must, not a luxury. Traditional training approaches are losing their effectiveness due to the rapid developments in technology and the growing need for a competent workforce. Companies today are using the most effective training techniques available, including gamification, game-based learning, micro-learning, mobile learning, blended learning, artificial intelligence, and virtual reality, to stay up. These training techniques produce interesting and efficient training programs by fusing education, psychology, and digital technology (Asian Development Bank 2020).

In this article, the author will identify the innovative approaches and digital technology of business training. Besides, will measure the effectiveness of innovative approaches and digital technology within business training sustainability on employee's performance based on previous articles.

## 2 Literature Review

Corporate training has always been important to the corporate world, but lately it has taken on an even greater importance. Digital technology and innovative techniques have changed the way corporate training is handled, and as organizations continue to expand and adapt to the fast-paced digital era, the need for innovative and sustainable

training strategies has become more and more obvious (Birou 2018). According to studies, firms have been able to embrace a variety of innovative techniques because to technological improvements (Fred Muya Nafukho 2022; Mielniczuk, 2017).

Technological innovation has been revolutionizing the corporate training environment in the Kingdom of Bahrain (Al-Cheikh 2013). With the introduction of digital technology and creative training methods, businesses are now able to offer their employees more efficient and long-lasting training programs. This literature review aims analysis Bahrain's business training experience besides, other proposals in the field of innovative approaches and digital technology; The following topics will deal with the research goal:

- (1) The innovative training approaches and digital technology of business training.
- (2) Measure the impact of innovative approaches and digital technology within business training on employee's performance based on journals.
- (3) Finding the advantages of innovative approaches and digital technology of corporate training.

## ***2.1 The Concept of Innovative Approaches and Digital Technology***

**The Concept of Innovative Approaches.** Innovative training strategies have drawn a lot of attention recently as businesses look to improve the efficiency of their employee training initiatives. These methods are created to address the particular requirements of the modern workforce, which is distinguished by diversity, technological innovation, and dynamic work situations. Enhancing employee performance, productivity, and overall corporate success are the objectives of creative training. Gamification, game-based learning, microlearning, blended learning, and mobile learning are just a few of the cutting-edge training strategies that have been developed (Baloyi 2019; Madgavkar 2022).

Many alternative theories might be used to describe the idea of innovative approaches. However, the focus of this study is on creative training approaches as described by the following authors. According to (Miller 2020) an innovative strategy is one that enables any business to create fresh concepts and cutting-edge approaches. On the other hand, (Aula 2020) has reported that the innovative method is the art of spreading information. Further, based on (Gommer 2018) innovative approaches are any policies, structures, methods, processes, or opportunities that a company management could consider novel. Additionally, Harvard Business School (2020) defined innovative ways as the instruments used in the course program that aids students in understanding necessary knowledge via the use of imaginative strategies since it may encourage strategic thinking that enhances team performance.

**The Concept Digital Technology.** The variety of training techniques that are accessible to businesses has increased because to developments in instructional technology, which have also made it possible to better match training techniques with intended results. A number of advances in education were introduced starting in

the 1980s, including the use of videos and simulations, on-the-job training, and the instructional system design ISD paradigm. The increasing use of personal computers and the development of computer-based training in the 1990s led to a reevaluation of conventional staff training approaches. The quick uptake of computer-based training was assisted by its speed, visual presentation, and accessibility of several learning resources from a single computer; training options increased to incorporate more computer-based possibilities in the late 1980s and early 1990s (Carton 2020).

Additionally, the development of the Internet and computer-based training at this time laid the groundwork for the sophisticated e-learning systems used today. As a result, using technology in corporate operations and training helps to ensure business sustainability. According to (Adeosun & Owolabi 2023), there are a variety of ways to express the notion of digital technology. Electronic systems and gadgets that represent data using binary code (0 and 1) are referred to as having digital technology; these two numbers are known as bits and are the foundation of all digital technology. However, the study's intended aim is as follows according to (Muhammad Bello Nawaila 2020), who defined digital technical training as an instructional approach that uses technology to convey material and assist learning. As well, it is computer software and other resources created specifically for staff training are referred to as training technology as determined by (Cascio 2019).

The affordability of technology-based training is one of its key advantages. Another advantage of training technology is flexibility, which enables learners to fit training into their busy schedules and study at their own speed and on their own terms from anywhere. There is no need to rent classroom space, hire instructors, or pay for participants to travel (Adeosun & Owolabi 2023).

## ***2.2 The Impact of Innovative Approaches and Digital Technology Within Corporate Training on Employees Performance***

**Corporate Training Concept.** Corporate training is the practice of transferring information and abilities to staff members of an organization (Patra & Roy 2023). The primary idea of corporate training, according to (Jassim et al. 2020), is to comprehend its goals, advantages, and different kinds. According to (Mamatelashvili 2020), it is a crucial element of organizational growth that aids companies in achieving their objectives. Yakovleva 2019 contend that the main goal of corporate training is to increase employee's productivity, efficiency, and performance via the acquisition of new skills and knowledge that are necessary to successfully carry out their job obligations. By ensuring that employees have the skills and information required to fulfil the shifting market needs, corporate training also aims to assist firms in remaining competitive in the marketplace (Al-Cheikh 2013).

**Employee Performance Concept.** Employee performance, according to (Cascio 2019), relates to the quality and effectiveness of an employee's job production.

(Madgavkar 2022) contend that it is a gauge of how successfully a worker carries out the duties and activities that have been delegated to them. The author of this study will examine how training techniques and digital technologies affect employee's performance. Based on (Torraco 2016), evaluating training effectiveness is essential to determining how the training program will affect the performance of the employees and the organization as a whole. Various methods are used to evaluate the training's impact on the employee's behaviour, skills, and knowledge. To determine the employee's satisfaction with the training program, it involves evaluating the employee's performance on the job both before and after the training and conducting questionnaires and feedback sessions. The assessment method also assists the organization in identifying the training's strengths and shortcomings so that the required adjustments may be made to increase the efficacy of the training program (Ahmad et al. 2022).

**Gamification.** We are surrounded with games, which have the ability to influence individuals to take actions they otherwise wouldn't. After corporate strategists and educators realized how games may increase motivation and engagement in people, this invasion of our modern world started ten years ago. Many believed that this might be used to boost company productivity and educational learning. As a result, gamification as a notion was created. Gamification is the usage of gaming elements outside of a game setting (Amir Mohammad Colabi 2022). Gamification was also described by (Jeanine Krath 2021) as the fusion of work and play; it enables for the enjoyment of fun interactions while striving to deliver excellent outcomes in training. Gamification may be used to inspire students and boost engagement. Learners are encouraged to accomplish activities and reach objectives by including components like points, badges, leader boards, prizes, feedback, and challenges (Mercedes Grijalvo 2022).

Training in compliance, onboarding, and soft skills may all benefit from the usage of gamification. The fact that gamification raises learner engagement is one of its advantages. Engaged students are more likely to retain knowledge and use it in practical settings. Gamification also offers immediate feedback, enabling students to monitor their development and spot areas for growth. As a result, learners become more motivated and are inspired to keep studying (Miller 2020).

**Game Base Learning.** While gamification uses game mechanics to enhance the learning experience, game-based learning takes it a step further. In game-based learning, students are immersed in a virtual setting that replicates real-world circumstances. With this approach, learners may practice and apply their talents in a secure setting without worrying about any negative outcomes in the real world (Kulkarni 2022). Jeanine Krath 2021 defines game-based learning as a method that makes use of games to teach a certain topic or skill. Games offer a hands-on, immersive learning environment that may boost motivation, information retention, and the development of skills and self-assurance. According to (Alkadash 2017), game-based learning is the use of games to impart certain knowledge or abilities. Thus, according to (Aljraiwi 2019), game-based learning is the process of instructing and training learners utilizing games, simulations, and virtual environments.

Different types of training, such as technical training, leadership development, and customer service training, may all benefit from game-based learning (Aljraiwi 2019).

**Micro Learning.** According to (Patra & Roy 2023) the idea of microlearning is the distribution of training information in small, manageable units that can be finished quickly and easily fit into learner's busy schedules. According to (Heidy Robles 2023) it makes it simpler for staff members to take in and remember knowledge since it enables them to master new abilities in manageable time intervals. This method may be readily incorporated into the workplace and gives employees the freedom to study at their own speed. In contrast, (Little 2014) defined micro-learning as the use of brief and targeted learning modules to impart certain knowledge or skills.

There are several ways to use microlearning, such as through podcasts, infographics, quizzes, and videos. Microlearning facilitates employee retention and engagement by segmenting complicated topics into smaller, more digestible units, making it simpler for individuals to apply their newly acquired abilities to their jobs. Microlearning has been demonstrated to boost employee retention rates and decrease the need for retraining (Little 2014). As a result, firms are able to minimize the frequency and expense of training programs, resulting in a more sustainable approach to corporate training. To improve learner's retention and understanding, micro-learning makes use of cognitive psychology concepts including chunking, repetition, and spaced learning. With microlearning, students may access quick learning sessions whenever, anywhere, and on any device (Patra & Roy 2023).

**Blended Learning.** The idea of blended learning is not new. It is thought to have initially surfaced in the late 1990s and comes from corporate training and development in the U.S.A. A contemporary method of teaching called blended learning blends digital technology with face-to-face training. It is a hybrid paradigm that gives students some autonomy over their educational process (Awwad & Razia 2021). By offering a selection of learning resources that are tailored to the specific requirements of each student, blended learning is intended to suit various learning preferences and styles (Arney 2014). According to (Harrison Whiting 2022) blended learning is a procedure where more conventional training techniques (in-class, instructor-led) are coupled with online learning materials to produce a more flexible user experience.

According to (Harrison Whiting 2022), blended learning is distinguished from e-learning by having lower educational costs. In addition to improving the human elements and social interactions between students and teachers, it also offers a face-to-face connection and the freedom to address all matters of unique requirements and learning preferences of trainees with disparities in their ages and levels.

**Mobile Learning.** Mobile learning is one of the most innovative methods of education that is gaining popularity across the world. Mobile learning is the idea of learning in many circumstances while using personal electronic devices for social and content exchanges (Heidy Robles 2023). Through mobile devices like smartphones and tablets, it is a teaching strategy that enables students to access instructional resources whenever they want, from anywhere (Fezile Ozdamlia 2011). According to (Masoud Hashemia 2011), mobile learning is a flexible and practical method of education that employs technology to expand learning outside of the conventional

classroom. Due to trainee's ability to access educational resources that are catered to their learning needs, mobile learning has also made education more customized and interactive (Fezile Ozdamlia 2011). As long as they have an internet connection, this type of e-learning allows students to access course materials whenever and wherever they choose (Kannan 2018).

**Virtual Reality.** Virtual reality According to (Kavanagh 2017) is a technology that replicates a user's actual physical presence in a virtual or fictional world. Although virtual reality has been an idea for many years, technological improvements have made it more accessible and engaging. A human can engage with a synthetic three-dimensional (3-D) visual or other sensory world by using computer modelling and simulation, according to (Freina 2015). Users may interact with the virtual environment using a headset and portable controllers, and the environment is constructed using computer-generated images. Many industries, including entertainment, education, healthcare, and engineering, put virtual reality to use. Virtual reality may be used in education to develop immersive learning experiences that give students a more engaging and participatory manner to examine scientific or historical subjects. Virtual reality may be utilized in the healthcare industry to imitate medical operations, giving physicians and nurses the chance to hone their abilities. Virtual reality may be utilized to provide immersive gaming experiences in the entertainment sector, giving customers a more interesting and lifelike gaming experience (Boyles 2017).

**Artificial Intelligence.** The phrase "artificial intelligence" (AI) was first used in 1956, which marks the beginning of the field's history. According to (Li 2017), artificial intelligence (AI) is a computational method to creating intelligent software and systems that can solve complicated issues by adopting human intellect and functioning in ways that are similar to how humans think, learn, perceive, and make decisions. On the other side, AI may assist companies in increasing work effectiveness and efficiency, lowering expenses, and enhancing consumer experiences. Corporate training is undergoing a significant transition as AI develops. AI is being utilized to develop individualized training plans that are catered to the requirements of every single employee. Due to AI's ability to analyse data on a person's performance and learning preferences, training programs may be tailored specifically for each individual (Kaestner 2022). One of the advantages of using AI in corporate training is that it can provide real-time feedback to employees on how they can improve their safety practices. This can help reduce accidents and injuries in the workplace. This is particularly useful in industries where safety is a concern, such as manufacturing or construction (Green 2017).

### ***2.3 The Advantages of Innovative and Digital Technology***

Gamification gives students a sense of autonomy, mastery, and purpose, which inspires them to study and succeed. Gamification promotes positive behaviours and attitudes by providing prizes, feedback, and recognition (Amir Mohammad Colabi 2022).



Game-based learning fosters a sense of immersion, presence, and realism, which increases the impact and memorability of learning. Game-based learning enables learners to experience and practice skills in a safe and supportive environment while imitating real-life events and obstacles, which leads to improved performance (Kulkarni 2022).

Microlearning enhance Retention: by utilizing repetition, feedback, and reinforcement, microlearning aids students in remembering and applying what they have learned. Microlearning makes learning easier to understand and more accessible by dissecting complicated ideas into manageable bits and presenting them in a fun and engaging way (Casco 2019).

Blended learning boost feedback: Learners who use blended learning receive quick and relevant feedback, which aids in the improvement of their abilities and comprehension. Collaboration is another advantage of mixed learning. By allowing students to compete, engage in motivational activities, or work together, blended learning promotes cooperation and social learning (Arney 2014).

Mobile learning has several advantages for training such as: Flexibility: Learning is more convenient and flexible thanks to mobile learning, which enables students to access content from any location and on any device (Ozdamlia 2011).

Virtual reality support adaptivity: virtual reality makes learning more individualized and efficient by adapting to learner's requirements, preferences, and talents. Virtual reality adapts to each learner's unique learning preferences and challenges them properly by changing the game's level of difficulty, tempo, and material (Green 2017).

Artificial Intelligence reinforce innovation: by posing challenges, posing issues for them to solve, and opening up new opportunities, artificial intelligence motivates learners to think critically and creatively (Li 2017).

## 2.4 Conclusion

Organizations are always racing to keep ahead of their competition in today's fast-paced business climate. To achieve this, organizations must invest in their employee's continuous learning and development (Al-Cheikh 2013). One effective way to do this is by implementing innovative approaches in training and leveraging digital technology (Harrison Whiting 2022). By doing so, companies can ensure that their staff not only keep up to date on industry trends and advancements, but also learn new skills that improve their overall performance (Armstrong 2017). Numerous studies have proven that innovative strategies are a beneficial investment that boosts an enterprise's future profitability while also helping to improve its company reputation among existing staff and potential recruits (Arney 2014; Maity 2019; Harrison Whiting 2022). Asian Development Bank 2020 suggest that human resources training is effective in opening up employee's professional skills and increasing their competency of innovation, which can lead to promoting creativity in the workplace. Amir Mohammad Colabi 2022, Freina 2015 also supports this notion, stating that reliance



on workforce technology can have a positive impact on capabilities, skills, jobs, and training.

Furthermore, the use of digital technology into training programs may improve information management, motivation, cost and effort savings, productivity, and employee engagement (Armstrong 2017). The impact of digital innovative approaches to corporate training on employee performance cannot be neglect. Investment in training programs that incorporate digital technology and innovative approaches can lead to increased employee competency, leadership, integration, cooperation, and creativity, which can benefit the organization's productivity, profitability, and long-term success (Green 2017; Kannan 2018).

However, despite the potential benefits of such programs, there are several challenges that companies may face. One challenge is choosing the method of learning for employees who are busy with the rapid changes of knowledge is still a separate problem; the need to constantly update and modify training programs to keep up with new technologies and trends, which requires significant investments in time and resources. Another challenge is resistance from employees who may be resistant to change, especially if they have been working at the organization for several years; this resistance may be due to factors such as limited access to technology or a lack of IT proficiency skills (Alemu 2015).

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# The Impact of Workplace Environment on the employee's Performance



Fatima Faez, Allam Hamdan, and Fatema Abdulrasool

**Abstract** A workplace environment includes various elements that comprise the corporate settings that impact the employees and their performance. These elements include different aspect such as open and clear communication, provides growth opportunities, healthy work relationship, equity and rewarding system. Workplace environment plays an important character towards the employees' productivity and performance. Creating a healthy workplace helps to increase the job satisfaction, morals, boost the productivity and performance, lowers the absenteeism numbers, and creates better relationship and bond between the employer and the employee. It is important to take into consideration the workplace environment of the corporation that contains collection of behavioral and situational factors that build and form the environment and atmosphere of the corporation. Majority of people spends more than fifty percent of their day and life in indoor atmosphere that affect and influence their actions, abilities, morals, mental status, engagement, productivity, and performance whether in a negative or a positive way.

**Keywords** Workplace · Environment · Performance · Influence · Productivity · Employees · Burnout · Toxic environment · Healthy environment

## 1 Literature Review

### 1.1 An Overview

A various number of studies showed the impact, influence, and the relationship of the work environment on the employee's productivity. Work environment in corporations has it owns significant meaning for the individuals that are working in, because the workplace affects and influence them directly and indirectly (Irfak 2022). According to Mohod and Ikbal (2018), they agreed on the importance of employee's engagement

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intellectually and emotionally where they will be committed to their corporation. They will dedication where they will fell strongly involved to their corporation and they will experience the sense of enthusiasm, significance, challenge, and inspiration. Additionally, it will add various of benefits and effectiveness to the corporations such as increasing the productivity, improving the quality of the services and the products, excellent customer care, reducing the workers turnovers, corporation between the workers, reducing disputes and reducing absenteeism. It has been proven the importance of the workplace environment as it plays a big criteria and role in determining the workers performance and as a method of making them concentrate on the job efficiently (Bakhtiyari 2020). Therefore, it has been noticed that that the workplace environment increases the production level in individuals up to 5% while for team's performances it reaches up to 11% as a result of improving the environment (Awan and Tahir 2015). Moreover, it helps to contribute 24% of the job satisfaction within the corporation.

Based on a study that analyzed job productivity in a toxic workplace environment, a toxic workplace environment impacts negatively the job productivity and leads to job burnout (Anjum et al. 2018). The study explained that when the corporation employees have negative feelings towards the corporation, they will tend to compromise their performance productivity level negatively. It showed that incivility, bullying, ostracism and harassment have a significant negative effect on the employee's productivity. Thus, it recommended that the human recourses department should have and apply strict policies to eliminate toxic workplace environment factors and create collaborative and fair workplace environment for everyone.

According to Irfak (2022) his conceptual framework showed that there is a link and relationship between motivation and environment of the workplace and they both affects the productivity and performance of the corporation's employees. Based on an empirical study finding, the findings and results showed that positive workplace environment promotes and encourages employee's performance within the corporation circuits (Zhenjing et al. 2022). They emphasized on that the environment is an important element to enhance the achievements striving ability of the corporation employees. Positive and good workplace environments offer pleasant and nurturing environments that helps to promote and increase the workers commitments which it will leads to having more employees loyal to their workplaces. Mokaya et al. (2013) found that various factors such as promotion, remuneration, working environment condition factors plays an important role when it comes to the employee's job satisfaction and performance. Furthermore, Bushiri (2014) reached a conclusion that the working environment plays an important aspect for motivating the workers which will lead the workers to perform their assigned jobs perfectly. Furthermore, he emphasized on that money is not the only motivator for motivating and encouraging the workplace performance that needs having a competitive business environment nowadays.

The relationship between the employee's performance and the workplace environment is created as a result of a relationship between the work environment that includes physical and non-physical environment and between the psychological work environment that includes the employee's performance including quality, quantity,

timeline of the work (Apriyanti et al. 2021). Furthermore, they explained that there is a relationship between the environment of the workplace and the leadership on the corporation performance and productivity level. When the work environment is encouraging and supportive and the leadership practices are efficient then the performance of the employees will be good.

An American psychologist called Abraham Maslow theorized a Maslow's hierarch of needs is also known as Maslow's theory of motivation that can be applicable as a rubric for corporation to analyze and evaluate the workplace environment and culture. This theory has got a direct impact on the job satisfaction. Understanding Maslow's theory can help corporation to determine the needs that are satisfied in the workplace and how to improve and develop them.

Maslow's hierarch is considered as a motivational theory that covers five different levels of human needs that must be satisfied and covered. The theory is represented as a pyramid that presents the level of needs that must be satisfied from the bottom level before going to the highest level. These levels of needs fall under the 3 different categories (Acquah et al. 2021). Furthermore, the first category is the basic human needs that covers safety and physiological needs. Second category emphasize on the psychological needs that focuses on social and self-esteem needs. The third category focuses on the self fulfilment and actualization.

First element of need is physiological needs which it is the main base of the hierarch for this theory. The physiological element refers to the main and basic needs of human being. Corporate employees need to have accesses to the opportunities and services in the workplace in order to feel that their basic needs are satisfied. These needs include comfortable workplace environment that have essential facilities, restrooms, rest areas that they can have their own breaks and regular monthly salary. Based on the theory, these basic needs must be addressed and satisfied before moving on to the next element of need to satisfy.

Second element is the safety needs, that have a hug impact on the motivation and satisfaction within the workplace. It is important for the workers to feel that their physical safety is prioritized and valued. The safety element emphasizes on having a safe and protected working environment that protects both physical and emotional of the employees. Corporates must have a safe and secure environment that have office furniture that supports that employees and reduce possible injuries risk. Employees should feel emotionally safe and supported when they are in the workplace, they should not feel worried about losing their job or any type of work threats that will impact them negatively. Employees should be treated with fairness regardless any type of discrimination.

Social needs considered as the third element of this theory. The theory emphasize on the belonging feeling were if it not available the employees will not feel engaged or motivated to do their work successfully. Therefore, this need can be satisfied by establishing a friendly workplace environment that emphasize on communication and collaboration with each other's. Employees should feel part of the workplace by feeling appreciated and recognized for their hard working.

Fourthly, self-esteem need is the one of the important elements of this theory. It focuses on the feeling and belief that the employees are all contribution and part of the

corporation goal where their contribution is recognized and appreciated. It is important for the employees to feel that they are part of the corporation family, growing, learning, and accomplishing goals. Moreover, this type of recognition, encouragements and receiving feedbacks will help to build more loyalty and confidence in the employee's abilities. Providing appreciation and regular recognition will have unlimited positive impact on the employee's performance.

Lastly, self-actualization need is the fifth and the top element of Maslow's theory hierarchy that is represented as maximizing and challenging the employee's potentials at the corporation. It challenges the employees at their work without feeling overloaded or overwhelmed. Employees would ultimately like to feel that they are doing their best at their current job position that motivate and encourage them to continue towards the success in their career path. A self-actualized employee will feel trusted and empowered leading to growth and engagement within the corporation. In order to make sure that this element is satisfied, the employees should get the chance and opportunity to succeed with their own methods. Supervisors play a huge role improving the corporation employee's abilities and skills that will help to advance and increase their career opportunities.

## 2 Conclusion

A workplace environment represents various elements that comprise the corporate settings that impact the employees and their performance. These elements include open and clear communication, provides growth opportunities, healthy work relationship, equity and rewarding system. Therefore, it plays an important character towards the workers productivity and performance. According to research and studies, it has been showed and proven that there is a good impact of the work environment on the employees' attitude and performance (Bushiri 2014). Many research and studies have been conducted on how a corporation can become profitable, successful, and competitive. As a result of these studies, it shows and indicates that the employee's performance is an important factor for corporation to success. Majority of people spends more than fifty percent of their day and life in indoor atmosphere that affect and influence their actions, abilities, morals, mental status, engagement, productivity, and performance in both negative and positive ways (Bushiri 2014).

Creating a healthy workplace helps to increase the job satisfaction, morals, boost the productivity and performance, lowers the absenteeism numbers, and creates better relationship and bond between the employer and the employee. The physical environment, recognition, employee's involvement, employee's development, and growth helps to create productive and healthy workplace environment. Managers and supervisors play a massive role in creating a workplace that will attract, motivate, and retain the employees (ResearchClue 2020). The internal workplace environment is consisting of the office, furniture, building, operation, and layout that the employees operate in. Therefore, bad workplace condition and environment will have a negative impact on the employees' health that it will make them work with less enthusiasm

which it will impact the productivity and progress negatively. Job satisfaction is essential for the corporates employees because it is an important element that impact the overall happiness and job pleasure. As a result of that satisfaction, the absenteeism and workplace burnout will decrease (McFadden and Altamirano 2020).

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# The Application of Governance in Media Organizations



Abdulsadek Hassan

**Abstract** The study aims to identify the role of governance in media institutions and the most important applications in which governance is used in these institutions, and the results revealed that free and responsible media are an active element in deepening the foundations of governance, through evaluating and evaluating government performance, and proposing solutions and alternatives to develop it, in order to enhance the approach of transparency, openness, contributes to enlightenment, education of public rights and freedoms, and activating their practice on the ground. The results also revealed the importance of using governance to deepen citizens' ability to express their opinions and positions, within the rule of law, and in a manner that contributes to community service and the achievement of the public interest.

## 1 Introduction

The concept of Governance is based on the principles of transparency, accountability and participation, which will advance reform and justice processes and reduce corruption (Beshi and Kaur 2020).

Since the media is a key factor in promoting these meanings and a major partner in shaping collective awareness, enlightenment and education (Casero-Ripollés 2018); Ensuring its professionalism, impartiality and integrity is a safety valve for progress and prosperity and also to enhance its competitiveness internally and externally as a soft power (Farazmand 2017).

With the technical development in the means of communication and the changes that have occurred in the media landscape and the extensive use of social media platforms over the Internet (Facebook and Twitter, for example), not to mention mobile applications (news aggregators and games for example) (Wukich 2016), which led to the convergence of lines between what is technological, media and news, and it

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became imperative We have to tackle Media Governance more deeply than before (Mishaal and Abu-Shanab 2015).

And media governance—as a relatively recent term—is concerned with dealing with media policies, regulatory legal rules, ownership systems, content production, and development and modernization approaches (Deane 2013). It is also concerned with community participation and decision-making methods in line with the public interest and analyzing the strength of institutions working in the media field locally, regionally and globally (Hokayem and Kairouz 2015). Accordingly, the scope of work in media governance is divided into three sections: macro (communities/industry), intermediate (organizations) and micro (individuals) (Russell 2019). Here it is completely different from "media and governance", which deals with the role of the media in disseminating the ideas of governance and sustainable development (Yuan and Gascó 2018). In simpler terms, media governance is concerned with framing and interpreting management and accountability processes and the institutional relationship between the media system and society (DeNardis and Hackl 2015).

Also, looking at media governance as just an alternative or a more modern term for media politics and regulation is in fact a superficial view; Governance is deeper than that, as it provides an advanced conceptual framework that helps analyze existing systems (Casero-Ripollés 2018), policies and methods from various points of view—as we mentioned earlier—and contributes to making continuous comparisons between the various production units within the same institution (Jameel et al. 2019) and its counterparts in other institutions to provide new production mechanisms that are commensurate with the developments of the times in the media and entertainment industry (Llazzolino and Stremlau 2017).

Media governance as an umbrella idea stems from the base of consensus among stakeholders through transparent rules based on studies of the behavior of media organizations as well as the behavior of recipients and followers - taking into account the idea that the recipient is now a producer of content on the Internet - and diversifying the media products provided after a deep study to the target audience (Yousaf et al. 2016), which contributes to the dissemination of knowledge and the achievement of profits from non-traditional sources (Wang et al. 2018). On the other hand, the process of media governance means, in particular, the right of equitable access to media content for different groups of people and reducing the information gap (Jameel et al. 2019).

In addition, supporting competitiveness is one of the most important executive components of media governance, as competition is the core of the media and entertainment industry to attract the public (Cook et al. 2017), which has become alienated from repetition, seeking everything new and attractive (Llazzolino and Stremlau 2017). On the institutional level, competitiveness requires specialized management that is aware of industry developments and the requirements of the masses (Wang et al. 2018). Freedom of expression of ideas and opinions and support for creativity to provide a variety of media and entertainment content are among the pillars of media governance, thus establishing the principles of respect for others and diversity in society (Sridhar et al. 2020).

Perhaps the application of the concept of media governance on the ground starts with the professional unions of the press and media and the institutions responsible for the development of workers and the review of all laws and rules that impede their work (Chen et al. 2020), and in parallel launching a comprehensive societal dialogue for what the recipient aspires to and involving civil society to create a common ground from which a maker can start the decision and the owners of media and entertainment institutions and the parties concerned with the industry (Hepburn 2015).

Finally, media governance does a great service to societies in emerging democracies, redefining the relationship between state-owned and privately owned media institutions (Hepburn 2015); It provides financing solutions based on unconventional ideas, and highlights the changing nature of media policies, the behavior of media organizations and the behavior of recipients in light of an unprecedented technological acceleration (Mansoor 2021).

## 2 Defining Media Governance

The concept of media governance deals with media policies, legal rules, ownership systems, content production, development and modernization approaches, as well as community participation and decision-making methods in line with the public interest, and an analysis of the strength and influence of media institutions locally, regionally and globally (Tursunbayeva et al. 2017).

Media Governance can be defined as: The system through which entities or companies are directed and controlled (Casero-Ripollés 2018). Governance is concerned with the structure and processes of decision-making, accountability, control and behavior at the higher administrative levels of a company or organization (DeNardis and Hackl 2015). Governance affects how the media organization's goals are defined and achieved, and how risks are monitored and addressed (Cook et al. 2017). And how to improve performance (Jean-Baptiste Jeangène Vilmer 2021).

media governance is a system and a process and not a single activity, thus the successful implementation of a good governance strategy requires an approach that includes strategic planning, risk management, performance management (DeNardis and Hackl 2015) and also organizational culture is an essential component of the unique characteristics of a successful media organization (Wang et al. 2021).

## 3 Governance Objectives

**Transparency:** Transparency is one of the modern and advanced concepts in governance, which should be conscious of the management of its importance to the company and its stakeholders (Chun and Luna Reyes 2012). Transparency means openness, abandoning ambiguity, blindness and misinformation, and making everything verifiable and sound vision (Ahmad et al. 2018).

**Accountability:** Shareholders have the right to hold the executive management accountable for their performance, and this is guaranteed by the law and their governance systems (He et al. 2022). Accountability also includes the responsibility of the executive management before the board of directors and the responsibility of the board before the shareholders (Chatfield and Reddick 2018).

- **Responsibility:** Governance regulations aim to raise the sense of responsibility of the two sides of the management (the board of directors and the executive management) and that each member of the management board behaves with a high degree of professional ethics (Lee and Kwak 2012). It also recognizes the responsibility of the civil rights of the shareholders and encourages cooperation between the company and the shareholders in matters such as profit and providing job opportunities and economic sustainability (Roengtam 2020).
- **Equality:** What is meant by equality is equality between small and large investors, and it also means equality between local and foreign investors alike (Hepburn 2015). For example, the owner of one share owns the same rights as the owner of one million shares (Cook et al. 2017), such as voting, participation in the general assembly, accountability of the board of directors, a share of the distribution of profits, etc. (Cho and Park 2012).

If we apply this to media organizations, they will have to abide by the principles of governance based on transparency, disclosure, accountability, participatory and integrity (Moreno-Albarracín and Liceran-Gutierrez et al. 2020). This certainly depends on the state's setting up of legislation that allows the freedom of information to circulate for media professionals in a timely and safe manner while preserving their rights and protecting them from harm. clear founders (Bonsón et al. 2017).

The state has a major role in paving the way for a free and professional media by formulating legislation regulating the media that guarantees the freedom of media practice and helps it achieve its mission and plays its role in criticism, accountability and oversight to become one of the arms of development (Yushau et al. 2021).

The restructuring of media institutions in preparation for their development is a cause for optimism, but in the Arab world we have experienced many changes that have led to more failure or the situation to remain as it is (Wang et al. 2021). Successful after the departure of its founder from its leadership without a smooth and orderly transition to the new leadership (Casero-Ripollés 2022), and the loss of the institution's message due to its owners' quest for profit may lose the goal for which it was established (Hepburn 2015). His country is facing to be a part of achieving development strategies, not an enemy (Liu 2017).

## 4 The Advantages of Governance in Developing the Performance of Media Institutions

Governance helps enable the media organization to set its medium and long-term strategy, define the goals to be achieved at each stage, provide the opportunity to set high-quality standards related to the media product presented to the public, assist the organization in preserving its rights, and even demand the amendment of some media legislation that leads to improvement media work (Mickoleit 2014).

It also contributes to the development of a cooperative framework that organizes the internal relationship in the media organization, in addition to coordinating the relationship between each of the institution, stakeholders and shareholders (Wang et al. 2018).

Governance also enables the organization to deal transparently with internal or external audiences, which leads to increased trust and loyalty of these audiences in the media organization (Beshi and Kaur 2020). In addition, it also works on defining the foundations and rules of the accounting system within the institution, whether it is for senior management personnel or working at different administrative levels (Chatfield and Reddick 2018). Governance also contributes to laying the foundations for evaluating media performance and trying to develop it on an ongoing basis, in line with the objectives of the institution (Jameel et al. 2019), as well as assisting the media institution in developing advance plans and rules that enable the identification of crises that may occur, and how to deal with them in a way that contributes to reducing risks to which they are exposed. organization, and reduce the time needed to resolve the crisis (Yuan and Gascó 2018).

Based on the foregoing, it can be said that the governance of media institutions is no longer an option or a luxury in today's world, but rather has become a necessity imposed by the challenges facing the media industry at all organizational, editorial and financial levels, and the competition imposed by social media (Beshi and Kaur 2020). Before taking any step in terms of activating governance programs within these institutions (Ahmad et al. 2018), preliminary steps must be taken, represented in organizing seminars and meetings with employees on the culture of governance, and introducing the process, its paths and benefits, by raising awareness of the role of governance in enhancing the sustainability of institutions, increasing their competitiveness (Hepburn 2015), and limiting of the risks and threats it faces, in addition to conducting a thorough study of the current situation, and reviewing the most prominent experiences of global governance in the field of media (Wang et al. 2018); To extract lessons learned from them when formulating the corporate governance plan (Zheng 2013).

As for the implementation phase of the plan, it requires the formation of executive committees to follow up the implementation of governance, and interest in conducting periodic studies to measure the impact on the performance of employees and the production of the media organization, and its reflection on the public (DeNardis and Hackl 2015).

## 5 Requirements for Implementing Governance in Media Organizations

The application of governance enhances the efficiency of performance and supports the ability to face challenges, as well as the most prominent role in strengthening oversight and activating the principle of accountability (Yushau et al. 2021). Also, there must be an element of consensus within the media organization, to mitigate any conflicts that may occur within its departments (Jameel et al. 2019). The difference in viewpoints affects the Its work, which reflects negatively on it, so it is necessary to harmonize between the employees of the departments and the administration (Wukich 2016).

The governance of any media organization requires looking at the work culture within the organization itself, so what is the way in which the administration looks at its role in society (Moreno-Albarracín and Liceran-Gutierrez et al. 2020), also what are its decision-making mechanisms, and how are its relations with the recipient, as well as how its employees view their role and position in the cultural and social system for the target audience (Yuan and Gascó 2018).

Governance requires the existence of an effective organizational structure based on transparency (Yousaf et al. 2016), and the distribution of roles and responsibilities among the various parties within the institution in line with the desired goals and the existing specialized academic competencies (Casero-Ripollés 2022), which leads to increasing confidence in the media institution, its mission and interaction with it, and deepening its social role (Sridhar et al. 2020).

Perhaps one of the most important requirements of governance is to focus on disclosure (Sridhar et al. 2020), transparency, accountability and oversight in the management of the media institution, and to enhance the independence of the media institution in the political and financial aspects (Casero-Ripollés 2018).

Governance requires adherence to the organization's strategic plan, standards, laws and regulations. As well as establishing balanced lines of healthy and effective relations between all levels of work on the basis of integration and partnership (Farazmand 2017).

As well as distributing roles clearly and specifically according to a clear job description for all tasks in the organization and specifying the nature and forms of internal communications and delegation (Wang et al. 2018). As well as the clarity of evaluation mechanisms, rewards and warnings within the organization, quality measures and performance improvement, ways to ensure the achievement of specific goals, the nature of internal relationships between departments and how to manage risks, challenges and deal with crises (Chen et al. 2020).

## 6 Suggested Recommendations for Implementing Media Governance in the Internet Age

The right to freedom of expression, including on social media, and the right to access information and to decriminalize everything related to freedom of expression issues. He also called on the media to combat dissemination of false information circulated on the Internet (Hokayem and Kairouz 2015).

Establishing the right to freedom of expression, including on social media, and the right to access information (Casero-Ripollés 2018), especially in actual practice, in line with international conventions that are superior to laws and require their application, which secures access to information and combats corruption (Moreno-Albarracín and Liceran-Gutierrez et al. 2020).

Decriminalization of everything related to issues of freedom of expression and the circulation of information, as criminalization is a major obstacle that limits freedoms [37], and activating the law on the right of access to information and the law on the protection of corruption whistleblowers, and the necessity of forming an anti-corruption commission to monitor the proper application of the law and to provide the opportunity for journalists and information seekers to review it (Chatfield and Reddick 2018). When the administration does not respond to their requests (Casero-Ripollés 2018).

Activating the role of institutions and working to secure the independence of the judiciary so that it can follow up on corruption cases and hold the perpetrators accountable (Wang et al. 2018), as the independent judiciary is the main pillar for building the rule of law, and in vain journalists try to access information and expose corruption if there is no independent judiciary that secures protection and accountability and approval of the digital transformation strategy towards e-government (Cho and Park 2012).

Provide the necessary protection for media workers, guarantee their rights, and enable them to produce quality content, and media organizations should seek to find alternative work models for political money that secure their independence (Cook et al. 2017).

Journalists and the media should not contribute to misinformation and dissemination of false information that is circulated on the Internet, but rather they should play a role in verifying and filtering information to restore confidence in the media (Roengtam 2020).

The media is not a platform for the state's viewpoint with its three powers, especially the legislative and executive, towards economic, social, cultural, civil and political issues (Wang et al. 2018), but at the same time, it is concerned with reporting on what the state is doing in various fields, without specifying a specific position on that (Bonsón et al. 2017).

That it is not a forum for the government in the sense of the executive authority, which is controlled by a particular party or group of parties (Mickoleit 2014), until it is possible to move away from the government, or its party, or parties containing



it, and so that it can embody the necessary neutrality towards government action and government parties (Ahmad et al. 2018).

That it is not a platform for a particular party, or for a group of parties opposing the government, so that it remains completely away from siding with the opposition, whatever its form (Liu 2017).

## 7 Government-Social Media Based Models

Government-social media-based models are frameworks produced by researchers to understand the importance and benefits of social media in e-government (Cook et al. 2017). The first models assumes that social media is a catalyst that transforms citizens, government and data (Chen et al. 2020). It discusses how social media interacts with these three dimensions (Jameel et al. 2019). Social Media-Based Citizen Engagement Model focuses on social media used as a tool to enable users to express their opinions, emotions, behaviors and interactions (DeNardis and Hackl 2015). Governments can use such media to transform their citizen to participate in good governance and to enjoy democracy (Wukich 2016). Social Media-Based Data Sharing Model focuses on the data that a citizen generated using social media when the person participated in a political topic (Ahmad et al. 2018). This data needs to be understood by citizens and governments (Farazmand 2017). Also, it needs to be stored and processed to make it sensible and usable for making decisions, and to enable citizens to participate collaboratively with governments (Hepburn 2015). Social Media-Based Realtime Collaborative Government Model focuses on the idea that using social media in e-government starts to enhance the communication between governments and citizens to be nearly in real time (Deane 2013). Lee & Kwak proposed a maturity model for open government that is based on public engagement (Jean-Baptiste Jeangène Vilmer 2021). The model contains five levels, which is based on the benefits of social media that provide transparency, participation and collaboration by public engagement (Zheng 2013). The following is a description of each level:

**Level 1: Initial Condition**, this level focuses on government podcasting information to public via government's official websites, with seldom use of social media or interactive tools (Casero-Ripollés 2018).

**Level 2: Data transparency**, actually is the first step of open government, where governments try to perform two important tasks, first is publish valuable and impact data, second is to publish data that is accurate, consistent and in a timely manner (Jameel et al. 2019).

**Level 3: Open participation**, this level focuses on enabling the public to participate and governments to take input from citizen's feedback, participation, discussion, and voting (Russell 2019).

**Level 4: Open Collaboration**, is the developed level of participation, where the government asks the citizen to play a role of co-creation, co-design for specific output (Ahmad et al. 2018). Here the task is more complex, and it looks like collective intelligent, so government may use shared document to engage the public in

participation, asking the public to participate in designing application to government (Lee and Kwak 2012).

**Level 5: Ubiquitous Engagement**, this level is built based on level 1 to level 4 by expanding the level to arrive to engagement status (Hokayem and Kairouz 2015). In this level we can see public engagement become easier by using different accessing technologies such as smart phones, tablets, laptops and desktops (Yushau et al. 2021).

## 8 E-government and Its Role in Good Management (Governance) in Media Organizations

In the process of modernization and development in general, it is considered an essential and prominent figure (Casero-Ripollés 2018). Technological progress about the role of e-government is one of the most prominent features of the technological era in which we live, and many countries have begun to develop and implement advanced policies and strategies regarding e-government, which in turn is an important tool that can help enhance transparency and accountability (Hepburn 2015).

Perhaps the emergence of the need for the establishment of an electronic government is due to the achievement of administrative simplification in terms of knowledge (Hokayem and Kairouz 2015), E-government means a new method in government work that uses information and electronics in managing the public affairs of the country and the citizen, with the aim of simplifying and facilitating the interaction between the government and individuals and private institutions (DeNardis and Hackl 2015), and providing information in an integrated and confidential manner to all those responsible to rationalize the process of taking and improving the performance of government agencies and facilitating the citizen's share of the service and reducing its cost within a comprehensive practical framework that ultimately leads to a rational management based on transparency in dealing [43], where the interference of employees in filling out forms is limited, which limits direct communication between citizens and employees, which reduces the chance of complicating the transaction and thus limits opportunities for corruption (bribery, for example) and greater achievement (Ahmad et al. 2018).

## 9 Governance of Media and Social Networking Sites

Social media sites are one of the most important manifestations of the so-called new media scene, which poses major problems, due to the successive developments that result from the combination of great advances in communication technology on the one hand, and media practices on the other (Yushau et al. 2021).

Most expectations indicate that the future of media activities will be in the new media (Zheng 2013) which is a matter that is directly deducted from the balance of

traditional media, and puts all the literature of its organization, governance, rationalization and accountability to the test (Cho and Park 2012). It also raises the need for concerted efforts to find ways to quickly govern the uses of social networks (Beshi and Kaur 2020). And their effectiveness can keep pace with the amazing developments that these networks are witnessing, and the increasing share they occupy in the social and human space (Mishaal and Abu-Shanab 2015).

The main features of the new communication scene can be reviewed in light of the dominance of social networking sites, as follows:

Accessibility, which arises from the ability of individuals and groups to reach the masses (Chen et al. 2020).

Speed, as it can reach target audience domains very quickly compared to traditional media (Mansoor 2021).

Anonymity, as the caller can hide his identity, and therefore not be held accountable for the type of content he broadcasts, and its consistency with the laws and regulations in force (Farazmand 2017).

High volume of Information, in reference to the large information flow (He et al. 2022).

No Geographic or Content Related Borders, in reference to transcending the role of geographical borders through the possibilities of cross-border broadcasting (Hokayem and Kairouz 2015).

Because of these dramatic developments, great risks arise from the abusive uses of social media networks, and some believe that these risks are related to political security only (Russell 2019), which is certainly a misconception; Its impact extends to include the users themselves, which is evident in the harm of individuals' interests, their exposure to crimes, and their involvement in conflicts as a result of some usage patterns (Beshi and Kaur 2020).

## 10 Conclusion

The results revealed that the media and communication is an essential mechanism in establishing the elements of governance that seeks to maintain a local existence in a balanced media environment, by rationalizing dealing with the media in accordance with rational systems, where the important role of the tactics and the negative effects of the media is known.

The results showed that governance affects all activities, including the role it played in achieving good governance through awareness, accountable participation, and transparency.

The results also revealed that governance plays an important role in improving the performance of media institutions, confronting corruption and nepotism, and predicting the continuation or failure of the institution in the long term, especially with regard to financial performance, and that the existence of an effective framework for the governance of media institutions is represented in the transparency of

the administrative structure of the media institution, and the distribution of responsibilities among various parties. Protecting the rights of stakeholders greatly improves the performance of the institution.

The results showed that the media institutions were absent from applying the standards of corporate governance, which was reflected on the performance to a large extent.

## 11 Recommendations

Amending the regulations to ensure the achievement of accountability standards and the establishment of the principle of transparency in media institutions.

Establishing laws aimed at promoting pluralism and diversity and reducing monopoly.

Spreading the concept of media governance among media professionals by holding training courses, workshops, simulation models and seminars.

The necessity of adhering to the standards of governance in the management of institutions whose application has become important after several global financial crises, most notably the collapse of the Bank of Credit and Commerce in 1991, the Asian financial crisis in 1997, and then the global financial crisis in 2008. These standards include: disclosure, transparency, identification of responsibility, accountability, decentralization, and participation.

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# **Technology and Innovation in Various Sectors**

# Big Data in Occupational Health and Safety



Hasan Alhaddad and Muneer Al Mubarak

**Abstract** In recent years, the interest in using the big data to solve complex problems in different sectors using different methods has increased. The Analytical Hierarchy Approach “AHP” method is one of the most popular methods to scientifically classify the dataset. The main problem in implementing this method is the fact that the expert’s opinion is mandatory. Accordingly, this research aims to use the published Data to present the framework that will be followed to identify the factors that affect the occupational health and safety in the Bahrain construction industry. It started with the purpose and reasons that encourage in identifying and studying these factors. Secondly, lots of resources from the literature review that could be helpful in this research were discussed and the reference’s example were added at the end of this report. The Analytical Hierarchy Approach is going to be used in this research by the assistance of the Visual Basic in the “Excel”, where more elaboration on how it is going to be used can be found in the methodology. The published statistics from local authority are presented and discussed. To conclude, this research shall set the concrete foundation on how the “Big Data” are so beneficial to analyse the factors that effecting the occupational health and safety in Bahrain construction industry to decrease the occupational incidents.

**Keywords** Big data · Occupational health and safety · Organizational safety management · Digital transformation

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# 1 Introduction

## 1.1 Background

In recent years, the orientation toward the technology in the construction industry (e.g., the extended use of networked machines and devices, wearable technological devices, technological sensors, and the use of the developed online containment) have switched on the production of massive quantity of information and data. Advances in big data technologies (e.g., Internet of Things, artificial intelligence, and the topic of concern in this research the big data) have led to construction industries to increasingly transforming their traditional manufacturing manner to improved manufacturing manner that supported with the smart technologies. Disparity with traditional or normal manufacturing, technological-supported manufacturers is well known as a mood of manufacturing where the technological-supported manufacturers is developed by real-time transmission and analysis of big data among the industries. As there is noticeable increasing in the usage of the digital technology that will enables the analysis process of the published information and data and accordingly support the efficient implementation of gaining the benefits from the “Big Data Field”, the field of big data are evolved to become the key enablers for enhancing the competitiveness and effectiveness in the manufacturing field (Xu et al. 2022).

Organizations in different sectors and of all types are increasingly depending on information and data analyzing and processing systems than any time in the past. Investments in the tools of information technology infrastructures have been estimated to provide improved capabilities towards decision-making, increased awareness of the health and safety precautions, and enhanced culture, and eventually the productivity function in the construction organizations from the concerned industries. An essential model for modern construction organizations, though not the only model, is that of ‘big data’ and ‘analytics’ which considered to be relatively new technologies have high expectations to enhance organizational perspective towards the necessity of taking all the health and safety precautions carefully in order to avoid any possible obstacles due to any accident and maintaining the productivity and, consequently, it must be highly invested in. However, such investments of information technology do not always lead to decreasing the occupational accident. For example, reporting on near-misses and preparing the necessary “Big Data” by using the technological big data projects could fail to predict the upcoming accidents (Raad Shker and Noori Hussin 2020).

Further, technology can be employed as a term information technology (IT) which is commonly preferences perspective of software describing, unified electronics and wireless communication while accumulating the mingling of media data like text, voice, image, and the other information (Raad Shker and Noori Hussin 2020).

For instance, research into the organizations, in the construction industries, use of intelligent technology noticed that “IT” infrastructure itself is not efficient for competitive pros as infrastructure could be released so easily by other organizations and a disability to use existing resources properly. Instead, existing research

explains that, when accompanied with organizational culture, IT could be beneficial to improve unparalleled organizational abilities which then enable improved organizational performance; organizations have to know how, and be willing to use, these tools effectively in the form of IT capabilities. In the involvement and transmission of generation knowledge represents the information technology as an essential strategy due to the fact of its proficiencies and magnitudes. The management's technological-revolution with its applied & academic believes has encouraged the solution-generation to various management difficulties and barriers in recent few years (Raad Shker and Noori Hussin 2020).

Accordingly, as a result of this growth revolution, the alterations of the structures in the functions of management, techniques of work in construction industries thereafter the analyzing and processing of information which has been developed as a significant reserve for any organization but is a key proportion of the procedure of administration. Hence, the existence of the technological information has the ability to discover novel skyline for the top management in construction industries and also to contrive the domain to be used effectively in industrial strategies due to the fact that it could be used for improving the organization's health and safety culture (Raad Shker and Noori Hussin 2020).

For many years, industrial companies and the other organizations from different sectors have relied on data and the accuracy of the data to stay in the business. Data could be collected from various resources in different sectors, films, incorporating images, papers, and social media interfering, and data resources can be in structured and unstructured forms. To have an efficient and effective data analysis, organizations must have installed their own system to aid them in registering, and processing structured and unstructured data sources into their own bases of data. Big Data including both structured and unstructured data sources. Big Data is a big and huge field nowadays (Zulkarnain et al. 2021).

To grape and excavate value from massive quantity of information and data, the Organizations, from different sectors, have been oriented towards adopting Big Data. Big Data is well known as the term that could be used to describe massive amount of data, that already sets earlier, where these values of the data have huge volume, vairiability, velocity, variety, and value for analysis. It's a new way of using data in extracting valuable insights and, more suitability, to stay competitive and exceed the others in the same field. In Big Data, data sources are collected, gathered, grabbed, generated, processed, and analyzed scientifically at a rate that is driven by data processing for scientifically making the right decisions. In addition, the industry Organizations uses Big Data for generating and developing competition, decreasing the rate of accidents, increasing the growth of the productivity rate, inspiration, and customer overflow (Zulkarnain et al. 2021).

Furthermore, the widespread in adopting the digital technologies supplies industry sector enterprises with various valuable sources of big data. Furthermore, the introduction of the Internet of Things (IoT) and cyber-physical systems in industrial application scenarios provides fundamental product data, necessary equipment data, and needed manufacturing data, whose processing is of major influence for improving sacalability, safety, and effectiveness. The obtained data from varies channels have to

pass through sundry steps to facilitate and enable the information content and context to be analyzed scientifically and realistically, and to be prompt understood. Such steps consist of data combination, storing, transmission, processing, visualization, and implication (Xu et al. 2022; Schmidt et al. 2021).

Throughout the different stages of the big data lifecycle, manufacturing companies can monitor the production process, encourage the assortment of various directorates, and foretell specific request, thereby successfully obtaining transformation and upgrading of the technologies in the industry sector. From this view, big data provide complete services to the organization in the industry sector and significantly increasing the efficiency of operation. Furthermore, big data can add several unparalleled features such as self-execution, self-learning, and self-regulation to the manufacturing operation. One of the most substantial and useful aspects is that big data facilitates customer-centric product development and research. As the market competition becomes increasingly intense in the contemporary industries, industrial organizations have to set a concrete foundation and maintain a strong relationship with the customers to augment customer gratification, which further will drives toward improving the provided services of the industrial organizations. The trend of providing a unique service is further requires industrial companies to use big data to know what the customers actually need. According to the earlier analysis, prompt realization of the main function of the big data and how to stratify big data with construction industries has become the focal challenges in this sector to keep trucking the improvements, updating, upgrading and maintain stability advantages in complex environments (Xu et al. 2022; Schmidt et al. 2021).

The importance of analyzing the effects and factors of the health and safety in the Bahrain construction industry is very essential for every organization, and it can be justified by three main aspects (Ferrett 2021), that are the Moral Expectations; Where it is the responsibility of the organization to ensure that health and safety working conditions are provided to the employees, as it is morally unacceptable by the society that the employees injured or suffered from health issues due to their work. Second, the Legal Obligations, as it is mandatory for the organizations to follow the legal standards and laws, otherwise they will be facing the consequences like the fine or imprisonment for the individuals concerned. Third, the Economic (Financial); where the Failure to follow the health and safety standards will lead to accidents, and these accidents will cost the organization (e.g., Fines in the criminal courts, Compensation payable to the victim, Lost production time whilst dealing with the injury and the investigation...etc.).

This research focuses on the factors that impacts the occupational health and safety procedures at Bahrain construction companies with the aims of the big data. The experience from the people in the occupational health and safety sector is needed and statistics from Bahrain Ministry of Labour will be used along with Analytical Hierarchy Process in order to identify the factors that improve the health and safety procedures. Although the experts' output is needed to accomplished a full study, but the purpose of this research is to set the framework to show the effectiveness and importance of the "Big Data" to face the modern challenges.

The applied techniques used in knowledge management as well as the major knowledge management issues can be very useful to filter the health and safety factors to ensure it fits the construction companies and help in improving the health and safety procedures. From Organizational Behaviour, the factors that will be identified should be taking in consideration that the organizational behaviour having an impact on the individuals. The identified factors will take in consideration the impact of the organizational behaviour on the individuals. Furthermore, a better understanding of the various organizational situations and the difficulties that raising from managing individual's behaviour will lead to identify realistic factors.

## ***1.2 The Purpose of the Study***

The purpose of this study is to decrease the accident and expand the productivity in the Bahrain construction industries by break down the governmental published information for the big data to decide whether there are any improvements can be made to the general manner according to varies Journals. The mandatory alterations needed according to the general legislations and the impact of the big data on the construction industries. Finding the empirical studies on big data in a competitive industry setting for organizational reputation. How the big data competence can be measured through different models for the organization. The significance of the relationship between IT and organization's health and safety culture through the theoretical framework.

## **2 Literature Review**

### ***2.1 Background***

In the last a few years, we've seen a widespread trend toward collecting the information and data for generating the data base that could be used as "Big Data", not necessarily in only one sector like business, but also for all sectors and in wide range of industries. The question that needs to be asked, however, is how the "Big Data" in Business can affects the quality of the productivity, services, profits...etc. These as a total facilitate the progress of the works as total and the progress toward achieving the goals that assisting in ensuring the continues implementations of the sustainable development.

## 2.2 *The Root Causes of the Incident*

The categorization of the incident is essential to be identified before start listing the root causes. Incident is generally categorized based on their nature and outcome and that could be; First, Accidents which is known as the unwanted event (not occurred deliberately) that results in injury or ill health. Second, the Near Miss or the unwanted event that has the potential to cause injury, damage, or loss, but did not. Third, any Work-Related Ill Health, that includes the Medical or Disease conditions caused by a person's work.

In this research the focus will be on the accident's root causes. In general, for any accident there will be two types of causes that are immediate and root causes; the immediate is a clear and obvious cause that led to this unwanted event, while the root causes usually referring to failures in the management system like lack of training, lack of supervision, failure to provide the required PPE, inadequate maintenance for materials and equipment...etc. For example, one of the workers was working at height by using the scaffolding and fell to the ground and consequently got severe injury. In the analysing of this event, it called an accident because it was not occurred deliberately. Moreover, the immediate cause could be the absence of the guardrail, while the root causes could be the absence of training and lack of effective supervision.

Although there are unlimited root causes, few of them are frequently repeated in literatures and in various investigation reports. Hence, the accident's root causes in the following pages were chosen due to their roles and effectiveness in the accident-occur possibility and outcome severity. They will be divided into two factors that are organizational factors (Training Competence, Level of Communication and Safety Culture) and job factors (Workload & Time Pressure, Work Environment).

### **Work Environment:**

Work environment is a place that designed to create binds between the operatives and the environment. If the operatives can perform their assigned activities at this working environment healthy, safely, comfortably, and optimally, then this environment can be called as a good work environment. Insufficient work environments may demand more time, labour, and concentration and consequently increasing the possibility of the incidents to occur. Moreover, the insufficient working environment was raised as a factor that can obstruct the operatives from performing the work.

Work environment includes the environmental conditions, physical or climatic, that have the ability in influencing the occurrence of incidents such as noise, wet, high/low lighting, high/low temperature, scope of work and nature of work. For example, scaffolders are more vulnerable in rain/wind conditions (Ferrett [2021](#)).

### **Training Competence:**

Training Competence referring to Courses and learning that the operatives has taken or will take on safety matters. Furthermore, training is well known and it is essential for all companies, organizations, institutions, or even in educational institutions. The

training is very important for both operatives and employees to work more in safer and healthier conditions for activities that being performed. Training is a process whereby people achieve certain abilities to help in achieving the organizational objectives. For instance, the training provides trainers with specific skills and knowledge that they actually need in their current work. However, sometimes there are certified personnel, yet they are not capable to perform their activities safely due to the absence of the frequent training/refreshments. Therefore, the activity related training and practice need to be introduced frequently to the operatives to ensure that they can have the necessary knowledge on how to maintain their work safely and healthy on the site and consequently reducing the incidents that related to the construction sector. It is essential to distinguish between specific and general training, depending on the nature of the work that wanted to be performed. For example, the learning about ergonomics in the office is not particularly helpful in the construction sites (Schmidt et al. 2021).

### **Level of Communication:**

The effective communication between the managers/supervisors with the workers on site is very essential and cannot be compromised, because the lack of the effective communication could lead to cause incidents on the construction site due to the misunderstanding. Furthermore, the main cause of incidents in the construction sites is the lack of communication and coordination between, managers/supervisors and workers and/or contractors and sub-contractors. The communication when performing the work is important to ensure that there is no misreporting, misleading information, or direction between the different parties in the site. There are different reasons why the lack of communication can occur, for example due to the physical distance between work colleagues or high levels of the noise in the background. Moreover, the literature suggested that the communication language difficulties were rarely an obvious factor that could lead to incidents. Language abilities appear to be helped only informally when operatives are recruited for work, with not much consideration for the implementation of health and safety measures. This shows how important every communication that happens regarding works related to the projects to prevent any injuries and fatalities on the site; false or incorrect communication between managers and workers can lead to these accidents. This is supported by statement that stated that the communication related to the safety performance on the site can be improved and maintained to enhance a positive on-site safety performance (Schmidt, et al. 2021).

### **Workload and Time Pressure:**

One of the most factors that could cause the incidents at the construction sector is the workload and time pressure. This is because of the nature of works that occurred in the construction site as it is physically demanding labour sector. Most of the construction workers face fatigue and mental health due to long-period working hours, sequential shifts, irregular working schedules, and inadequate breaks. For instance, working overtime can also cause the fatigue for the workers, and this can

affect their performance during working days and consequently increasing the possibility of the incidents to take place, and increase also the recorded injuries and fatalities in the construction sector. For instance, this factor has direct reflection on unsafe performances of activities with an increase of the risks that related with the poor execution due to the time pressures and followed methods in performing the work (Schmidt, et al. 2021).

### Safety Culture:

Traditionally, attempts to enhance workplace safety awareness and concentration on technical issues and individual human errors and failures, are the main popular definition of the safety culture at the working place. Moreover, a series of major and minor accidents in the working place such as collapsing of the unsupported trench's side wall, falling from height, the fire and explosion due to lack of supervision, repeated slips and trips at the workplace, are all highlighted the role that organizational policies and procedures contribute to accidents from one side, and showing the absence of the safety culture at the organizations (Arbin et al. 2021).

### 2.3 Accident Ratios: Frank Bird's Accident Triangle

Among the last decade the "Big Data" has improved, and the societies has become more conscious about the importance of its implementation. One of the most additives came from Frank E. Bird, who developed the "Accident Triangle". The Frank Bird's Accident Triangle for accident ratios is mainly developed for predicting the serious outcome of the accidents based on statistical ratios. It displays a relationship between number of accidents with the different results of the outcome. Although it is almost impossible to predict the outcome of the accidents, but these statistical relationships of the accident ratios only suggested that for every 600 minor incidents (near misses), 30 incidents will cause damage to property only, 10 incidents will cause minor injuries, and 1 incident will cause serious injury, see Fig. 1.

According to Frank Bird's Accident Triangle (Fig. 1), the accidents cannot be predicted accurately, but the massive number of incidents is an indication that current status of the safety at the organization is inefficient and an immediate action must be

**Fig. 1** Frank bird's accident triangle (Bird's triangle: What are its limitations 2020)



taken, and all the safety precautionary measures must be reevaluated and assessed to decrease the possibility of the serious injuries from occurring (Bird's triangle: What are its limitations 2020).

## **2.4 Analytical Hierarchy Process (AHP)**

Analytical Hierarchy Process (also known as AHP), is a process used in decision making (Saaty 1996). Although there are several criteria, the AHP method utilizes the fact that the magnitude of each criterion isn't equal. Based on that difference, it evaluates the ideal solution. AHP also as an inbuild checks and balances which are indeed in order to allow the user to reach a logical and consistent solution.

### **How does AHP work?**

Although AHP is considered to be one of the most advanced decision-making methods, its relatively difficulty to apply but yet it's possible if the right steps are being taken. Here is a simple procedure on how does AHP work.

#### **Step 1: Identifying the alternatives**

Identifying the alternatives is the first and most crucial part of the AHP. These alternatives are dependent on the question and could be different solutions to a problem or types of products. After the first step, a list of all the alternatives must be ready.

#### **Step 2: Identifying the criteria**

This step involves identifying the criteria or in other words factors in which the alternatives chosen at the first step are going to be rated with.

#### **Step 3: Prioritizing the criteria using pairwise comparison**

This step involves the use of the pairwise comparison in order to create a matrix. This starts off by comparing the factors chosen in the second with each other to create the matrix mentioned earlier. Following that, a comparison between the alternatives with respect to one of the factors chosen in the second step creating a matrix for each factor.

#### **Step 4: Consistency**

In the fourth step, a series of calculations are being performed in order to ensure that the data keyed in the third step are consistent. The consistency is very crucial since, if the data isn't consistent then the whole AHP would be invalid.

#### **Step 5: Relative weights**

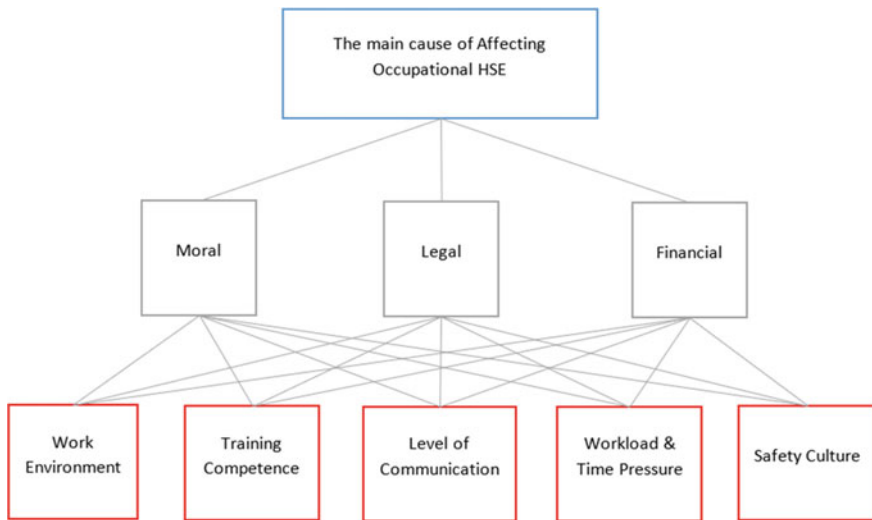
The final step of the AHP is to calculate the relative weight of each component in the matrix mentioned in the third step. The relative weights are used to evaluate the alternatives to get the optimum solution.



### 2.5 Implementation of the AHP

To implement the AHP, first the number of factors and causes needs to be identified. In this research, the factors are the moral, Legal, and Financial. The criteria or the factors that will be used to find the main cause that affecting the occupational health and safety at construction companies at Kingdom of Bahrain are Work Environment, Training Competence, Level of Communication, Workload and Time Pressure, and Safety Culture. After the identification a simple figure needs to be created in order to make the understanding of the system easier, see Fig. 2. To find the main combination between the factors and the main cause of the accidents that could help in minimizing the number of occupational injuries that occurred yearly, and all these huge amounts of collected data can be considered as benefit that gained from the “Big data” implementation.

After creating the diagram, the following step is to compare each criterion with another, creating a matrix (Raad Shker and Noori Hussin 2020). See Tables 1, 2 and 3; where “C” referring to criteria.



**Fig. 2** Diagram of AHP with three Factors and five causes. *Source* Author’s work

**Table 1** Pair-wise comparing in matrix (Raad Shker and Noori Hussin 2020)

	C1	C2	C3	C4
C1	1			
C2		1		
C3			1	
C4				1

**Table 2** Scale of importance (Raad Shker and Noori Hussin 2020)

Importance intensity	Definition
1	Equal importance
3	Weak importance
5	Moderate importance
7	Strong importance
9	Extreme importance
2,4,6,8	Intermediates values

**Table 3** Pair-wise comparing (Raad Shker and Noori Hussin 2020)

How important is	From importance scale
C1 to C2	
C1 to C3	
C1 to C4	
C2 to C3	
C2 to C4	
C3 to C4	

After providing the matrix “M1” with the data, a series of calculation are required to be done to calculate the relative weight of each criterion and to check if the data entered in the matrix are consistent.

**Step 1: Normalizing**

The values in each column needs to be standardized, this can be done by making each column’s sum equal to 1. This can be done by dividing each value in the column by the sum of the whole column, creating a new matrix “M2” (Mcdermott 2009).

**Step 2: Criteria Weight, W**

The criteria weight can be calculated by averaging the values of each row giving the weight of each criterion (Mcdermott 2009).

**Step 3: Weight Sums Vector, Ws**

The Weight sums vector can be calculated by multiplying the Criteria Weight by the unnormalized matrix (Mcdermott 2009).

$$\{W_s\} = \{W\} \times [M1] \tag{1}$$

#### Step 4: Consistency Vector & $\lambda$

The consistency vector can be found using the following equation (Statistical Reports 2022).

$$\{Consis\} = \{W_s\} \times \{1/W\} \quad (2)$$

And the  $\lambda$  “also known as the eigen value” can be found by calculating the average of the consistency vector (Elghaish et al. 2020).

#### Step 5: Consistency Index and Consistency Ratio

The consistency index can be calculated using the following equation (Elghaish et al. 2020); where n is the number of alternatives in the system.

$$CI = \frac{(\lambda - n)}{(n - 1)} \quad (3)$$

The consistency ratio is the number required to know whether the values entered in the matrix is consistent or not; and it can be determined by dividing the consistency index by the random index (Elghaish et al. 2020).

$$CR = \frac{CI}{RI} \quad (4)$$

where, RI is a constant value that depends on the number of alternatives known as the random index number.

#### Step 6: Composite Weight (CW)

After completing the past steps, the final step is to find the composite weight which is the rating that determine which combinations between the alternatives and the chosen criteria is the best and considered to be as an optimum. The composite weight (CW) can be determined by using the equation below (Elghaish et al. 2020):

$$\begin{aligned} CW \text{ of alternative 1} = & \\ & \sum_i (\text{weight of alternative 1 with respect to } C_i * \\ & \text{weight of alternative 1 with respect to other alternatives}) \end{aligned} \quad (5)$$

## **2.6 AHP in the Excel Sheet and Visual Basic**

The Codes shown on Appendix A, are the codes that were developed in order to manage to process the collected big data (inputs from the “experts”) in order to manage to increase the sample size to make the research as formative as should be and gaining the necessary information to decrease the occupational accidents in the Bahrain construction industries. The pictures in the Appendix B are showing the Author’s work on the steps on how the AHP could be used, where inaccurate inputs were entered without referring to any experts.

## **2.7 Benefits of the Big Data**

To continue the discussion in the Big Data the table in the next page (Table 4) shows the Work Injuries Summary During the Period from 2017 till 2021, These statistics were taken from the Social Insurance Organization which representing the Local Authority. The mentioned table provide the number of the injuries for each year separately and it is divided for Bahraini & Non-Bahraini, Male & Female, Public Sector & Private Sector. Generally, the statistics shows that the number of injuries of the Private Sector are much larger than the injuries that recorded for the Public Sector (e.g. The total number of injuries in 2021 as a whole for Bahraini, Non-Bahraini, Male and Female for Private Sector were 699 injuries while in the same period for Public Sector the total number of injuries were only 106 injuries), which is justified due to the differences in the scope of work, nature of work, and list of activities. The table shows also that the total number of work injuries for both sectors in the period from 2017 to 2021 are decreasing around 30% from 1127 injuries in 2017 to 870 injuries in 2021. The main concern here is with the Private Sector as the Construction Industry are included in this particular sector and although there is some improvement statistically in the private sector in the last 5 years as the number of work injuries are decreasing, but it is not enough, and the immediate and root causes that led to these work injuries must be studied and identified if possible.

The Second table in the next page (Table 5) shows the Work Injuries Summary Based on Injury Cause During the 1st Quarter of 2022 for only the private sector. These statistics were also taken from the Social Insurance Organization. Among all the injury cause, the table shows that the most repetitive injury cause is the Falling Objects with resulting in 28 injuries in only 3 months, second and third repetitive causes are, respectively, Slip/ Fall (21 injuries) and Falling from Heigh Places (15 injuries). These are general statistics and does not show the actual number of injuries that took place in only the construction sites, but it give us an overview of the main and critical injury causes.

**Table 4** Work injuries summary at kingdom of bahrain during the period from 2017 till 2021 (Statistical Reports 2022)

Total	Non-bahraini			Bahraini			Year	Sector
	Total	Female	Male	Total	Female	Male		
148	13	7	6	135	60	75	2017	Public sector
221	23	12	11	198	96	102	2018	
193	23	10	13	170	95	75	2019	
128	15	8	7	113	48	65	2020	
106	21	8	13	85	51	34	2021	
979	518	28	490	461	57	404	2017	Private sector
816	401	13	388	415	63	352	2018	
825	452	43	409	373	51	322	2019	
742	430	23	407	312	41	271	2020	
699	386	12	374	313	43	270	2021	
1127	531	35	496	596	117	479	2017	Both sectors
1037	424	25	399	613	159	454	2018	
1018	475	53	422	543	146	397	2019	
870	445	31	414	425	89	336	2020	
805	407	20	37	398	94	304	2021	

Work Injuries Summary at Kingdom of Bahrain During the Period from 2017 till 2021

### 3 Conclusion

The Analytical Hierarchy Approach “AHP” method was recommended in this research as it is one of the most popular methods to scientifically classify the dataset. The main problem faced while trying implementing this method is the fact that the experts’ opinion is mandatory. This research achieved the aim successfully by using the published Data to present the framework that could be followed to identify the factors that affect the occupational health and safety in the Bahrain construction industry. The main purposes and reasons that led to encourage and motivate in identifying and studying these factors were discussed. Also, lots of helpful and informative resources from the literature review were contributed to this research and were discussed and the referenced clearly and were added at the end of this report. The Analytical Hierarchy Approach was developed in this research by the assistance of the Visual Basic in the “Excel”, where more elaboration on how it can be used were presented in the methodology section. The published Accident- statistics from local authority at Kingdom of Bahrain are presented and discussed. Finally, this research illustrated the concrete foundation on how the “Big Data” are so beneficial to analyse the factors that effecting the occupational health and safety in Bahrain construction industry to decrease the occupational’s incidents.

**Table 5** Work injuries summary based on injury cause during the 1st quarter of 2022 for only the private sector at the Kingdom of Bahrain (Statistical Reports 2022)

Total	Non-Bahraini				Bahraini				Cause of injury
	%	Total	Female	Male	%	Total	Female	Male	
8	3	2	–	2	6	6	1	5	Collision with moving machinery
6	1	1	–	1	5	5	1	4	Collision with other objects
7	4	3	1	2	4	4	1	3	Entrapment
21	9	6	–	6	14	15	4	11	Slip/Fall
28	19	13	–	13	14	15	1	14	Falling objects
15	16	11	1	10	4	4	–	4	Falling from high places
3	0	–	–	–	3	3	–	3	Hot objects
7	1	1	–	1	6	6	3	3	Traffic accidents
5	1	1	–	1	4	4	–	4	Heavy lifting
9	4	3	–	3	6	6	1	5	Cut by hand tools
10	10	7	–	7	3	3	–	3	Cut by machinery
1	1	1	–	1	0	–	–	–	Penetration of sharp objects
55	28	19	–	19	34	36	5	31	Others
<b>175</b>	<b>100</b>	<b>68</b>	<b>2</b>	<b>66</b>	<b>100</b>	<b>107</b>	<b>17</b>	<b>90</b>	<b>Total</b>

Work Injuries Summary Based on Injury Cause During the 1st Quarter of 2022 for Only the Private Sector at the Kingdom of Bahrain

It is important to highlight the theoretical implications of the study’s findings. The methodology employed helped us get to the heart of the employee’s positive feelings about remote work. It’s important to highlight the implications of outsourcing work to employees and human resource management at any time and effectively using the available data to decrease the accidents and increasing the awareness about the importance and the necessity of taking all the health and safety precautionary measures. The findings presented in this publication demonstrated the expanding trend toward the digital delivery of services in the varies sectors specially the construction industries. Research in the cited and analyzed publications demonstrates that this trend is present not only in Bahrain but throughout the world and was initiated even with the beginning of collecting the data. The social repercussions of most challenges are

addressed, as are the connections between these topics and environmental sustainability; finally, the publication adds to the existing body of literature on the topic of remote work by providing new ideas and insights.

Research shows that the collection of the data from the one base “The Big Data” is nothing new for many sectors and for many employees around the world, and in Bahrain’s construction industry the situation is no different. There are many methods and techniques and even algorithms could be developed in order to use the collected data from different sectors for different purposes. The literature and reports reflect the opinions of those who have studied the topic, both in terms of cost savings and environmental impact. The discussion section is where they were introduced. The big data and the need to work safely have solidified the design and building industrie’s commitment to develop different algorithms and techniques. Many businesses and their employees, including architects, designers, and other creatives, will adopt this model in place of the more commonplace conventional method. For entrepreneurs, it is contingent upon improved health and safety awareness and enhance productivity, increased ease of life, and the normal frugality that results from increased income. Sustainable savings are consistent with things like money and time saved on avoiding the legal punishments, for example. Bahraini, who work in the construction industry, is aware of the necessity of adhered to all the health and safety precautions and the value of putting them into practice, even if financial considerations are the driving force. Situations, where “The Big Data” decreasing the possibilities of the accidents, are so desired. The biggest challenges to using the “Big Data” in this purpose stem from the need for collecting the actual data at the first step. Decreased Accident, increased productivity in the workplace, improved quality of life at workplace, and more effective means of communication are the primary motivators behind this research.

### ***3.1 Study Implications***

It is important to highlight the theoretical implications of the study’s findings. The methodology employed helped us get to the heart of the advantages of utilizing the “Big Data” in the Occupational Health and Safety Field. It is important to highlight the implications of Safety data to employees and human resource management, not only during accidents or disasters. The findings presented in this publication demonstrated the expanding trend toward the digital delivery of services in the construction sectors. Research in the cited and analyzed publications demonstrates that this trend is present not only in Bahrain but throughout the world. Finally, the publication adds to the existing body of literature on the topic of utilizing “Big Data” principles and the published safety data for achieving the benefits for both employees and business owners in the constructing field by assisting in decreasing the accidents and increasing the productivity.

### ***3.2 Study Limitations and Future Research***

This study established the framework of how the big data can be used to decrease the accidents that could be raised due the absence of the effect elements and factors to create a good health and safety culture in The Kingdom of Bahrain Construction Industries. The chosen and discussed method (AHP) required the experts input in order to identifying the most effect factors scientifically. This method is not the direct limitation of this research, but for future works, the prepared excel sheet could be used as the code of the AHP already prepared and installed for collecting the results based on the provided data and, consequently, the comparison could be between the results from applying the AHP method and the governmental published data of the accidents among Bahrain Construction industries. The provided model of the implementation and using of the big data is most beneficial model for identifying the major threats towards implementing effective and sufficient precautionary health and safety measures in order to decrease the occupational accidents.

For future work, the researchers can use the developed AHP model. A small sample size (a few numbers of experts) will be as a weakness of their study. A larger sample size would improve the reliability of the results. This would allow for a more accurate assessment of what are the main factors that affecting the health and safety culture at Bahrain construction industries and compromising with the employee's lives. Moreover, the researchers' inputs must be taken from the experts who actually working in Bahrain Construction industries. Anyhow, the developed AHP method can be treated globally.



## Appendix A

### The Used Code in the Visual Basic in the Excel (Author's Own Work)

```

Sub Rectangle1_Click()
Dim A(6, 1)
j = 1
For Z = 1 To 3
    For i = 1 To 3
        If Cells(4, i) = j Then
            A(j, 1) = i
        End If
    Next
    j = j + 1
Next
For Z = 1 To 2
    Cells(6 * Z, 1) = "Enter relation of each factor w.r.t"
    Cells(6 * Z, 5) = Cells(3, A(Z, 1))
    w = 1
    For k = Z + 1 To 3

        Cells(6 * Z + 1, w) = Cells(3, A(k, 1))
        Cells(6 * Z + 1, w).Interior.ColorIndex = 15
        Cells(6 * Z + 1, w).Borders(xlEdgeLeft).LineStyle = xlContinuous
        Cells(6 * Z + 1, w).Borders(xlEdgeRight).LineStyle = xlContinuous
        Cells(6 * Z + 1, w).Borders(xlEdgeBottom).LineStyle = xlContinuous
        Cells(6 * Z + 1, w).Borders(xlEdgeTop).LineStyle = xlContinuous
        Cells(6 * Z + 2, w).Interior.ColorIndex = 6
        Cells(6 * Z + 2, w).Borders(xlEdgeLeft).LineStyle = xlContinuous
        Cells(6 * Z + 2, w).Borders(xlEdgeRight).LineStyle = xlContinuous
        Cells(6 * Z + 2, w).Borders(xlEdgeBottom).LineStyle = xlContinuous
        Cells(6 * Z + 2, w).Borders(xlEdgeTop).LineStyle = xlContinuous
        w = w + 1
    Next
Next
End Sub

```

## Appendix B

See Figs. 3, 4, 5, 6 and 7.

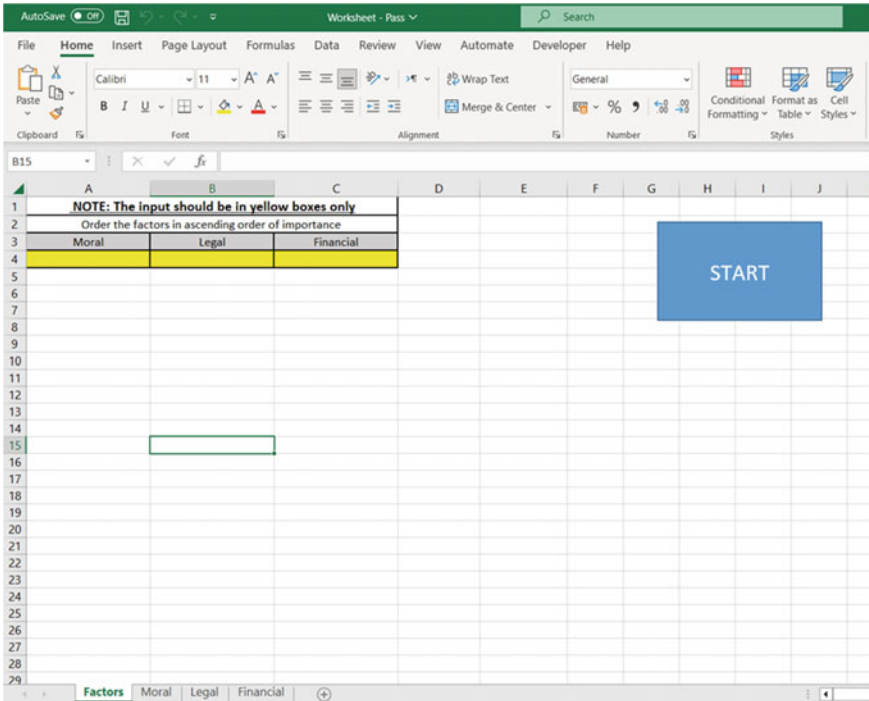


Fig. 3 Comparing between the three aspects (Moral, Legal, Financial). Source Author's work

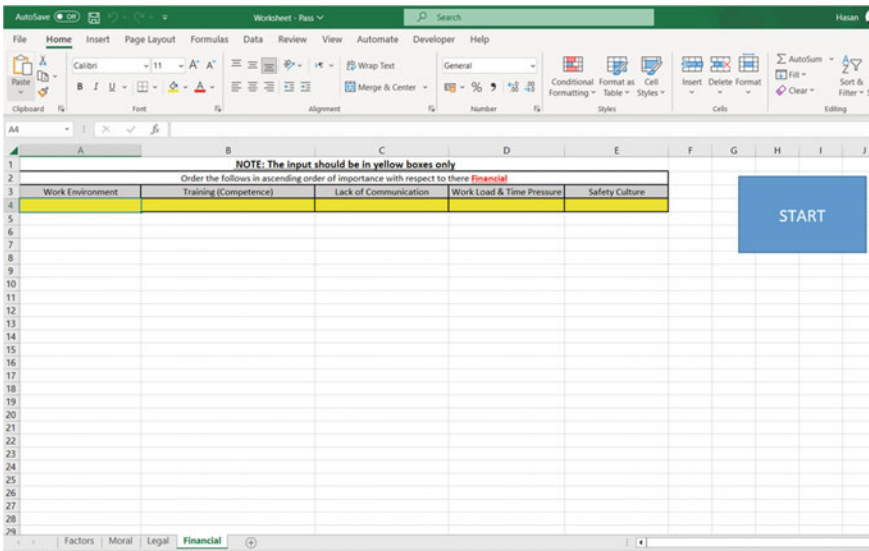


Fig. 4 Comparing between the chosen factors in respecting to the financial aspect. Source Author's work

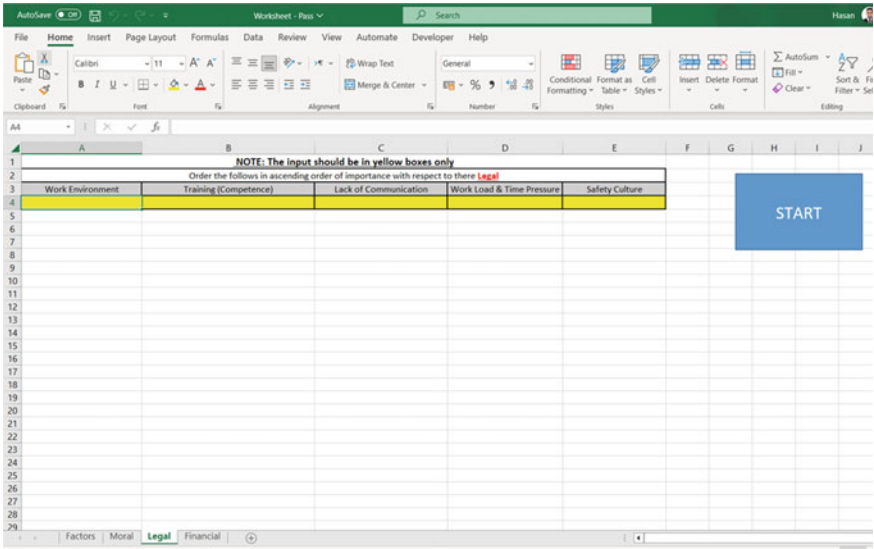


Fig. 5 Comparing between the chosen factors in respecting to the Moral aspect. *Source* Author's work

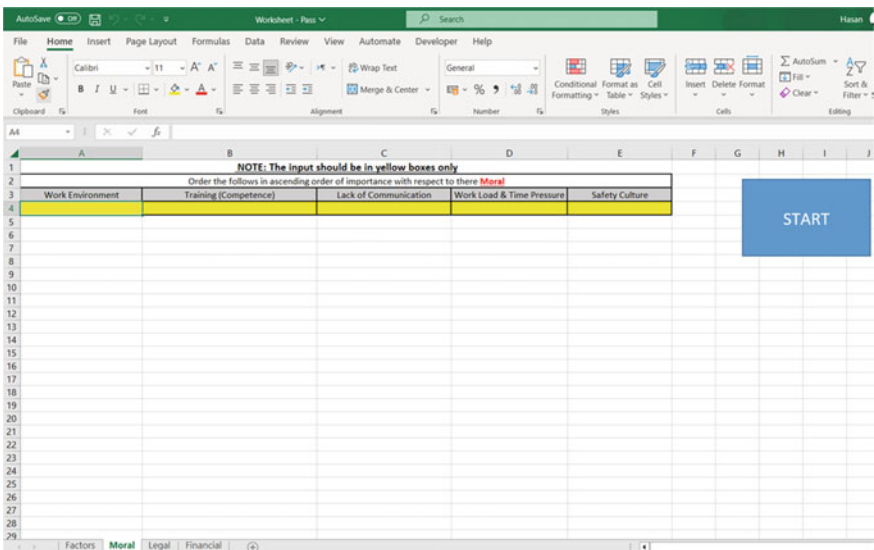


Fig. 6 Comparing between the chosen factors in respecting to the Legal aspect. *Source* Author's work

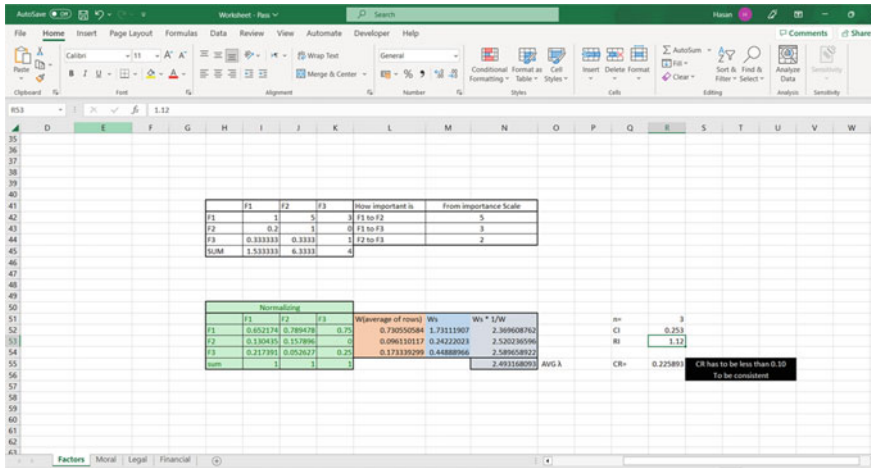


Fig. 7 Sample of calculation after entering inaccurate data. Source Author's work

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# Challenges for Internet of Things (IoT) Applications in Vocational Education in Bahrain



Sayed Mohamed AlHelaibi and Muneer Al Mubarak

**Abstract** Internet of Things (IoT) has entered all the product and service sectors around the world, even the educational services sector. And to cope with the rapid development of the technology, it has become necessary to integrate the IoT even in the vocational education domain in the public high schools, especially in those days and after the COVID-19 pandemic that changed the world totally. This paper aims mainly to analyze the effects of IoT on vocational education in the Bahraini public high schools, to determine the factors that hinder the application of IoT in vocational education in the Bahraini public high schools, especially during the COVID-19 pandemic, and to suggest solutions to enhance the application of IoT in vocational education in the Bahraini public high schools. For conducting this research, a comparison between literature reviews and SWOT analysis as well as qualitative approaches have been followed. The results show that the IoT has a positive and significant effect on improving the quality of the services that are provided in the vocational education in the Bahraini public high schools, and to optimize its effects, more supportive regulations and rules are needed. This research paper provides a roadmap for the decision-makers in Bahrain for improving the application of the IoT in vocational education by showing the main obstacles and difficulties that exist. Also, this research can serve as a guideline and reference for future studies aiming to develop the practice and application of the IoT in education in any country and in the vocational education track.

**Keywords** Internet of things · Applications · Vocational · Education · School · Covid-19

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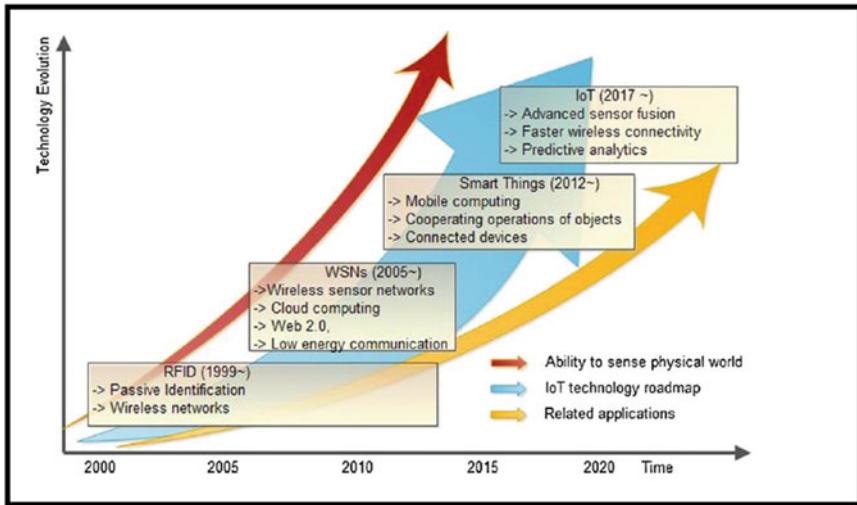
## 1 Introduction

Education is one of the fundamental pillars of development in any country. It aims to develop and improve the knowledge, skills, and attitude of the students to prepare them at the end of their education journey for participating in the development process of the country and keep them able to serve the country by providing high-quality and efficient services and products that satisfy the needs of the citizens and achieve sustainable development based on their gained and learned lessons. The government of Bahrain used to provide a high level of educational services to its citizens with the continuous development of this important sector due to their belief in the important role of education in achieving sustainable development and the related objectives of United States agreements that the government signed (Suga 2015).

One of the development initiatives that were added to the education sector in Bahrain is vocational education in the high secondary schools. Since the establishment of vocational education for high school students, a lot of developments have been conducted to make this educational track attractive and capable of satisfying the desires of the students who prefer practical courses more, and the developments are still ongoing. The latest improvements that have been added to this sector are the Internet of Things (IoT). With the rapid development of technology in the world and the appearance of the Internet of Things (IoT), it became necessary to utilize this recent method in the education domain and vocational education by embedding and integrating its applications in the vocational educational services. A lot of efforts have been spent to integrate the Internet of Things (IoT) into vocational education to make it match the prevailing practices in developed countries and cope with current changes in the world, especially in the technology field.

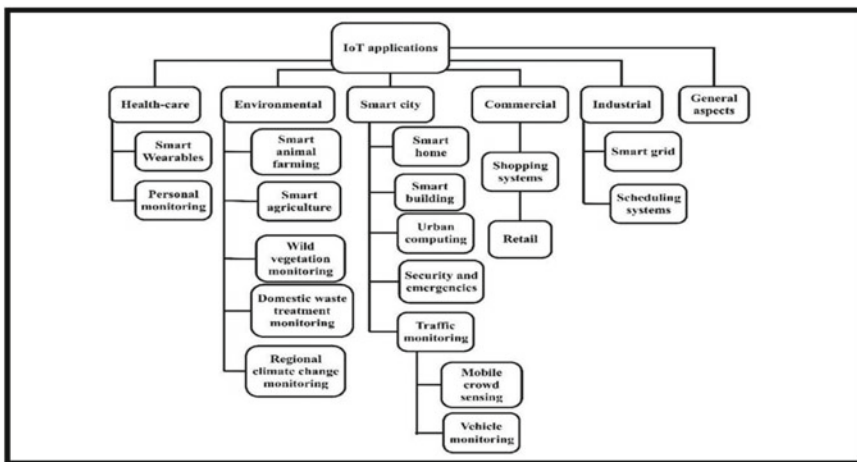
The internet of things (IoT) is defined as “the interconnection of machines and devices through the internet, enabling the creation of data that can yield analytical insights and support new operations (Nord et al. 2019). The Internet of Things (IoT) is considered a system composed of smart objects supplied with sensors, networking, and processing technologies that integrate and function together to provide an environment in which smart services are delivered to consumers (Asghari et al. 2019). The internet of things was first proposed in 1999 (Li et al. 2015), and then it passed through several stages as shown in Fig. 1 (Li et al. 2015).

The Internet of Things (IoT) is nowadays a growing domain, and it is going to continue its growth in the coming years (Chaudhary et al. 2019). Several technologies have been involved in the Internet of Things (IoT) up to this date, including wireless sensor networks (WSNs), barcodes, intelligent sensing, low-energy wireless communications, cloud computing, etc. (Li et al. 2015). There are several examples of applying the internet of things (IoT) in our real-life as shown in Fig. 2, where it has been merged in multi-applications like: health care, including smart wearables and personal monitoring; environmental, including animal farming, agriculture, domestic waste treatment, and regional climate change monitoring, smart city, including smart homes and smart buildings; security and emergency; traffic monitoring (for mobile crowd sensing and vehicle monitoring); commercial, including shopping systems and



**Fig. 1** Stages of internet of things (IoT). *Source* Li, S., Xu, L. D., & Zhao, S. (2015). The internet of things: a survey. *Information Systems Frontiers: A Journal of Research and Innovation*, 17(2), pp. 243–259. <https://doi.org/10.1007/s10796-014-9492-7>

retail; industrial, including smart grid and scheduling systems; and general aspects such as education, assets management, and real estate, etc. (Asghari et al. 2019).



**Fig. 2** Taxonomy of internet of things applications. *Source* Asghari, P., Rahmani, A. M., & Javadi, H. H. S. (2019). Internet of Things applications: A systematic review. *Computer Networks*, 148, pp. 241–261



Applying the internet of things (IoT) leads to several benefits for humans, where smart services are provided to utilize every activity at any place and time, and the most important benefit of the IoT is efficient management due to monitoring and immediate decision making (Asghari et al. 2019). When applying the Internet of Things (IoT) in the industrial domain, enterprises are going to have competitive products, green business models with optimized resources, and real-time information processing resulting in more profits (Li et al. 2015). Despite the above-mentioned benefits for applying the Internet of Things (IoT), some concerns have been mentioned by the researchers. Nord et al. stated that privacy, security, and trust are issues and challenges for the application of the Internet of Things (IoT) (Nord et al. 2019). While Asghari et al. mentioned that the main concern of internet of things (IoT) applications is satisfying the metrics of quality of service (QoS). And they added that the user's requirements should be supported by smart services in the applications of the Internet of Things (IoT) that cover quality of service (QoS) metrics like security, cost, service time, energy consumption, reliability, and availability (Asghari et al. 2019).

### ***1.1 Research Problem***

A lot of efforts have been spent in order to integrate the internet of things (IoT) into the education and the vocational education in the Bahraini secondary high schools, although there are challenges restricting the full merging and application of it, and those appeared clearly during the transformation from face-to-face learning to remote learning as a result of the COVID-19 pandemic.

### ***1.2 Need for the Research***

With the huge diffusion of knowledge and quick development of technology, it has become necessary to respond to those changes by improving the education services sector generally and the vocational education services specifically in the high schools in Bahrain, although there are some difficulties and challenges standing in the way of the full application and development of the Internet of Things (IoT) in this vital and important sector.

Launching from this, this study was initiated to address the difficulties that are facing the application of the internet of things (IoT) in vocational education in Bahrain, and this study is going to have a significant contribution to the development of vocational education by determining the difficulties and challenges and providing them to the decision makers in the Ministry of Education in Bahrain with recommendations to overcome the main difficulties that restrict the full application of the internet of things (IoT) in vocational education in Bahrain high schools.

### ***1.3 Research Objectives***

The objectives of this research are the following:

- 1- To determine the effects of Internet of Things (IoT) applications on vocational education in Bahrain high schools.
- 2- To determine difficulties that restrict the application Internet of Things (IoT) in the vocational education in Bahrain high schools.
- 3- To set recommendations that enable the application Internet of Things (IoT) in the vocational education in Bahrain high schools.

### ***1.4 Research Methodology***

This research uses the qualitative approach to achieve the previously mentioned objectives. Where it relies mainly on a systematic literature review for the previous research plus conducting SWOT analysis for the current status of Internet of Things (IoT) application in the vocational education in Bahrain high schools.

## **2 Literature Review**

### ***2.1 Internet of Things (IoT) in Education***

Same as the other fields, internet of things (IoT) technologies have entered the education field, which has added positive value to the educational system on all levels in Bahrain. The Internet of Things (IoT) connects people, processes, devices, and data to enable all the parties in the education process to find a simple method to transfer the data received from the sensors and portable devices into important information and to take action based on it (Mircea et al. 2021). During the implementation of internet of things (IoT) applications in the education process, the teachers and students work together using tablets, smartphones, or even virtual reality helmets. Also, for implanting the Internet of Things (IoT) in the education field, the teaching and learning process can be carried out remotely utilizing a webcam and an Internet connection (Mohammadian 2020). Majeed & Ali describe the internet of things in education by using the educators the smartphones and wearable devices to enhance teaching and learning, student engagement, and student satisfaction (Majeed and Ali 2018).

## **2.2 *Benefits of Internet of Things (IoT) in Education***

The benefits of merging the internet of things (IoT) in education are countless, according to Mircea et al., and they listed some of those benefits, which include: the creation of interactive classrooms; activating students and making them proactive actors in the learning process; encouraging creativity. And they mentioned in their research that the quality of the education process is affected and increased by the Internet of Things (IoT), because the students will learn more quickly, and the teachers are going to be better able to carry out their roles. Also, the Internet of Things (IoT) facilitates knowledge acquisition at any place and time (Mircea et al. 2021).

Hamlaoui and Weber said that the integration of the internet of things technologies in the educational environment facilitates the interaction of people (students and teachers) and objects (physical and virtual). Furthermore, during the employment of a virtualized experiment like Crocodile Chemistry, a considerable cost saving can be made in comparison to the real experiment (Hamlaoui and Weber 2020). Felicia et al. pointed out that the internet of things (IoT) concept is new and holds great promise for removing all barriers to education, including geographic location, linguistic differences, and economic advancement. Additionally, the integration of technology and education promotes quicker and easier learning, raising both student quality and knowledge levels (Felicia et al. 2021). Yakoubovsky et al. found in their study about the effectiveness of E-learning and the Internet of Things (IoT) application in education that the E-Learning system and the IoT application increase the efficiency of learning and studying by 20% and more, and the efficiency of memorization is increased with boosting the overall learning process (Yakoubovsky et al. 2022).

In addition to the above-mentioned benefits of applying and employing the internet of things (IoT) application in the education Mohammadian stated that when the Internet of Things (IoT) is employed in the education field, it is going to solve many issues and break main barriers that are existing (Mohammadian 2020). It can be noticed from the presented literature reviews that there is agreement between the research on the positive effects of the usage and application of the Internet of Things (IoT) in the education field.

## **2.3 *Application of Internet of Things (IoT) in Education***

The devices of the Internet of Things (IoT) are currently utilized in education to track and monitor learners in numerous areas, such as identifying their learning habits. These devices include e-books, tablets, sensors, fitness bands, and virtual and augmented reality headsets. For instance, a smart classroom has been suggested, which uses cameras and microphones to monitor learner's activity and evaluate their level of interest. This implementation can be used with students of various ages

(Felicia et al. 2021). Felicia et al. mentioned in their research paper the applications of the Internet of Things (IoT) in the education sector per each age stage, and they are summarized in Table 1.

There are different methods and forms for applying the Internet of Things (IoT) in the education field, where it can be applied in:

- 1- Teaching and delivery process (online—On person).
- 2- Learning process (online—e learning—face to face—hybrid).
- 3- Evaluation and assessment (formative and summative).
- 4- Activities and tasks.
- 5- Management of the class and student's behavior.

On the other hand, there are several applications for the internet of things that can be used in the education domain, including but not limited to:

- 1- Augmented Reality (AR) like: Zapper, Roar, Augment, and Augmented Reality App etc.
- 2- QR code and sensors.
- 3- Online (Teams and Zoom classes).
- 4- E-learning platforms like educational gate platform (<https://www.edunet.bh/Account/Login>)
- 5- Virtual experiments application and simulation application (like: Crocodile application in physics, chemistry, and biology plus Autograph application in mathematics).
- 6- Smart board and e-data show.

**Table 1** Summary of the internet of things (IoT) Applications in the Education Field based on the Age as mentioned by Felicia et al. (2021) “Increasing role of IoT in education sector: A review of internet of educational things (IoEdT),” in 2021 International Conference on Green Energy, Computing and Sustainable Technology (GECOST). IEEE, pp. 1–6

Education environment	Applications
Higher education	<ul style="list-style-type: none"> <li>–Smart campus for increasing comfort and efficiency of campus (Nord et al. 2019; Asghari et al. 2019)</li> <li>–Learner experience optimization (Li et al. 2015; Chaudhary et al. 2019; Mircea et al. 2021)</li> <li>–Automating invigilation/plagiarism technology (Mohammadian 2020)</li> </ul>
Secondary/primary education	IoT as subject to encourage STEM (Hamlaoui and Weber 2020; Felicia, et al. 2021; Yakoubovsky et al. 2022)
Pre-school	<ul style="list-style-type: none"> <li>–Internet of toys (IoToys) [15–16]</li> <li>–Movement detection during play [13–15]</li> </ul>
Special education/supporting disability	<ul style="list-style-type: none"> <li>–Enabler for movement restriction for student (Immobile), [24–25]</li> <li>–Early detection of learning disability [22, 23]</li> </ul>
General	<ul style="list-style-type: none"> <li>–Monitoring attendance, body temperature</li> <li>–Monitoring attention [28]</li> </ul>

## ***2.4 Challenge for Internet of Things (IoT) in Education***

Although the Internet of Things (IoT) assists educators in the classroom by improving the learning environment, extending learning opportunities, upgrading learning methods and tactics, improving management effectiveness, and decreasing management expenses. And despite the initiatives taken by different governments in different countries to apply the internet of things (IoT) in the education field, they have not been fully enforced due to several factors, which include (Felicia et al. 2021): Lack of financial resources, poor device updates, weak security protocols, user ignorance, complex ethical issues involving trust and privacy, data security, poor preparation, poor facilities, poor instructor self-efficacy, ICT incompetence, and so on.

While the main challenges of the Internet of Things (IoT) in education are the legitimate concerns about security, privacy, and safety, all of them are sources of risks, representing challenges requiring proper management and attention for optimizing and fully enhancing the internet of things and to achieve the intended benefits from the application of the internet of things (IoT) in the education field (Felicia et al. 2021). Felicia et al. added that security remains the highest concern for the Internet of Things (IoT) in education, where the students can manipulate the examination marks and attendance given. And to overcome those challenges, new regulations and rules are required (Felicia et al. 2021).

## ***2.5 Internet of Things (IoT) Applications, Effects and Challenges in Vocational Education***

The application of the internet of things (IoT) in the vocational education does not differ highly in the principle and concept from the application in the general education, except there is few difference in the application as a result of the nature of the vocational education where it focus more in the training, teaching the skills and practical side more thus the application of the internet of things (IoT) in the vocational education nowadays focus on connecting the machines, and equipment's during learning to the internet via barcode and sensors plus conducting the experiments in the virtual laboratories using simulation and internet of things (IoT) programs same as those mentioned above for conducting the experiments in the general education track.

But to activate the Internet of Things (IoT) in vocational education more efficiently in a way that serves the purposes of vocational education and achieves the strategic goals, it requires connecting all equipment to sensors and connecting it to the Internet and data, which is somewhat expensive and requires more resources. There is also nowadays a trend towards introducing smart robots (robots connected with the internet) in vocational education with the application of augmented reality. This is in order to obtain all the benefits resulting from the use and activation of the Internet of Things (IoT) in the field of vocational education, which are the same as

previously mentioned and explained above, where all studies say that the IoT has a positive effect on education of any kind in terms of improving quality, the learning environment, teaching and training methods, motivation of students, management of the educational situations, education outcomes, academic achievement, and others.

Despite the great benefits of the application of the internet of things (IoT) in vocational education, especially smart robotics, there are many challenges that hinder the full application of the internet of things (IoT) in the vocational schools in Bahrain, and those are such as the challenges of applying the internet of things (IoT) in general education that have been mentioned earlier in this paper, knowing that the most important concern is security.

## ***2.6 SWOT Analysis of Internet of Things (IoT) Applications in Bahraini Vocational Schools***

SWOT analysis is a useful analysis technique that is commonly used for determining the strengths, weaknesses, opportunities, and threats that any system or firm have. The following table (Table 2) demonstrates the outcomes of the SOWT analysis for the status of the Internet of Things (IoT) applications in the vocational education Bahrain schools based on an informal interview with a Bahraini vocational education teacher who has experience teaching courses in this sector for more than 4 years.

Based on the above-mentioned points, it can be noticed that there is a gap between the current status and what is desired. And to overcome the existing obstacles, a set of recommendations is provided in the next section.

## ***2.7 Solutions***

To enable the full merging and application of the Internet of Things (IoT) in vocational education in Bahrain high schools, the Ministry of Education is recommended to:

- 1- Provide an assistant teacher for each core and specialized subject in order to help the main vocational education teachers in preparing the lessons, activities, resources, materials, and all requirements that are needed for the Internet of Things (IoT) applications.
- 2- Improve and update all the current textbooks that are used in vocational education by building them basically on internet of things applications (IoT) with the transformation to smart books instead of the traditional hard textbooks that are currently used in vocational education. work on improving the existing IT infrastructure in the buildings of the vocational schools.
- 3- Provide all the necessary items, materials, and tools that are required for the application of the Internet of Things (IoT), especially the portable computer

**Table 2** SWOT Analysis of Internet of Things (IoT) Application in Vocational Education

Strengths	Weaknesses
<p>1- Most teachers and students in vocational education show positive attitudes toward the transformation and usages of the Internet of Things (IoT) application in the vocational education processes</p> <p>2- Develop and improve the information and communication technology (ICT) skills as the required twenty-first century skills, which prepare the vocational education students to enter the work market with proper and efficient skills</p> <p>3-Activation of the smart board and augmented reality</p>	<p>1- Some students and teachers face problems in connecting to the internet at their houses</p> <p>2- Lack of resources like portable computers (laptops), where most teachers and students do not have laptops to do online learning during the COVID-19 pandemic</p> <p>3- Lack of infrastructure at the vocational education schools and limited numbers of classrooms, laboratories, and workshops with all their devices and machines that are fully connected to the internet</p> <p>4-Lack of teacher’s numbers causing extra load and stress on them to perform the required task to implement the Internet of Things (IoT) in the vocational education courses</p> <p>5-Older vocational teachers need more time to deal with the Internet of Things (IoT) application in the vocational education courses</p> <p>6-Current textbooks for vocational education courses are not connected with Internet of Things (IoT) applications</p> <p>7-Failure of employing the internet of things (IoT) in the summative assessments for the vocational education courses</p> <p>8-The provided internet is slow and of poor quality; it lost its signal suddenly</p>
Opportunities	Threats
<p>1-Usages and activations of Internet of Things (IoT) applications in the analysis of the vocational education student’s performance and supplying feedback on their works</p> <p>2-Activation of the educational gate platform with supportive Microsoft tools like Teams, Outlook, OneDrive, Kahoot, and other programs</p> <p>3-Activation of the machine learning in the vocational education workshops and laboratories</p>	<p>1- Security</p> <p>2-Privacy</p> <p>3-Hacking</p>

(laptop), to all teachers who are working in vocational education and to be ready for any possible pandemic that may happen.

- 4- Maintain, rehabilitate, and improve the structure of vocational education schools to be able to match the quick and rapid revolution of the Internet of Things (IoT).
- 5- Provide free internet for the students and teachers at their homes through a memorandum of agreement with one of the telecommunications service companies in the country.

- 6- Increase the awareness of cyber security through continuous posters, publishers, videos, and other tools, etc., to overcome the associated risks and concerns for the application of the Internet of Things (IoT) in vocational education.
- 7- Establish guidelines and user's policies for the teachers and students on how to deal with and activate the Internet of Things (IoT) applications in each subject for the vocational education.
- 8- Employ the internet of things in the assessments of the vocational education courses properly in a professional way that evaluates the students' level and performance precisely and accurately with the provision of tools that prevent and detect fraud and plagiarism.

### **3 Conclusion**

To conclude, this paper has shown the importance of the full transformation and application of the Internet of Things (IoT) in the education field and the vocational education track specifically, due to the positive effects and benefits that are going to be obtained from the full application of the IoT. From the presented literature reviews, it has been found that there is an agreement that the Internet of Things (IoT) has a positive effect on the quality of education and the students learning by increasing the student's motivation towards learning, which in turn facilitates the achievement of the learning outcomes in a quick, easy, and highly efficient manner. Although the Internet of Things (IoT) has entered the vocational education in Bahraini schools, more efforts are needed to be made by the Ministry of Education in order to optimize the effects of the IoT in the vocational education to the required status that matches the country's objectives and to achieve the previously set out goals that are mentioned in the United States agreement for sustainable development. Also, it has been found that the main challenge for the application of the internet of things in the vocational education track in Bahrain is the availability of the resources and the security. Thus, it is required from the Ministry of Education in Bahrain to take into consideration those two challenges and establish new rules and regulations with the provision of all resources required to enhance the effects of the Internet of Things (IoT) on the vocational education outcomes.

#### ***3.1 Study Limitations and Future Research***

The main limitation for this research is the short time frame, and for the future studies, it is recommended to improve the research by surveying the expert opinions who are working in the field of vocational education in Bahrain to determine precisely the difficulties and challenges facing the internet of things (IoT) application in each practical subject and to share the expert teachers insights in establishing the solutions that guarantee the full application of the internet of things (IoT) in this important



educational track in Bahrain in order to develop the vocational education to a high level that matches the current standards.

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# The Impact of E-learning on Business Education



Abdulla Almajthoob and Allam Hamdan

**Abstract** With the introduction of the Internet and other types of electronic communication and information distribution, online education has developed over the course of its development, with four major periods in the process. E-learning's growing popularity in business, management, and education has contributed to increased levels of both productivity and efficiency in these fields. It also gives students the opportunity to learn at their own pace, gives them more control over their schedules and locations, reduces the costs of infrastructure and transportation, and saves money. The implementation of e-learning is a time-consuming and complicated process that requires information technology, emotional intelligence, and human resources. It is important to approach it in a logical manner because it might have both positive and bad consequences. This study demonstrates the factors that are necessary for e-learning, as well as the theoretical literature evaluation and the good and negative effects of e-learning.

**Keywords** E-learning · Online learning · Blended learning · Business education

## 1 Introduction

Starting in the 1990s with the introduction of the Internet and the World Wide Web, the present iteration of online education has evolved with the rise of the Internet and other forms of electronic communication and information dissemination. An outline of the four distinct eras in the development of online learning. In the first stage, which started in the 1990s, colleges with established distance learning programs, such as Penn State Global Campus and University of Maryland College, swiftly adapted their curriculum for online delivery using the possibilities given by the Internet. Massive enrollment increase occurred during the second wave of online education (2000–2007). In 2008, over 4.6 million U.S. students took at least one online course. A new type of online

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education known as “Massive Open Online Courses” (MOOC) emerged during the third phase (2008–2013), often known as the MOOC phenomenon. Phase four is the period after 2012 (Kumar et al. 2019). The unanticipated impact of the COVID-19 outbreaks, as well as the resulting obligation to ensure physical distance, has resulted in an increase in the prevalence of online courses. Even prior to the COVID-19 outbreak, digital alternatives to traditional education were a promising reality, with global EdTech investments totaling US\$18.66 billion in 2019. Despite the fact that running a university is difficult in general, this is the case (Hargitai et al. 2021).

The term “e-learning,” which may also refer to “online learning,” has developed and come to signify numerous things in the fields of business, management, and education (Yawson and Yamoah 2020). What is meant by “business education” is the collection of pedagogical and business abilities required to instruct students in the ways of thinking, doing, and knowing about business. There is little room for dispute that ICT may be used to great advantage in the field of business education, particularly with regards to enhancing productivity and efficiency (Oladeji 2021). Google Classroom, Zoom, Microsoft Teams, and other online tools have been used to have discussions with students, record lectures, and tests (Makhlouf and Alani 2022). Throughout the last five years, the share of institutions that provide online degrees went from 25 to 37%, as stated in the study. While online MBA programs are expanding, there has been even greater growth (over 67% and 80%, respectively) in online specialty graduate and undergraduate programs (Kumar et al. 2019).

The integration of E-Learning components and remote educational technology has been found to increase the level of self-directed learning among students in the process of content mastery. This, in turn, leads to an improved quality of education by leveraging the vast and constantly expanding global educational resources available (Awwad et al. 2023). Teachers now have the option of posting downloadable lecture notes and student assignments on the web. Students’ comprehension greatly benefits from the implementation of e-learning. As a bonus, e-learning can improve students’ academic performance (Hermawan et al. 2021). Computer-based learning is more effective than traditional teaching approaches in imparting information and skills to students. An undeniable catalyst for interactive learning, ICT plays a pivotal role in this regard (Awwad et al. 2023). Moreover, e-learning offers various advantages in higher education, including students’ freedom of schedule and location, savings on infrastructure and transportation costs, and the chance to learn at their own pace. Students are more engaged and work together better when they use a mix of digital tools. The smaller learning units that are common in e-learning can help students understand the subject better and remember it longer (Hargitai et al. 2021).

Despite all the effort put into making e-learning work, there are still several variables that might undermine its effectiveness as a remote learning method (Hermawan et al. 2021). Earlier research concentrated on topics including desire to use, adoption, usability, course content, and personalization; satisfaction was first studied systematically beginning in 2007. Success in e-learning was then investigated, as was the impact of individual student characteristics on the efficacy of e-learning (Yawson and Yamoah 2020). A large body of e-learning research, however, has improved our understanding of the satisfaction, information quality, service quality, utility,

and system quality that are crucial to the success of e-learning programs (Yawson and Yamoah 2020). E-learning requires the availability of information technology that facilitates a seamless learning process. Information technology associated with internet networks and their utilization Emotional intelligence is required to implement e-learning for an entire semester because it is associated with movement, self-control, and self-recognition. (Hermawan et al. 2021). HR also plays a crucial role in assuring the successful implementation of e-learning. Another factor that determines the success of online education is the course's level of difficulty.

The use of e-learning in schools has both positive and negative outcomes, such as a potential decrease in students' ability to interact socially, an increase in exam fraud, the need for costly technology investments, and the development of new, potentially prohibitively expensive digital skills among both students and teachers (Hargitai et al. 2021). Introducing an E-Learning system into the educational practice of a traditional university is a time-consuming and complex process that calls for a methodical approach that accounts for the following: infrastructure development; the design and development of technical, technological, organizational, and methodological conditions conducive to E-Learning; the staffing of the process of designing, implementing, and co-conducting automated training process management systems (Awwad et al. 2023). Also, Students need more inspiration to study from home since it's incredibly boring. Particularly if there are individual or group duties that must be completed (Hermawan et al. 2021).

## 2 Literature Review

Enhanced learning methods, tactics, and strategies, along with the proliferation of ICT and the acceleration of technical development, gave rise to the emergence of e-learning in the nineteenth century (Benabdallah 2022). E-learning is gaining popularity in both business and academia. AIDhaen (2023) predicts that the value of the worldwide e-learning industry would rise to \$65 billion by 2023. Forecasts put the value of the global LMS market at \$18.44 billion in 2025, up from \$5.05 billion in 2016 (Panigrahi et al. 2018).

### 2.1 *Business and E-learning*

Business may have existed before civilization. Globalization involves business. Business helps countries from all around the world trade, share services, and engage. E-learning is one way that globalization has impacted company formats. E-learning is crucial to corporate growth, diversity, and productivity (Saad et al. 2022). Business education “studies applications of mathematics, economics and behavioral sciences to problems in the production and distribution of goods and services” (McFarland 2017). Business and entrepreneurial education is insufficient. When this knowledge

is many people's only way out of poverty, it's much more concerning. Only 27% of Mexican adults had a good job, defined by Gallup as 30 or more hours per week for a regular paycheck. Experiential e-learning can teach business and entrepreneurship (McFarland 2017).

Business and entrepreneurship education promotes regional and social economies through universities. Business and management schools shape students' business and entrepreneurial skills and society's business roles. Training and development are important, but management education in tertiary education is part of the national curriculum and not limited to firm training (Beqiri and Beqiri 2021). Economic growth, convergence, and wealth depend on education (Costandi et al. 2019). Recent benchmarking surveys demonstrate that many US and Canadian organizations, large and small, use e-learning to improve IT skills, which is vital for staying technologically sophisticated. Nestle, a global company, trains employees in leadership, teamwork, and communication through an online learning system. Banks like Bank of America teach interpersonal skills online. E-learning adds business value. In many firms, experienced and committed staff resign due to technological illiteracy, which is seen as a loss of value (Saad et al. 2022). Organizations now use E-learning to teach every employee new trends instead of paying professionals or holding physical classes (Saad et al. 2022). However, time management is the most important issue for working professionals learning online. Online learning benefits today's fast-paced, competitive workplace. Online training helps experienced workers advance their professions. Online learning helps professionals learn new skills without taking time away from work. Because it's cheap and can train a lot of people at once, many organizations and individuals prefer this type of education (Saad et al. 2022).

## 2.2 *E-learning Advantages*

An organization's geographically spread team can train together online, increasing competitiveness. Online tools let students learn at their own speed (Panigrahi et al. 2018). Thus, online training benefits language learners, teachers, administrators, academic institutions, and universities by increasing autonomy and self-confidence (Benabdallah 2022). Several studies have found that online or blended learning strategies can improve students' technology perceptions by making digital flexible learning material easy to access and use and enabling autonomous learning styles (Alhalwaki & Hamdan 2019). Online education can help students build global networks. E-learning also forces teachers and researchers out of their comfort zones, making them more successful. For graduate students seeking to expand their skills, an online education platform may offer specialized degree courses not offered at their local higher education institution (Alami and El Idrissi 2022). E-learning also reduces the projected instructor shortage, overcrowding, construction costs, enrollment, profits, a friendlier learning environment, reduced bias for reusing or reselling course materials, access to the developing world and geographically isolated, technology costs, revenue loss due to transfer credits, and Blended learning increases student-teacher

contact and decreases online transactional distance (Al-Rawi et al. 2021). Online education requires more self-discipline than classroom instruction. Since instructors rarely interact with students, keeping them enrolled and engaged is difficult (Panigrahi et al. 2018). Employers may utilize e-learning success indicators to monitor trainee progress (Saad et al. 2022). It can encourage hesitant workers to complete online courses. E-learning among workers could be influenced by rewards.

### ***2.3 E-learning Factors***

E-learning effectiveness depends on the instructor/course organizer, IT infrastructure, institution support, and students (Costandi et al. 2019). The teacher helps children learn and practice using different computer operating systems (Benabdallah 2022). E-learning is dominated by technology; hence some studies attribute its problems to inadequate internet connectivity, a lack of technological tools, and a lack of literacy in using modern technologies like computers, laptops, cameras, printers, and scanners. Thus, it's crucial to master didactics and psycho-pedagogy to use those new technologies (Benabdallah 2022). E-learning success depends on students' positive attitudes toward it, regardless of how advanced the technology is (Alami and El Idrissi 2022). The digitization of management education may give rise to concerns regarding privacy, security, and the digital divide, which may be influenced by social and cultural barriers (Alhalwaki & Hamdan 2019).

### ***2.4 E-learning Drawbacks***

Despite the benefits to access, quality, and cost that online education provides, its adoption and implementation are challenged by resistance from within institutions. Staff members report issues with e-learning programs such as a lack of focus, insufficient time, too much effort to adapt, inadequate knowledge, and resistance to change (Panigrahi et al. 2018). E-learning limits human interaction between students and teachers (Costandi et al. 2019). The interview revealed that network lectures lack interaction (Mandasari 2020). The current state of E-Learning in this Higher School is in its nascent stage. The instructors utilize Moodle to send assignments to students or conduct videoconferences. However, there seems to be a lack of consideration towards the factors that motivate or demotivate students to actively participate in the learning process. Additionally, the potential challenges that may impede the teaching/learning process have not been adequately addressed (Benabdallah 2022). Online learning presents various obstacles for instructors and students. Lecturers must produce slides, instructional materials, learning videos, discussion forums, and student post-tests. Interviews with numerous lecturers showed that uploading required more preparation than face-to-face learning. Lecturers must check student assignments/post-tests personally and in groups. Online studying is convenient, but

instructors must prepare and review student assignments (Mandasari 2020). Self-discipline is essential because learning weakens without face-to-face connection (Costandi et al. 2019). E-learning has various drawbacks, including professor training expenses, faculty resistance to change, employer mistrust, high entrance prices, administrative issues, and loss of geographic competitive advantage (Grandzol and Grandzol 2006).

## 2.5 *Theoretical Literature Review*

Online developers must understand learning methods to choose the best ones. Strategies should excite learners, enable learning, build the full person, accommodate individual differences, promote meaningful learning, foster interaction, etc. (McFarland 2017). Online course development needs faculty to go beyond replicating the classroom. Given the advantages and drawbacks of online learning, faculty must rethink how to attain learning goals. E-learning as a reliable educational model lacks national pedagogical engineering. E-learning deployment can be difficult (Alami and El Idrissi 2022). Online education literature proposes searching for educational approaches that boost student learning, faculty intellectual progress, and academic production (Grandzol and Grandzol 2006). If done successfully, professors can improve pedagogy both online and, in the classroom (Grandzol and Grandzol 2006). Self-regulated, problem-based, and collaborative learning are the most common online or blended learning pedagogies, according to bibliometric study (Katal et al. 2023). Self-regulated learning incorporates cognitive, metacognitive, behavioral, motivational, and emotional/affective components. It includes goal planning, self-monitoring, self-instruction, and self-reinforcement. Problem/project-based learning (PBL) allowed students to work in groups to solve authentic problems or projects under the guidance of teachers (Katal et al. 2023). Students with better learning motivation, self-regulated learning strategies, attitudes, and behavior may understand the MOOC experience better. Collaborative learning improves student learning and problem-solving by encouraging peer support.

E-learning has restrictions, and students' future attitudes toward using it as a study tool are unknown. It emphasizes research student acceptability criteria (Alami and El Idrissi 2022). Fred Davis' technological Acceptance Model (TAM) introduced technological acceptance, adoption, and post-accept. TAM has dominated most previous models. Most of these researches focused on the two most important constructs—reported ease of use and perceived usefulness. where computer self-efficacy, innovativeness, computer anxiety, perceived enjoyment, social norm, content, and system quality are added to the TAM model (Al-Marroof et al. 2021). Researchers have examined numerous aspects besides PU and PEOU that affect technology adoption. These are: Perception of interaction (PoI): The TAM framework is extended with construct PoI to accommodate continuous system usage rather than users' early adoption of IT, Cognitive absorption: The three dimensions of cognitive absorption (the level of involvement), temporal dissociation, heightened enjoyment,

and focused immersion are different for individuals and affect both PU and PEOU to determine technology adoption, self-distraction, Cognitive age, Social neophyte, Self-efficacy assesses users' abilities to do tasks. Self-efficacy in class is linked to the e-learning system. Teachers' capacity to use technology efficiently and greatly impacts classroom instruction (Al-Marroof et al. 2021).

Cognitive and non-cognitive learning outcomes are separated. Ng (2023). Cognitive learning: management educators may help students grasp language acquisition and industry 4.0 disruptive technologies. Students would learn about future trends, business-shaping technology, applications, and ethics. Non-cognitive learning: instructor abilities, staff competency, reputation, and access can affect student satisfaction in higher management education. To maximize learning outcomes in online learning platforms, self-efficacy, virtual competence, engagement, design interventions, and others should be considered before designing and delivering content (Panigrahi et al. 2018). Csikszentmihalyi's flow theory explains user motivation. Users are motivated by their cognitive state of efficiency and motivation. Users are immersed in an activity in flow theory. Self-motivation is one of the finest strategies to learn and encourages people to enjoy their activities (Al-Marroof et al. 2021).

## 2.6 *Prior Studies in E-learning*

E-learning saves time and eliminates transaction costs, according to empirical research (Głodowska et al. 2022). Respondents also valued environmental and ecological issues. E-learning has negatives include difficulties concentrating and a lack of interpersonal skills needed for real-world work. Thus, e-learning should supplement face-to-face instruction. This study emphasizes the need to weigh the pros and cons of e-learning to establish a well-rounded education system. At the Higher School of Management, (Alami and El Idrissi 2022) (2020–2022) conducted a quantitative and qualitative study. 60 first-year students—male and female from varied learning environments—were randomly selected from 100 participants. A questionnaire and interviews identified technological, pedagogical, and organizational problems faced by the participants, including a lack of technology skills, inadequate internet connectivity and speed, and no physical support from their academic institution. Another intriguing discovery was that teachers and students lacked digital tool abilities, which led to online learning resistance and tension and anxiety. Due to a lack of student–teacher connection, the investigated teaching model was less effective, leading to a preference for classroom-based teaching over e-learning to better meet academic and professional standards (Benabdallah 2022). Business school research of 466 students from 2381 students reported a 96% response rate and 448 correctly answered questionnaires. The study found that peer advice and rewards can boost students' e-learning platform awareness. Students' technological expertise and experience greatly affect such platforms' use. The study also reveals that technology acceptance in e-learning depends on satisfaction. E-learning's perceived usefulness influences acceptance decisions, according to empirical findings (AlAmi



and El Idrissi 2022). Survey research was descriptive. Bahraini community data was collected from February 1 to February 19, 2021, using an online poll. The goal was to evaluate the community's reaction to online and mixed learning methods. 30.48% of individuals rated excellent computer abilities, 34.29% very good, 24.76% good, 7.14% ordinary, and 3.33% weak. E-learning technology capacities were analyzed using the acquired data (Al-Rawi et al. 2021). (Hermawan et al. 2021) studied 205 Accounting Program students at the Faculty of Business Law and Social Sciences, University Muhammadiyah Sidoarjo. E-learning improved pupils' accounting understanding. E-learning implementation was significant at  $0.000 < 0.05$ , supporting the hypothesis (E Learning Influences Accounting). E-learning may improve accounting comprehension for Universitas Muhammadiyah Sidoarjo students. A significant Abu Dhabi public institution conducted a study in 2019. 2015–2018 Business Faculty students answered 78 questions. After evaluating the questionnaires, E-learning was determined to help business students more than traditional teaching methods. E-learning may help business studies, as shown by this substantial outcome (Sandybayev 2020). Despite the COVID-19 pandemic's challenges, e-accounting education may not harm the educational process. Online learning offers flexibility and accessibility, but presenting financial statements and practical applications to teachers may be problematic. Various teachers have adjusted their approaches for online learning, and there are various tools and technology to aid. E-accounting education's performance depends on several elements, including the quality of instruction, student resources, and educators' and students' willingness to adopt new learning methods (Makhlouf and Alani 2022).

### 3 Conclusion

Online education has evolved with the rise of the Internet and other forms of electronic communication and information dissemination, with four distinct eras in the development. E-learning has become increasingly popular in business, management, and education, enhancing productivity and efficiency. It also offers students freedom of schedule and location, savings on infrastructure and transportation costs, and the chance to learn at their own pace. E-learning requires information technology, emotional intelligence, HR, and a time-consuming and complex process to implement. It has both positive and negative outcomes, and requires a methodical approach.

This study aims to demonstrate the impact of online e-learning on business education in Bahrain, using a data sample of people under three categories and one and a half years after the COVID-19 epidemic. E-learning is the use of Internet and digital technologies to create experience that educate fellow humans, and is gaining popularity in both business and academia. It combines online and face-to-face learning, and is predicted to reach \$65 billion by 2023. E-learning is essential for corporate growth, diversity, and productivity. It can teach business and entrepreneurship, promote regional and social economies, and add business value.

Time management is the most important issue for working professionals learning online. Online training increases competitiveness, autonomy and self-confidence, reduces instructor shortage, overcrowding, construction costs, enrollment, profits, a friendlier learning environment, reduced bias for reusing or reselling course materials, access to the developing world, technology costs, revenue loss due to transfer credits, and increases student–teacher contact. E-learning presents obstacles for instructors and students, including professor training expenses, faculty resistance to change, employer mistrust, high entrance prices, and administrative issues. Online course development needs faculty to rethink how to attain learning goals, and self-regulated, problem-based, and collaborative learning are the most common pedagogies. E-learning has limitations, and researchers have examined factors that affect technology adoption, such as perception of interaction, cognitive absorption, self-efficacy, virtual competence, engagement, design interventions, and flow theory.

E-learning can save time and eliminate transaction costs, but has negatives such as difficulty concentrating and lack of interpersonal skills. Studies have found that peer advice and rewards can boost students' e-learning platform awareness, and that technology acceptance in e-learning depends on satisfaction. E-accounting education may not harm the educational process, depending on the quality of instruction, student resources, and educators' and students' willingness to adopt new learning methods.

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# The Aviation Industry During Crisis and the Journey to Sustainable Recovery: Literature Review



Mohamed Fared Rafea and Allam Hamdan

**Abstract** The covid 19 pandemic has had a major impact on the aviation industry, causing disruption to global air travel and leading significant financial losses for airports and airlines. Due to the pandemic, demand for air travel has declined significantly, lockdowns, and travel restrictions. These stated factors led airlines to cancel flights, grounded aircrafts, and layoffs of employees. To mitigate this matter, the aviation industry had to be proactive and react rapidly to the changing situation and implement new measures in order to ensure business continuity. In this empirical study we will subject the cause and effect of financial losses and provide business strategies for future searches.

**Keywords** ICAO · Economic growth · Cost containment

## 1 Introduction

SARS or COVID-19, was an international epidemic that caused an outbreak originating from Wuhan, Hubei Province, China. Numerous were killed due to the infectious disease causing an international crisis (Kazda 2022). The fight of the most severe public health crisis has derived researchers to publish many studies showing its significant impact (Gao 2022). The Covid- 19 Pandemic has crossed international boundaries that have affected various sectors worldwide from early 2019 to late 2021. Whereas, it has impacted a major crisis in the Aviation sector. Many sanctions and restrictions on flights were obligated to stop the spread (Ciotti 2020).

In many regions the aviation sector plays a crucial role in the contribution of a state's social development and economic growth. it remains a strong bondage for the tourism economy that provides transportation of tourists and cargo globally (Kaitano Dube 2021).

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Globally 25 million jobs are created by air transport. Due to the pandemic of SARS, many staff were at risk of either losing or have lost their jobs due to management decisions. Since March 2020, many airports have announced the terminations of staff. The effects of the pandemic have made many airports either reduce or suspend several operations for long months (Ciotti 2020).

On March 6th, 2020, the international Civil Aviation Organization (ICAO) and the World Health Organization (WHO) issued a joint statement reminding everyone involved in air travel to comply with existing laws and guidelines that are related to aviation and the public health. Additionally, on March 11th, 2020, the Director-General of the WHO declared COVID-19 a pandemic, he has emphasized the need for countries to balance health concerns with economic and social considerations. While at the same time to avoid unnecessary travel and trade restrictions (Serrano 2020).

The problem of unreported staff on duty had a strong effect on the overall functioning of airport operations. With a high number of personnel not reporting to work, airports were left with a significant shortage of staff, which in turn created additional pressure on the remaining employees. To overcome this issue, an alternative solution had to be implemented, which included new shift patterns to ensure the smooth running of daily operations (Ciotti 2020).

In recent times, many countries have imposed various restrictions on airlines due to the ongoing Covid-19 pandemic. They have either canceled flights due to no-shows or due to rapid cases of the designated country's high rise of Covid-19 cases. This has caused a major backdrop in aeronautical revenue. Airlines have had to cut costs and take various measures to survive in the current economic market. These measures have included reducing number of flights, cutting salaries and laying off employees.

The purpose of this research is to distinguish the past problematic factors that have been reported during the covid-19 epidemic in Airports and Airlines. This study aims to assess the financial costs incurred during the pandemic, and explore measures of ensuring sustained operations post-pandemic, thereby enhancing business continuity within the Aviation sector. Entities that will benefit from this study in the long term are likely to include Airports, Airlines, Tourism Administrators, Financial Managers, and travelers.

## 2 Literature Review

### 2.1 Airports Rules and Regulations During the Pandemic

In recent years, Air Transport has become an essential way of transport for the daily traveler, as well as for business and industries that require timely transportation of goods and personnel. It is one of the leading industries that provides governmental securities to an originating state. Due to the pandemic both Airport operations and

Airline operations, were impacted significantly causing a decline of such operations for a prolonged period. The travel restrictions and lockdowns imposed by various governments have led to a decline in the number of passengers traveling by air, which has resulted in a significant loss of revenue for both governments and airlines (Chung 2015).

Studies on past surveillance strategies subjected that symptoms have not accurately reflected the sum of personnel infected with COVID-19 among international flight passengers (Kosack et al. 2021; Anitha Kumari et al. 2023). Therefore, it was crucial to implement rapid contact tracing in addition to initial disease screening at airports. Similar results were encountered in a study during passenger flow to Greece, where a small percentage of passengers from the UK, Spain, and Turkey tested positive upon arrival. When testing all travelers was not feasible, strict 14-day quarantine measures was enforced to reduce the risk of the spread (Sharun 2020; Al Kurdi 2021).

Hamad International Airport at Doha Qatar, is one of the busiest airports around the world with a large scale of transit flights. How have they reacted during the pandemic? They have reduced transit flights majorly. At the peak of the pandemic they have closed the airport for non Qatari nationals. Also they mandated a strict urge of travel when is necessary, which are for medical and business related travels only (Muley 2021).

According to the public transportation statistics of the United States, it has perceived a significant decline in the demand of transit (EL-Chaarani et al. 2023). The data used from a used transit navigation app indicates a logistical decline in daily demand of transit requests. The pandemic prompted a decrease in travel for some open travel frameworks in the United States (Munawar 2021).

The spread has forced the governments to take drastic measures, which have included travel bans on international travel and the closure of airports around the states of US. Worldwide a gradual decline has been indicated in the daily number of flights. It has also showed a major decline to 64% by late March 2020 due to the travel restrictions enforcement in America and Europe (Munawar 2021).

In the cases of employees, many were forced to lay off due to periodical contracts varied on the major financial loss of the main operating sector of the Airport. Within the Airlines, many pilots and flight attendants were terminated due to very low operational flights or even non. Many customers at that time were scared to fly or even step into the airports due to a stigmatized media of highly rapid cases of covid during these operations internationally.

## ***2.2 Airline Flight Handling Business Structure***

Global network flights have declined majorly to 51% during the spread. A survey was conducted and indicated that each European airport lost a percentage of half of their broad connection flights. The limitations of travel and the closure of borders have affected the air terminals. Airports have been transformed into parking areas

due to many grounded aircraft. There was a sudden decrease in scheduled landings, flight charges, and commercial revenue. Thus, causing airlines to not make sufficient income to maintain ground connections. With airports closing globally, 6 million employees working in administrations, shops, vehicle rental agencies, and terminal cafes were on the edge of loss. A recommendation has been conceived from a study resulting in monetary help to be extended as awards, funds, credits, and tax (Munawar 2021).

The **ICAO**, International Civil Aviation Organization which was established on the 1<sup>st</sup> of November 1944, at the Chicago conference (Pepin 2023). Attention has been dropped by the International Civil Aviation Organization; the number of passenger travel operations has gone down drastically. These studies have indicated slightly before these restrictions have been announced. Just the awareness of the spread has caused major changes in the aeronautical sector (Barczak 2021).

The focuses of these researchers have analyzed the security measures that have been taken at airports and airlines, showing and emphasizing the faster spread of the disease. Attention has been drawn also to Air Cargo transport. The use of free luggage space for the transportation of goods has been majorly limited. Moreover, some international carriers did not record major losses due to the fact of organizing medical transport of the needed of certain goods (Barczak 2021).

During the outbreak of Covid-19, 80% of the international capacity has been suspended. Over 180,000 aircraft have been parked. Many airlines were on the edge of bankruptcy. One good example is when Lufthansa Airlines closed their subsidiary of German wings due to financial distress during the crisis (Albers 2020). Whereas many have pleaded for financial aid to recover all financial losses. Marketing campaigns have been launched to stimulate the demand for travel and customer satisfaction with air travel (Zhang 2021).

For instance, Qantas Airlines, they have introduced an innovative idea; Fly-nowhere flights. Which are flights that departed and land within the same airport. The flight would cruise around the domestic airspace for several hours to make an amazing sightseeing and flying experience. The republic has usurpingly responded by selling out tickets in a minor of eight minutes. Taiwan has seen an increase in demand for domestic and off-island air travel. Mandarin Airlines, Taiwan's main domestic air carrier; has added extra capacity over the summer session between China and Taiwan's sunny east offshore islands (Zhang 2021).

In effect of the pandemic many airlines have set back to rely on their host governments for survival. The United States' Government had pled for an approximate of \$25 billion bailout package. South Korea's owned banks provided \$971 in order to support their air carrier (Korean Air). In the case of Europe, Dutch, French, German and Italian governments supported their national carriers in a bondage of support valuing billions of euros (Florida-Benítez 2021).

According to **IATA**, International Air Transport Association; air travel will not recover until the year 2024. North American carriers have estimated a loss of \$24 billion and \$84 billion worldwide collective losses. Top US airlines have recorded major losses in 2020. Compared to 2019, statistics have gone down less by 3.8 billion

passenger travel listed by the (ICAO) International Civil Aviation Organization. A staggering combined loss of \$370 billion to airline revenue (Vinod 2021).

Many major airlines have adapted to the concept of touchless technology in order to minimize human to human contact. They have directed their operations through cost efficient objectives in order to retain expenses and set values of healthcare at the same time. They had implemented their resource allocations on web or mobile check-ins, electronic bag-tags (EBT), and self-scanning boarding passes (Suk 2021).

Two different concepts are perceived, which are air travel motivation and demand. Travel motivation refers to a more psychological concept derived from the force. It sets people to strive in achieving their goals and add to their values. This drives the industry to partake in tourism augmentation drives (Zhang 2021).

**GDP, price, elasticity, disposable income**, and lastly **local economic development** are functions of variables derived from the concept of Travel Demand. Gross Domestic income (GDP), is the measurement of any monetary value of finalized goods and services (Callen 2023). The relationship between regional activities and **economic growth** sets a positive reliability of development. It can be forecasted with the usage of various models that involves historical data. As we know the future is unpredictable. Forecasters are aiming to be as accurate to exercise caution concerning future travel. This method is critical for the airline industry, for it enhances the infrastructure and **resource allocation** planning and deployment (Zhang 2021).

Each year, the air transportation industry moves more than 52 million tons of cargo, which is equivalent to 1% of global trade volume and over 30% by value. According to IATA, reports from 2020, air cargo generates significant profit for airlines, accounting for up to 10–15% of their total revenues prior to the pandemic. In 2020, air cargo brought in \$102.4 billion, which represents around 12.3% of the total revenues generated by airlines (Arora 2021).

FedEx, UPS, and Amazon air are consumer-orientated entities that have dedicated fleets to transport cargo. Commercial flights have always carried the overflow cargo by loading the aircraft with shipping containers. Due to this change, the decline of passenger traffic and cargo-only flights has derived a generating gain in cash flow. Many airlines have by then adopted cargo-only flights to generate cash flow (Vinod 2021).

During post-Covid-19, Cost Containment should provide an immersive opportunity to rebase the cost on a budgeted clean sheet that will build upon the new operational budgeting need from the ground up. To the more favorable terms, many values have to be forced. These values are restricting charges, asset write-downs, and renegotiating existing contracts. As a business model, this will allow reinventing the airline network, pricing, revenue management, and airline operations (Vinod 2021).



### 3 Conclusion

In recent years, air transport has become an essential means of transportation for daily travelers, business, and industries that require consecutive transportation of goods and personnel. The aviation industry is a leading contributor for an origination state's economy, providing jobs, and revenue. In past circumstances, the pandemic has severely impacted the aviation industry. Which has caused operations to decline drastically for long periods of time. Travel restrictions and lockdowns declared by several states of its government, led to a major decline in passenger flow which resulted in revenue loss for both airports and airlines (Chung 2015).

Past studies indicated that covid-19 symptoms of passenger personnel have not reflected accurately. It was crucial to implement strategies of rapid contact tracing and disease screening in airports. Statistics have indicated that a large percentage of travelers flying from Spain, UK, Turkey to Greece of being covid 19 positive upon arrival. Some implications led to strict 14-day quarantine to mitigate the risk of infections (Sharun 2020).

Globally, airports and airlines were impacted by the pandemic. They had to reduce operations, number of flights, and some resorted to closure. For example, Hamad International Airport Doha, being an all time busy airport. They had to reduce a significant number of transit flights. When at the climax of the pandemic, airport operations reduced to only Qatar national and enforce strict travel restrictions for only medical and business related travels (Muley 2021).

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# Cyber Security Awareness and SMEs' Profitability and Continuity: Literature Review



**Amal Khalifa Al Aamer and Allam Hamdan**

**Abstract** Small and medium-sized enterprises (SMEs) play a crucial role in the global economy, but they are also increasingly vulnerable to cyberattacks due to their limited resources and expertise in cybersecurity. Cyberattacks can have serious consequences for SMEs, including financial losses, reputational damage, and even bankruptcy. Therefore, it is essential for SMEs to be aware of the risks of cyberattacks and to implement effective cybersecurity measures to protect themselves. This research paper aims to investigate the impact of cyber security awareness on SMEs' profitability and continuity in the Kingdom of Bahrain. The findings of this research paper are expected to contribute to the understanding of the importance of cyber security awareness for SMEs and the need for greater investment in this area. The research will highlight the challenges that SMEs face in implementing effective cybersecurity measures and the potential impact of cyberattacks on their profitability and continuity. The study will also provide recommendations for SMEs on how to improve their cyber security practices and mitigate the risks of cyberattacks. The research paper will make a significant contribution to the literature on cybersecurity awareness in SMEs and provide insights into the challenges and opportunities for SMEs in this area. The study will have important implications for policymakers, SME owners and managers, and other stakeholders interested in promoting the growth and sustainability of SMEs. By raising awareness of the importance of cybersecurity, SMEs can protect themselves from the increasing threat of cyberattacks and ensure their profitability and continuity.

**Keywords** Cybersecurity · SMEs · Profitability · Business continuity

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## 1 Introduction

Cyber-attacks rise and the damage they cause to their victims is continuously increasing as new tools and techniques are developed. Big data, social networks, online transactions, information stored or managed via the Internet, and automated processes performed through the use of IT systems present permanent risks for information security and data privacy (Bendovschi 2015). Cyberattacks on small and medium-sized enterprises (SME) businesses continue to impede company growth because they invade private business and personal data. Small- and medium-business owners are under pressure to prevent cyberattacks rather than respond to them. Cyberattacks are becoming more frequent and more intense globally, and they are harming users, systems, and networks more and more (King et al. 2018). SMEs are a green target for cyberattacks due to how they exchange knowledge and conduct business online. SME owners frequently lack the resources and resources needed to apply cutting-edge cybersecurity techniques and take advantage of business prospects (Henschel and Heinze 2018). Moreover, SME owners often don't have a cybersecurity infrastructure that can keep up with threats. Small business owners face distinct cybersecurity challenges from large corporations.

## 2 Literature Review

### 2.1 *Cybersecurity for Small and Medium-Sized Enterprises (SMEs)*

Small and medium-sized businesses (SMEs) are a diverse group of companies that often work in the service, retail, agribusiness, microfinance, and manufacturing sectors. SMEs often strive to grow and can be inventive and ambitious, but some become stagnant and stay family-owned. The analysis in this study is focused on small and medium-sized businesses (SMEs). SMEs are who or what? Although the question may appear to be straightforward and uncomplicated, the majority of the material evaluated offers opposing viewpoints. There is no universally agreed-upon definition of SMEs (Storey 2014). There are many classifications that categorize SMEs according to different factors, such as net worth, profitability, sales income, turnover, number of employees, etc. SMEs are characterized by particular motives depending on the jurisdiction one operates in and the objective one seeks. The absence of a single definition is a substantial practical problem; it seriously reduces the likelihood that some study findings may be generalized because the subject matter of conversations may need to be specifically stated to avoid any ambiguities. This study uses the following definition of SMEs: companies classified as Micro Enterprises have less than 10 employees, Small Enterprises have between 10 and 50 employees, and Medium Sized Enterprises have between 50 and 250 employees (Karim and Gide 2018). This definition is in line with the ones used in Ghana and Nigeria, the

two case studies used in this study, and it is also consistent with other related ICT research projects. After defining SMEs, the next goal is to locate SMEs that utilize the Internet for business operations and/or communications. SMEs have been hailed as the growth catalyst for emerging markets. SMEs are generally thought to employ roughly 22% of the workforce in developing nations. As of 2010, the SME sector in Ghana accounted for nearly 92% of all enterprises and contributed over 70% of the country's GDP (Tukamuhabwa et al. 2021). Similarly, according to the Federal Office of Statistics as reported by Ariyo (2005), 97% of all enterprises in Nigeria employ fewer than 100 people, while a SME is often described as one with fewer than 250 workers. While cyber-security flaws are a critical risk for all firms, SMEs are typically the hardest hit and have the most trouble recovering from a cyber-attack. In the parts that follow, the problems with cyber-security metrics and dimensions are thoroughly examined (Ozier 2002).

## ***2.2 Cybersecurity Influence on SMEs Profitability and Continuity***

Small and medium-sized enterprises (SMEs) are a vital part of the global economy, accounting for over 90% of businesses worldwide. However, due to their limited resources and ignorance of the associated hazards, they are also susceptible to cyber security attacks. The impact of cyber security breaches on SMEs can be devastating, leading to financial losses, damage to reputation, and even closure of the business (Awwad 2021). In this literature review, we will review the current status of research on how cyber security affects SMEs.

As per the UK government's Department for Digital, Culture, Media and Sport (DCMS) study, it was found that 43% of SMEs experienced a cyber security attack in the past 1 year. The average cost of a breach was £3230, and the most common types of breaches were phishing emails, followed by viruses and malware (DCMS 2019). Another study by the US National Cyber Security Alliance (NCSA) found that 60% of SMEs go out of business within six months of a cyber-attack (NCSA 2023).

One of the main reasons why SMEs are vulnerable to cyber-attacks is their limited resources. They often lack dedicated IT staff or budgets for sophisticated cyber security measures. A study by the Ponemon Institute found that 58% of SMEs lack a cyber-security scheme in place (Ponemon Institute 2019). The absence of preparedness makes them an easy target for cybercriminals (Mahmood et al. 2023).

In a study (Renaud and Weir 2016), it was investigated if Scottish SMEs were taking the cyber threat seriously. A significant portion of the results indicated that SMEs were not. Only 15% of the participants thought they were vulnerable to an attack in any way near the truth. The double explanation for this was that human nature wants to relate to emotional and experimental information, whereas communication was fact-based. The other issue was that SMEs were being overloaded with advice and

there were disputes among security professionals. However, there are also cultural factors that contribute to the vulnerability of SMEs. A study by the University of Warwick found that SMEs often have a culture of “just getting on with it” and may not take cybersecurity seriously until they experience a breach (Chun 2019). This attitude can lead to a lack of awareness of the risks involved and a failure to implement basic cyber security measures. Building a cybersecurity culture is considered to be the most effective method for addressing the human factors that weaken the cybersecurity chain. Researchers (Gcaza and von Solms 2017) found that even those with more cybersecurity knowledge might behave in a similar manner to those with no awareness at all. The study found that creating a cybersecurity culture is the most effective way to address the human factors that weaken the cybersecurity chain. The raising cybersecurity awareness within a company is a must for starting improvement measures and developing a cybersecurity culture that is based on strong knowledge but also with the appropriate attitude and conduct (Ponsard and Grandclaoudon 2020). Users must at the very least understand the basics of security awareness, be aware of the organizational security measures outlined in the information security policies and procedures, and be aware of the potential consequences of their actions in order to foster a security-conscious culture (Zani et al. 2018).

In the chain of cybersecurity, people are frequently seen as the weakest link. As a result, procedures should be in place to guarantee that people are aware of what is needed because user ignorance can lead to additional vulnerabilities. Cybersecurity can be compromised by practices including using flimsy passwords, installing dubious software, and employing unreliable hardware and software. However, limited awareness of the issue, a lack of understanding of what needs to be done, and a failure to take action and implement policies have contributed to the problem. If this issue is not addressed, it can lead to a range of cybersecurity threats, attacks, and other errors (De Bruijn 2017).

Larger firms are frequently the focus of the broader cybersecurity sector, and SMEs occasionally strive to adopt their advice (Kimwele et al. 2010). Policies are only one element of a comprehensive cyber security strategy that also includes a variety of technical controls, procedures, staff training, and information security governance (González et al. 2013). This will be unworkable for many SMEs, particularly smaller businesses (Almeida et al. 2018). As a means of coping, many SMEs outsource cyber security and rely on online storage to guarantee data ease of use (CsC and Stehílková 2011; Hutchings et al. 2013).

Nevertheless, not all businesses have the financial resources to opt for this solution. Although there are various information security guidelines available in the research literature that specifically cater to SMEs (Sangani and Vijayakumar 2012), it's unlikely that SMEs will search through academic research literature to obtain the appropriate guidance (Pagura 2020).

The literature review's papers highlight several shortcomings that could hinder SMEs from implementing cybersecurity measures (Schneider 2013). These can be grouped into three groups: (1) SMEs failing to understand the importance of cybersecurity for maintaining their business operations, (2) insufficient knowledge regarding cybersecurity threats and precautions, and (3) insufficient resources to implement

cybersecurity controls. Each of these three areas is discussed in more detail below (Todd and Rahman 2015).

The first concern is that SMEs don't understand how crucial cybersecurity is to their ongoing operations (Harris and Patten 2014). Small and medium-sized firms (SMEs) may not fully comprehend how important cybersecurity is to maintaining the long-term profitability and continuity of their business, according to several publications (Barlette et al. 2017). The severity of the problem is demonstrated by studies showing that small businesses that experience cyberattacks are 60% more likely to shut their doors within six months (Robert Johnson 2019). SMEs lack situational awareness if they are unable to detect the possible damage that cyberattacks could do to their companies (Mitrofan et al. 2020).

The second area deals with awareness of cybersecurity threats and precautions. In this area, there are three possible shortcomings (Brodin and Rose 2020). Firstly, SMEs may not recognize their vulnerability to cyber-attacks. Secondly, even if they do realize this, they may still lack awareness of the necessary precautions and controls to protect their systems. Finally, even if they comprehend the preventative measures, they may still lack awareness of the necessity to remain updated with the most recent developments in both threats and countermeasures (Imsand et al. 2019).

The reality of cyberthreats may not be appreciated by SMEs owners and staff (Perez 2020; Sangster 2020). 38% of firms experienced data breaches in 2021, with the average cost per breach coming to \$9066 according to the Department for Digital, Culture, Media, and Sport's survey on cyberattacks. Furthermore, at least one attack occurred in 27% of small businesses every week. These numbers imply that many SMEs may not be fully aware of the danger they are exposed to (Kaušpadienė et al. 2019). This is further corroborated by the fact that, by the same survey, just 15% of small enterprises have performed a cyber security audit.

In the event that SMEs acknowledge the possible cyber threats and the danger of being targeted, they will require assistance in identifying and implementing the appropriate preventative measures and security protocols. The UK government has recognized the issue of limited knowledge about cyber security and has launched initiatives to improve awareness. One such initiative is the Cyber Essentials scheme (CyberEssentials 2021), designed by the National Cyber Security Centre (NCSC). This government-backed scheme offers a straightforward approach to protect organizations of any size against common cyber-attacks.

In the UK, businesses of all sizes are eligible for Cyber Essentials certification, and small businesses can even receive government grants to help cover the costs of certification (Cyber Essentials Grants, n.d.). However, according to Statista, less than 25% of SMEs in the UK are knowledgeable of this scheme. It is (Cyber Essentials scheme awareness by United Kingdom (UK) businesses 2020, by size, n.d.) often assumed that SMEs will seek advice from reliable sources about the necessary precautions and controls to protect against cyber-attacks. The limited adoption of the Cyber Essentials program and several research articles (Shred-it 2011) indicate that this assumption is probably naive (Reuter 2015), (Berry and Berry 2018), though. The time constraints that SMEs experience are also mentioned in Heidt et al. (2019) and Lacey and James (2010), which may make it difficult for them to properly



appreciate the most recent cybersecurity dangers and recommendations. Furthermore, according to Lloyd (2020), many cybersecurity messaging overemphasize the dangers and negative effects of cyberattacks while underscoring the advantages of putting in place the proper controls and preventative measures. According to Renaud and Dupuis (2019), Manheim (2014), and Persoskie et al. (2014), this fear-based approach may deter people from interacting with cybersecurity topics altogether.

Sangster (2020) has highlighted the mistaken beliefs held by numerous small businesses regarding cybersecurity. For example, certain SMEs may assume that they are a small scale or unimportant to attract the attention of cybercriminals (Nachreiner 2012; Lacey and James 2010; Kabanda et al. 2018; Chung 2020). Others may think that their current cyber security measures are sufficient since they have yet to experience an attack, a phenomenon known as the “halo effect” (BullGuard 2020). These perceptions can serve as explanations for not executing necessary cybersecurity controls (Njenga and Jordaan 2016). Lacey and James (2010) suggest that some SMEs view cyber-security as a technical problem that is irrelevant to their business concerns, a view supported by ENISA (2015).

Nonetheless, these beliefs are misconceptions that could hinder SMEs from comprehending the potential risks they encounter. Berry and Berry (2018) claim that while small business owners typically have the required technology security resources, they frequently lack the rules, processes, and training required to ensure that their employees are knowledgeable of how to use it safely. Kurpjuhn (2015) has been stressed that employee training and engagement are critical components of cybersecurity for SMEs. This is due to the possibility that employee behavior could compromise the cybersecurity protections set in place by SMEs (Gundu 2019), which can also have a crucial part in safeguarding against cyber risks. Patterson (2017) reported that the absence of employee engagement can hinder good cyber hygiene practices in small businesses.

To address these misperceptions and challenges, SMEs should prioritize employee training and involvement, implement necessary policies and procedures, and seek guidance from reliable sources to better understand and mitigate their cyber risks.

According to Kent et al. (2016), this type of deficit is related to SMEs being aware of the cyber security danger and knowing what steps to take but lacking the necessary resources. According to Lee et al. (2019), there are several possible resource gaps, including social resources, where SMEs might not face pressure from vendors, clients, or rivals to install cyber security controls. Additionally, SMEs might not understand the value of staff members helping one another or turning to other local small firms for advice (Marett and Barnett 2019).

Organizational resources are the second kind of resource, where SMEs may be short on funding (Heidt et al. 2019) or have trouble setting priorities for assistance (Redmiles et al. 2020). It can also be difficult for SMEs to decide which advice to take because of information overload (Cenfetelli and Schwarz 2011; Renaud and Weir 2016; Gafni and Pavel 2019).

Last but not least, SMEs could lack personal qualities like self-efficacy and confidence. According to the Department for Digital, Culture, Media, and Sport’s assessment on cyber security, 48% of UK firms lacked the assurance to complete the



basic responsibilities included in the Cyber Essentials plan (Williams 2020). A lack of self-efficacy could emerge from this lack of confidence (Lent et al. 2006). The inability of SMEs to implement efficient cybersecurity measures may be hampered by a variety of resource shortages (Vance et al. 2012). SMEs may need to look for additional resources, such as funding or advice from industry professionals, and prioritize training and education for both staff members and business owners to handle these issues (Ifinedo 2012). Endsley (1985) formulated a situational awareness theory, which she defined as “the perception of environmental elements within a volume of time and space, the comprehension of their meaning, and the projection of their future status” (p. 32). There are three levels of situational awareness, according to Endsley.

The first level is knowing pertinent information regarding a specific area, which may need purposeful effort to seek out. SMEs would fit into this class if they are ignorant of the truth about cyber risks and the potential for a data breach. The second level involves constructing a comprehensive understanding of the situation, which requires not only being aware of the threats but also understanding their implications and taking appropriate precautions and controls. The third level involves choosing to take action based on the previous levels of awareness. This level is influenced by preconceptions, which can either lead to accurate or misinformed decisions. Even if the decision is to take action, lack of resources or information overload can hinder the ability to do so, aligning with the inaction seen in. Endsley's theory of situational awareness highlights the importance of SMEs being aware of cyber threats, understanding their implications, and having the resources and ability to take appropriate action.

### 3 Conclusion

In conclusion, this paper highlights the importance of cyber security awareness for SMEs and the potential impact of cyber attacks on their profitability and continuity. Many people believe that the major goals of cyber security are to lower risk, stop data breaches, and lessen hazards caused by hackers and viruses. Business executives must redefine cyber security as a growth facilitator, though, in order to fully realize its potential. Utilizing well-established technologies like the web, mobile, and cloud can provide businesses a significant advantage. Effective cybersecurity gives SMEs the freedom to develop, invent, and customize product offers that can significantly increase market opportunity and company growth. Customer retention is one of the most crucial elements in business growth because losing consumers hinders expansion. The consequences from any data breach affects a customer, employee, business partner, or supplier, in addition to the reputational damage it poses to the organization concerned. Would you want to work with a company that doesn't take proper care of your personal information? A high level of corporate social responsibility can be shown in the culture that prioritizes data security and privacy. It is also sensible

financially. It is expensive to turn prospects into customers, and it is even more expensive to lose a devoted client or business partner. By demonstrating a dedication to security and privacy, you can reassure customers that working with your company is a reliable choice. A network of SMEs is used by large organizations. For instance, the EU General Data Protection Regulation (GDPR) applies to organizations that operate within the EU. Data controllers—those who collect the data—are accountable for both their own compliance and that of any third-party processors under the GDPR. The fact is that lax enforcement of legislation has given those SMEs who make the effort to invest in cybersecurity a rare opportunity. Large organizations are carefully scrutinizing the security procedures of each potential third party and seeking agreements with partners to ensure that secure systems are in place in light of the numerous harmful data breaches. The data controller is responsible for ensuring that third parties in its supply chain implement sufficient technological and organizational safeguards that are on par with their own. If SMEs want to take advantage of the potential prospects, they must be able to operate safely online. An efficient cyber security plan combined with appropriate risk management gives companies the opportunity to innovate, stand out from the competition, and ultimately increase sales. When the focus is solely on the cost, it can often be difficult to see the value of excellent cyber security. The commercial benefits of a strong security posture and the potential for expansion should be prioritized before expense. In a recent survey, 96% of participants admitted that while evaluating a possible acquisition target's cyber security capacity, they also consider the target's overall financial value <sup>7</sup>. The Hiscox study indicates that 83% of the firms that responded think there is industry pressure to exhibit strong cyber security. According to 76% of respondents, maintaining a positive internet reputation is essential for gaining competitive advantages. Business leaders cannot overlook the advantages of cyber preparedness, regardless of their long-term objectives, such as selling the firm or looking for financing to expand. Organizations that can transition from using cyber security as a defensive measure to one that is a strategic value generator will ultimately succeed. The benefits include being able to leverage a reputation for security readiness to command increased public confidence, loyalty, and market expansion potential. An organization is in good shape if it is aware of its possible hazards and how to reduce them.

The paper shows that SMEs face significant challenges in implementing effective cybersecurity measures, but by investing in cybersecurity and raising awareness, they can mitigate the risks of cyberattacks and protect themselves from financial losses and reputational damage. The findings of this research paper provide valuable insights and recommendations for policymakers, SME owners and managers, and other stakeholders interested in promoting the growth and sustainability of SMEs. By prioritizing cyber security, SMEs can ensure their long-term profitability and continuity in an increasingly digital and interconnected world.

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# The Impact of Smart Technologies on Enhancing Service Quality in the Public Sector: A Review



Maryam Al Fulaiti and Allam Hamdan

**Abstract** This study will fill a knowledge gap in an academic report by looking at how successfully e-services were implemented in the public sector in order to provide services for citizens and how it was successful in adopting this approach rather than the traditional approach to meet the needs of citizens as a public organization and meet the citizens' expectations, particularly the user's expectation in regards to implementing the information system. The goal of this study is to determine if the implementation of offering services through electronic channels is successful and efficient in raising customer satisfaction, a goal shared by many public organizations with a governmental bent. The study continued by stating that customers are the public sector's future workers and should always be satisfied with the online services the public sector offers.

**Keywords** Smart technologies · E-service · Public sector

## 1 Introduction

According to Mansour (Mansour 2008), governments are responsible for providing citizens with products and services. Governments all across the globe have been enhancing the capability and reputation of their public sectors. In emerging nations, it has been noted that public sector monopolies are unable to keep up with the public's rising expectations (Mansour 2008). In order to implement these policies, the government has focused its efforts on reforming the administrative system, implementing development initiatives, and integrating information and communication technology (ICT) into service delivery and execution procedures (Nawafleh 2018; Askim 2010). Administrative changes must be radical, dramatic, and fundamental in character; they cannot merely be "change in degree" as described by "continuous improvement" (Kraemer 2006). This is necessary to improve the effectiveness of policies and

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overall efficiency. Public administration will change as a result of how the digital revolution has fundamentally changed how most tasks are completed. According to Cordella (2015), the standardization of official administrative procedures and service delivery techniques supports and simplifies organizational activities, especially those crucial ones that control and coordinate bureaucratic organizations. Governmental entities that practice e-government employ ICT to produce efficient services that are distinguished by higher quality and easy public information access. It is hoped that as a result, administrative reform and development initiatives will be better prepared (Kraemer 2006; Von Haldenwang 2004). A further definition of “e-government” was given as “the organization in the public sector employing a certain information technology” (Heeks 2006). The “electronic government” was first mentioned in the “National Performance Review” of the US federal government in 1993. Its objective was to use information technology to improve citizen interactions with the government and increase access to services. In 1997, the US government launched “Access America,” a web service 2007; Kamensky. E-government, as defined by (Mary Josephine and Muninarayanappa 2023), is the use of internet-based technology to deliver effective and efficient governmental services to the general population. The public sector and e-government services are significantly impacted by technological innovation, which has an impact on how the government communicates with its citizens and disseminates information. The consumer’s position is also altered and elevated by this technological advancement, going from being an important and active content creator to a passive recipient of information and services from the government (Bertot 2010). The link between the public, private, and individual sectors is improved and controlled through e-government, which opens up business prospects (Layne 2001). Although evaluating e-government service performance is a challenging process, it is necessary for successful e-government adoption in order to deliver value, satisfy effectiveness standards, and accomplish desired goals. This is due to the fact that, similar to prior initiatives, the deployment of e-government confronts significant limitations and problems that might restrict its benefits (Heeks 2003). In addition to this limitation, Joshi and Islam found that the failure of e-government initiatives carried out by organizations in poor countries is mostly due to the absence of a workable strategic strategy for deploying the services (Joshi 2018). Both parties must divulge private information, including financial and personal information, in order to access the services they need through this link (Athmay 2015). The one-sided communication, public mistrust, a lack of follow-through, and access restrictions, all of which had the potential to erode the public’s confidence and relationships and lessen the effectiveness of the political system, led Judith E. Innes and David E. Booher to agree that the traditional approach to involving the public was ineffective (Judith 2004). Examining Dillon and Morrie’s (1996) observations on user psychology, technological quality, and the process design of information technology in terms of users, the 2012 Australasian Conference looked at this subject. Researchers examined the factors that affect how the public views and accepts the adoption of e-government services at the conference. The effort made to ensure that the website satisfies end-user requirements and needs, performance expectations when using the website, effort expectations and requirements, and facilitating



support and conditions are four factors that, according to research done by (Rajumesh 2023), had a significant impact on how users used the e-government system. (Naqi et al. 2021) also discovered that although other elements like trust, prior e-government service use, and perceived ease of use of internet services all have an impact on adoption, perceived usefulness is the most crucial one. The 45 million people, or fewer than 1% of the world's population, who live in the impoverished Gulf Corporation Council (GCC) countries are impacted by social and demographic changes. Since the bulk of the 53 million people who will live there by 2020 are expected to be under 25 years old, there will be possibilities and problems for the governments of the GCC states (Abyad 2018). Increased access to international media, education, and cutting-edge technology among the youth population illustrates how cultural norms and attitudes are evolving throughout the community (Hamdan et al. 2019; Awwad and El Khoury 2021).

## 2 Literature Review

### 2.1 E-services Quality

The classical quality notion provides the basis for the e-service quality concept, which is frequently used in marketing literature in relation to customer happiness. Ssemugabi stated that “efficient delivery of online public services to the citizens in a timely and cost-effective manner which enhances the citizen’s trust and e-government effectiveness” (Ssemugabi 2019) is what he meant by “e-government quality.” (Barnes 2002) We assert that the quality of e-services has a substantial impact on e-government’s efficacy, the capacity of an organization to effectively launch an online service, and the happiness of people. Most studies have found a correlation between the effectiveness of a website’s capacity to deliver qualifying services and the quality of its e-government services, which may assist people, organizations, and businesses in making decisions about their digital government transactions. (Ssemugabi 2019). Customers and service quality are closely related, and both have an effect on people’s behavior (ZeithamI 1996). Venkatesh (2012) emphasize the significance of taking user perception into account while constructing self-services technology. The quality of a service’s delivery is an important component that determines how satisfied a customer will be with it overall. Conversely, a poor service experience can prevent a citizen or user from completing the transaction, which can result in negative feedback and bad word-of-mouth promotion from other citizens (Sharma 2015). Due to the lack of systems, procedures, and cultures that support providing quality services, many companies in the public sector have struggled to offer services of a high standard. It is challenging to gauge and receive service quality, particularly in underdeveloped nations. The delivery of services in the public sector is more complicated because, unlike in the private sector, it involves identifying unmet requirements rather than meeting articulated demands (Fahim 2019).

## 2.2 *User Satisfaction*

According to Pearson (1980), user satisfaction is the total of a user's emotive reactions to various aspects of the computer-based information services and products that are offered inside an organization. According to various perspectives, there are various definitions of user satisfaction in relation to information technology, including "a pleasant or unpleasant user feeling associated with the advantages the person had hoped to achieve as a result of interacting with the information system" (Seddon, A Partial Test and Development Of Delone and Mclean's Model of IS Success 1996) (Seddon 1996) (Mansour 2008). According to the same perspective, William J. Doll (Doll 1988) defined user satisfaction as "the effective attitudes towards a specific computer application by someone who interacts with the application directly" (Doll 1988). In contrast, Samuel Ssemugabi (2019) defined pleasure as the user's acceptance and comfort within the framework of the user information system (Ssemugabi 2019). The success of any information technology may be evaluated in part by how satisfied users are with it (Ives 1984). The process of the services and product assessment necessary in the creation of the satisfaction response has been the subject of much research to examine and comprehend. Contrarily, a lot of data showed that customer satisfaction is a result of perceived service and product quality as well as fulfillment of performance expectations (Oliver and DeSarbo 1988). According to Deng (2009), perceived service and product performance is the outcome of the evaluation of a service's and a product's characteristic via real consumption. According to the Expectation Confirmation Theory (ECT), people have varied expectations about the advantages and quality of a certain service or product, which affects how satisfied they are with it (Oliver 1980). According to ECT, the confirmation of performance expectations and satisfaction have a positive connection, with positive confirmation of performance expectations leading to increased satisfaction (Yi 1990). The consumer will, nevertheless, be satisfied if the service, product, and service performance meet their expectations (Oliver and DeSarbo 1988).

## 2.3 *Perceived Utility*

The definition of perceived usefulness given by Schulz and Slevin in 1975, according to Davis (1989), is "the extent to which a person believes that using a particular system would enhance his or her job performance," as opposed to the definition of usefulness, which is the ability to take advantage of a thing's advantages. According to Davis (1989), the degree to which users believe that using the services will be beneficial to them and the degree to which their participation will increase their capacity to carry out transactions without trouble or effort determines the perceived utility of e-government. Assuming Bhattacharjee (2001a, b), A system's usefulness and a citizen's desire to utilize it are related. In other words, people are more likely to employ a system when it is advantageous. According to Camilleri (2019), a person's

motivation to use an information system depends on their attitudes about utilizing it, which are influenced by how easy and valuable they believe it to be. According to Camilleri (2019), behavioral intention has a significant influence on the consumption of e-government services. This is in reference to demographic criteria like age, gender, and experience that influence engagement in using e-government services generally. Thominathan and Ramayah examined the importance of perceived usefulness and user satisfaction in regard to Malaysia's e-filing system in their 2015 study. The study's findings imply that citizen usage and engagement are influenced by perceived utility and enjoyment (Alfulaiti et al. 2023; Al Dhaen 2021). The likelihood that a user would utilize and support e-government services is strongly influenced by how helpful they perceive a given information system to be. Because e-government services are being implemented slowly in underdeveloped nations, the use of some information technologies is restricted and outlawed. When offering services, it is common practice to disregard the wants and preferences of the client. (Ibrahim 2016). Many scholars have blended different frameworks based on various models and theories to better understand and explain why people like the self-service options of a certain information system over traditional services. End users of e-government services differ from those of e-commerce, and they could include persons who aren't accustomed to utilizing technology, such the elderly and those with less education, who might find it challenging to interact with or use e-government services.

## ***2.4 Citizen Confirmation***

The user's perception of the utility of an information system and the confirmation of expectations from earlier use have an impact on user happiness. While the post-acceptance that is seen as valuable has an impact on the user's confirmation. According to Al-Kaseasbeh (2019), consumers of certain services or products will obtain knowledge of and experience with the performance of such services or products. This will lead to the development of new cognition. Confirmation of expectations is defined by Ming-Chi Lee as "the users' anticipated benefits gained through their experiences with some information technology" (Lee 2010). Expectation-Confirmation Theory (ECT), created by Richard L. Oliver in 1980, is a framework for understanding how user satisfaction relates to post-adoption satisfaction, which is based on four main constructs: user expectation, perceived performance, belief confirmation, and satisfaction. Use expectation is the term describing a person's perception of how a certain technology, service, or product will really work. The post-adoption pleasure through confirmation construct acted as a mediator in the expectation-confirmation theory, indirectly affecting how each person perceived their performance. In the marketing industry, ECM was once used to look into customer happiness. This method was predicated on the idea that before using a service or product, a customer creates an initial expectation about it. The customer built their expectations of a product's performance from the moment they used it for the first time. A degree of service or product satisfaction is determined by comparing the

original anticipation with the customer expectation from the first use of services and products (Bhattacharjee 2001a, b). According to the expectation-confirmation hypothesis, the post-adoption expectation had a direct impact on the individual's perceptions of performance, which in turn had a direct impact on the individual's confirmation of beliefs and post-adoption contentment. Additionally, the individual disconfirmation construct served as a mediator between the perceived performance and post-adoption happiness (Bhattacharjee 2001a, b). The term "confirmation of beliefs" describes how an individual assesses and makes decisions about technology, services, or products in relation to the original user or individual expectations. When a technology, service, or product performs better than expected and confirmation changes from negative to positive, post-adoption satisfaction rises. Contrarily, underperforming technology, services, or products can lower post-adoption happiness or even cause discontent since they raise unfavorable initial expectations and confirmation. The degree to which a person is satisfied or content with a technology, service, or product after using and experiencing it is referred to as post-adoption individual satisfaction.

### 3 Conclusion

The direct effect of the development programs on improving service efficiency was found to have a satisfactory variance, demonstrating that these programs may change how well-performing public institutions are at providing services. In actuality, empirical results support the claims made in the literature. These results underline how important it is to carry out the right reforms and create the right development initiatives. It is important to bear in mind that since it is generally recognized that deploying technological systems, like e-government, might boost the efficiency of the services, its function should not be questioned while studying the literature on the impacts of e-government in increasing service efficiency. But the results of the present investigation were surprising. The results do not undervalue e-government, but the estimations did demonstrate a very tiny positive impact of e-government on the efficacy of services. Actually, it provided important data on the effectiveness of e-government. In reality, the research argued that e-government implementation should be supported by other elements including regulations, system modification, management support, collaborative personnel, and public acceptability because it was not always anticipated to produce the intended results.

As a consequence, it was made abundantly evident that this adoption process is more than only buying a system; it is an integrated process that relies on the collaboration of several components to be effective. These results also provided evidence in favor of the proposition that e-government promotes and enhances efforts at development. The moderating impact also led to unexpected results and suggested an interaction effect. The relationship between e-government and development initiatives shows that adopting it cannot be done in a vacuum from other factors. The results

really shown that when e-government adoption is supported by the proper development programs, the effect of these policies and programs boosted the efficiency of the services as we had an empirical foundation, which led to literary argument support. In order for e-government to be a more potent reformer, it is crucial to bear in mind that the interaction's influence was small, emphasizing the need for more measures to enhance the alignment between development initiatives and e-government. Last but not least, although though the study only focused on people's perceptions, decision-makers' and e-government directors' perspectives should also be taken into account because they could differ from those of the general population.

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# Sociocultural Factors and Millennials Attitudes Toward Entrepreneurship



Mohamed Fateel and Allam Hamdan

**Abstract** This literature review explores the factors influencing Bahraini millennials' attitudes toward entrepreneurship. The study analyzes the impact of education, culture, social support, personal values, and parental influence on the development of entrepreneurial attitudes among millennials in Bahrain. The findings indicate that education plays a crucial role in promoting entrepreneurship among Bahraini millennials, with entrepreneurship courses and training programs significantly influencing the development of entrepreneurial skills and attitudes. Social support, especially from family and peers, was found to be a critical element in motivating millennials to pursue entrepreneurship. Parental influence, including parental encouragement, support, and business experience, was also found to have a significant impact on millennials' attitudes toward entrepreneurship. Policymakers, educators, and businesspeople can benefit from this conceptual framework to understand better and encourage an entrepreneurial mindset among millennials in Bahrain.

**Keywords** Bahrain · Millennials · Entrepreneurship · Education · Culture · Social support · Parental influence · Attitude

## 1 Introduction

Global economic expansion and advancement have recently become more widely acknowledged to be significantly influenced by entrepreneurship (Prasetyo and Kistanti 2020, p. 2575). In recent years, there has been observed rise in industries and entrepreneurship growth in Bahrain, especially among millennials. However, there hasn't been much study on the Bahraini millennial generation's views on entrepreneurship. This literature review intends to investigate the sociocultural elements influencing Bahraini millennials' views on entrepreneurship.

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The document will evaluate the literature that revolves around social and cultural factors that have an impact on Bahraini millennials' views about entrepreneurship. Cultural and social elements are the two primary aspects into which the influences can be divided.

The first factor is culture, which is the most critical factor influencing attitudes toward entrepreneurship. In Bahrain, millennials' views on entrepreneurs are influenced by a variety of cultural variables.

Bahrain is a Muslim nation, and Islamic teachings impact people's attitudes toward entrepreneurship. Islamic teachings support entrepreneurship as a strategy for fostering economic development. However, more research is needed to determine how much Bahraini millennials adhere to Islamic teachings and how this affects how they view entrepreneurship.

Also, the values and beliefs influence millennials' attitudes toward entrepreneurship. Bahraini culture is based on traditional principles, influencing how people view entrepreneurship. Traditional values and viewpoints could encourage or discourage entrepreneurship. For instance, millennials may view entrepreneurship as deviating from the conventional career or educational path or as a method to uphold their cultural legacy.

Education is another cultural concern impacting how millennials feel about business. The nature, type of education, and usefulness of that degree to the labor market can substantially influence attitudes toward entrepreneurship.

The second factor is the social aspect, which is the commonalities of people in general. Social aspects influencing the views of millennials on entrepreneurship in Bahrain may be summarized as family, peers and media.

Family encouragement and effect can significantly impact how millennials perceive starting their own business. Family members may support or oppose entrepreneurship depending on their experiences, attitudes, and views.

Also, millennials' opinions of entrepreneurship can be influenced by their peers. Peer attitudes, values, and beliefs may affect how millennials view entrepreneurship.

Media can also impact how millennials view entrepreneurship. The media can present entrepreneurship in a favorable or unfavorable light, which might affect how millennials feel about it.

This literature review will look into the body of knowledge on the numerous aspects that affect young people's attitudes regarding entrepreneurship in Bahrain.

## 2 Culture

Culture is an important issue that affects how millennials feel about entrepreneurship (Hanson-Rasmussen and Lauver 2018). Cultural norms and principles have influenced people's perceptions of entrepreneurship and readiness to participate in business ventures. The administration's initiatives regarding entrepreneurship in Bahrain reflect the importance placed on security and stability.

The growth of conventional businesses like gas and oil has taken precedence over encouraging entrepreneurship in Bahrain (Tok et al. 2021, p. 100708). This focus on security and stability reflects Bahrain's cultural norms, which emphasize economic stability and security more than innovation and taking risks. The recent efforts of the government to broaden financial markets and lessen its reliance on oil and natural gas have, however, raised the pressure for creativity and entrepreneurial behavior.

Numerous initiatives, including the Bahrain Development Bank, which offers funding and support to small and medium-sized businesses, prove the government's dedication to fostering entrepreneurship (Ahmed et al. 2019). The government has also undertaken several efforts to encourage innovation and entrepreneurship, such as the Startup Bahrain initiative, which is led by the Bahrain Economic Development Board and aims to improve and expand the nation's start-up ecosystem.

Despite such attempts, Bahrain's millennials' views regarding entrepreneurship are nevertheless shaped by the country's strong emphasis on stability and security. According to a study by Gardiner and Goedhuys (2020), Bahraini millennials who place high importance on work security and stability may be less inclined to participate in entrepreneurial activities because they value the alleged stability of regular employment. The study contends that an individual's perception of danger and willingness to engage in entrepreneurial activities might be influenced by personal values. Some Bahraini businesspeople have worked to promote entrepreneurship as a legitimate career choice and alter cultural opinions of it in order to get beyond these cultural obstacles. For instance, to encourage and assist business in Bahrain, the Bahraini Entrepreneurs Organization (BEO) was established in 2007. The BEO seeks to promote knowledge of the advantages of entrepreneurship in Bahraini culture and offers knowledge and networking opportunities for business owners.

### 3 Personal Values

In Bahrain, millennial views about entrepreneurship are also significantly shaped by personal values. Several personal traits have been linked in studies on how people view entrepreneurship. They include a high affinity for taking risks, ingenuity, and independence. Young people in Bahrain are more likely to start their businesses than older generations, and those who value innovation are more inclined to pursue original and imaginative business ideas (Puceanu et al. 2018, p. 92). Although young businesses may have adequate access to resources and are risk-takers, older people are more knowledgeable and experienced, according to Kim et al. (2020, pp. 118–129). The study contends that such perceptions may prevent older business people from receiving support from different agencies. But the cultural contexts and population samples could contribute to the different perspectives of the studies.

The risk-taking tendency has also been identified as an essential core principle driving millennial views on entrepreneurship in Bahrain. According to a study by Soomro et al. (2021, pp. 239–255), Bahraini millennials who take risks frequently are likelier to start their businesses. According to the study, risk-takers are more

likely to seek entrepreneurial possibilities because they are more prepared to deal with uncertainty and possible failure.

Additionally, self-confidence has been discovered to impact Bahraini millennials' attitudes toward entrepreneurship. "self-efficacy" refers to a person's confidence in their capacity to carry out entrepreneurial endeavors successfully. According to a study by Prasetyo and Wahab (2022, pp. 418–422), millennials from Bahrain with high levels of self-efficacy are more likely to engage in entrepreneurial activity. The study further states that those confident in their capacity for achievement as entrepreneurs are more inclined to seize chances and overcome challenges.

Further, millennial views of entrepreneurship in Bahrain may be influenced by cultural norms. According to a study by Abd El Basset et al. (2022), Bahraini millennials who place high importance on family and community are more likely to start businesses that give back to their neighborhood. According to the study, cultural values are crucial in determining people's entrepreneurial endeavors and the social influence they hope to make.

Personal values can be just as important a motivator for people to pursue entrepreneurship as external circumstances. In a study by Alsaad et al. (2023), it was discovered that Bahraini millennials are more likely to pursue entrepreneurship if they have a high level of intrinsic motivation, such as a desire for autonomy and personal development. According to the study, those driven by personal objectives and values are more likely to see entrepreneurship as a way of reaching those goals and may be more prepared to take risks and overcome challenges to accomplish their ambitions.

Furthermore, the study contends that people with a high feeling of autonomy are more likely to look for business chances because they are motivated by a desire for independence and the power to decide their fate. Similarly, those who value personal development highly might view entrepreneurship as a way to advance their knowledge and abilities. They might be more eager to take on challenges and learn from their mistakes. The investigation's results highlight the significance of individual values and intrinsic motivation in entrepreneurship. In order to encourage people to pursue their aims and ideals and to see entrepreneurship as a means of doing so, governments and other stakeholders may think about strategies to promote an entrepreneurial culture (Adikaram and Razik, 2023).

## 4 Education

It is generally agreed that programs that teach entrepreneurship greatly impact how students feel about the business world. Many research investigations have shown that this kind of education can enhance students' entrepreneurial skills, attitudes toward entrepreneurship, and readiness to engage in entrepreneurial endeavors. However, there are still few opportunities for entrepreneurial education in Bahrain.

According to a study by Al-Shammari and Waleed (2018, pp. 43–57), most Bahraini institutions do not offer entrepreneurship-related programs. On the other

hand, a study by Hassan et al. (2021, pp. 63–88) found that educational institutions like colleges and universities provide several courses and entrepreneurial education programs. The difference in results between the two studies could be the different methods of evaluation used and sample sizes for the study. However, even when these courses are offered, they are frequently electives with a tiny student body. Due to a lack of entrepreneurship education, students may not have as much exposure to the field and may develop an unfavorable opinion regarding business.

According to Gangi (2017, pp. 375–388), the lack of entrepreneurial education in Bahrain can be causing harm to the growth and expansion of the economy there. In contrast, Ng et al. (2019, p. 012045) argue that education is not the only factor boosting economic growth. The study shows that infrastructure development, government policies, and financial access are crucial to economic growth. Hence, innovative company growth, job creation, and development are all crucial aspects of entrepreneurship that considerably boost the economy's expansion. Thus, it is crucial to support entrepreneurship education to give students the abilities and knowledge they need to engage in business ownership (Hamdan et al., 2022).

In Bahrain, entrepreneurship education is still not widely available, which may negatively affect how students discover entrepreneurship. Bahraini colleges should therefore consider implementing extensive entrepreneurship programs that give students a solid understanding of entrepreneurship, its principles, and its benefits (Shahzad et al. 2021, p. 173).

Bahrain may not have a lot of educational opportunities in entrepreneurship available. Nevertheless, there seems to be proof that the learners there are nonetheless highly interested in the field. A study by Zaki et al. (2021, p.152–173) discovered that many Bahraini business students overwhelmingly desired to establish their own companies. It also demonstrates that young people in Bahrain have an underlying entrepreneurial drive despite their lack of official education in this field.

The majority of Bahraini students studying business, according to the report, were drawn into the concept of starting their own business by the prospect of financial reward and the chance to follow their ideas and aspirations (Zaki et al. 2021, pp. 152–173). This demonstrates that Bahraini students are enthusiastic about creating their enterprises despite the lack of professional training in entrepreneurship. This indicates a reservoir of skilled and driven people prepared to enter the business sector, encouraging news for Bahrain's path in entrepreneurship. These students might succeed as businesspeople and contribute to advancing their nation's economy with the correct assistance and materials.

## 5 Social

The importance of social support in influencing millennial beliefs regarding entrepreneurship has also been highlighted. Social support can significantly influence the decision to engage in entrepreneurial activity, which can take many forms, including family, peer, and institutional support. In Bahrain, social support is crucial

in determining how people feel about starting their businesses. Family support has been noted as a critical element in motivating Bahraini millennials to pursue entrepreneurial endeavors. According to a study by Abd El Basset et al. (2022), family support including financial and emotional support was a key factor among Bahrain millennials considering starting their own business. According to the study, support from family may reduce some of the dangers related to entrepreneurship while functioning as a safety net for people engaged in it.

Parental influence is also a significant aspect that may affect Bahraini millennials' beliefs regarding entrepreneurship (Nabawanuka and Ekmekcioglu 2022, pp. 123–144). Parents' views and guidance might influence millennials' feelings about entrepreneurship and career decisions. Parents with successful entrepreneurial experiences might motivate and inspire children to pursue business. However, parents discouraging risk-taking or seeing entrepreneurship as unstable may impact their kids' attitudes toward the industry (Ghura et al., 2020; Harraf et al., 2021).

According to a study by Ullah et al. (2021, p. 10880), parental support considerably influenced university students' entrepreneurial inclinations in Bahrain. According to the study, young people who experienced tremendous parental encouragement and backing were more likely to show a desire to start their businesses. The study also found that parents with entrepreneurial experience were more inclined to encourage and promote their children's pursuit of entrepreneurial endeavors.

An essential component in determining the entrepreneurial goals of students in Bahrain is the influence of parental support and views toward entrepreneurship. A study by Lopes et al. (2020, pp. 81–99) found that parental encouragement is key in encouraging adolescents to pursue entrepreneurial jobs. According to the study, parents' encouragement and support made students more likely to indicate a desire to launch their firms. The study also discovered that parents with entrepreneurial experience were more inclined to mentor and encourage their kids to pursue entrepreneurial jobs.

However, their parents' opinions may also negatively impact millennials' views toward entrepreneurship (Liu et al. 2019, p. 101581). This finding disagrees with Lopes et al. (2020, pp. 81–99), where parents motivated their children to entrepreneurial activities. In Bahrain, university students' ambitions to start their businesses were significantly hampered by parental disapproval, according to a study by Tunio et al. (2021, p. 11419). According to the study, parents who gave their children negative criticism or little support were less likely to encourage them to start their enterprises. These researches demonstrate how parental encouragement and entrepreneurship-friendly attitudes influence young people's entrepreneurial inclinations in Bahrain. While encouraging and guiding students toward seeking entrepreneurial jobs can come from supportive parents, unsupportive parental attitudes might deter children from taking chances and pursuing their interests (Hamilton 2018, pp. 829–845).

Peer support is also crucial in influencing the views of millennials toward entrepreneurship. Peer support can give people access to a community of like-minded people, enabling the exchange of resources and ideas. According to a study by Sa'diyah and Pratika (2022, pp. 1520–1532), Bahraini millennials frequently turn

to peer networks to learn about and access resources for entrepreneurship. According to the study, peer networks can give people access to business prospects and boost their confidence to engage in entrepreneurial pursuits.

In Bahrain, institutional assistance, such as government policies and initiatives, influences millennials' views toward entrepreneurship. According to a study by Szymkowiak et al. (2021, p. 101565), institutional support is frequently seen by Bahraini millennials as a crucial factor influencing their decision to engage in entrepreneurial activity. According to the study, government policies and initiatives may foster entrepreneurship in Bahrain by giving people the tools and assistance they need to succeed as business owners.

## 6 Conclusion

In conclusion, the literature research has shed light on the many variables influencing Bahraini millennials' attitudes toward entrepreneurship. Education, culture, social support, personal ideals and parental influence significantly influence Millennials' views toward entrepreneurship. The development of an entrepreneurial attitude among millennials in Bahrain was significantly influenced by education. The accessibility of entrepreneurship courses and training programs and the caliber of education can significantly influence the development of entrepreneurial skills and attitudes among millennials.

It was discovered that social support, especially from family and friends, was a crucial element in motivating millennials to pursue entrepreneurship. Positive social support can give millennials the tools, information, and self-assurance they need to launch and run their businesses.

Finally, it was discovered that parental influence significantly influenced Bahraini millennials' attitudes toward entrepreneurship (Nabawanuka and Ekmekcioglu 2022, pp. 123–144). Parental encouragement, support, and business experience can positively influence Millennials' attitudes toward entrepreneurship. The literature study demonstrates the complexity and diversity of the factors influencing Bahraini millennials' attitudes toward entrepreneurship. Policymakers, educators, and businesspeople can benefit from a conceptual framework that considers the interaction between education, culture, social support, technology, individual values, role models, and parental influence to understand better and encourage an entrepreneurial mindset among millennials in Bahrain.

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# Achieving Sustainability Through Smart Home Optimization



Maryam Saleh AlGhenaim and Allam Hamdan

**Abstract** The importance of sustainability is increasing in many areas, including our homes. Although the adoption rate of smart home technologies is still lower than anticipated, smart home technologies are making an increasingly significant contribution to energy management, economics, and people's quality of life. This research investigates the sustainable benefits of smart home technologies on individuals' perception and behavior by proposing a theoretical model that is based on Technology Acceptance Model (TAM) and the extended unified theory of acceptance and use of technology (UTAUT2) model to determine the key determinants (performance expectancy, effort expectancy, social influence, facilitating conditions and hedonic motivation).

**Keywords** Smart home · Energy consumption · Sustainability

## 1 Introduction

As a primary result of urbanization, growing population concentrations, and rapid economic growth, the demand for energy has increased at a rate that has never been seen before. The residential sector is responsible for most of the total energy consumption (Ji and Chan 2019) Many specialists have dedicated their efforts and time to investigating the topic of energy management, and as a result, a broad range of smart power strategies and solutions have been developed for use in commercial and residential environments respectively.

In the most recent decades, the emergence of big data, artificial intelligence (AI), the Internet of Things (IoT), applications, devices and the development of information, systems and technology that have improved to the point where they could affect how individuals live their day-to-day lives. Technology and automation have grown

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interwoven in our daily lives, and examples of both may be found in everything that we use (Oh 2020).

The adoption of smart home technology is a promising strategy for improving quality of life, society, the economy, and the living environment of residents in addition to saving the environment and reducing energy consumption. Several technologies and systems have been designed to save the environment and reduce energy consumption.

An interactive residential setting is referred to as a “smart home”. Smart home provides services to its residents through the utilization of various sensors, applications, and electronic equipment that are all connected to one another over a network. The appliances in a smart home are connected to one another over the internet, which gives end user the ability to remotely control aspects of their house such as the temperature, the lighting, the home theater, and the security access. The adaptive home service that is related to these technologies and capabilities makes the consumer of the smart home more filled (Tabassum et al. 2019a; b).

The primary benefit of smart homes is that they consider making it possible to live in a more sustainable manner by continuously utilizing technologies of information and communication (ICT) that emphasize the environment of the home and energy management that is more considerate to the environment.

In today’s world, the concept of long-term sustainability is crucial because it highlights how important it is to meet the demands of the current generation while maintaining the ability of the next generation to meet their own needs. It is a complicated concept that considers several different aspects, including social equality, economic development, and the conservation of the natural environment. To move toward a more sustainable future, we need to take several initiatives, including increasing our use of renewable energy sources, protecting our natural resources, and reducing our amount of waste.

The implementation of a sustainable smart home means building a residence with integrated management functions that offer energy-saving advantages that help in improving energy consumption and encouraging sustainability, reducing the environmental impact by reducing waste and emissions, improving the economic cost, and improving the quality of life.

Smart homes have the potential to have a less harmful effect on the surrounding environment if instead of using carbon fuels to operate their systems, they utilize renewable energy resources like solar and wind energy. In addition, smart homes can be made to be friendlier to the environment by incorporating features and components that save water and energy, such as water-saving fixtures and energy-efficient appliances. Residents can contribute to the reduction of carbon emissions and still experience the conveniences of a smart home by putting these technologies into practice in their home (Singh et al. 2019).

However, the complexity structure of implementing smart home, which includes the installation of electronic devices, integration, service quality, infrastructure requirements, and resident awareness and knowledge of the technology’s application, is what explains the challenges that residents face when adapting to smart homes. For illustration, when a smart home is implemented, the financial cost and environmental

impact are closely tied to changes to the residential setting. These adjustments include connection, modification, elimination, and residential mobility. The purchase price is only one component of this relationship (Chang and Nam 2022a, b).

In furthermore, the intention to build a smart house usually depends on personal factors, such as how an individual views technology or the amount of work that is required to implement it (Awwad and El Khoury 2021). As a result, considering the structural and behavioral diversity present in the residential environment should emerge before the development of smart homes (Li et al. 2021a, b).

In this study, we will explore how sustainability can be incorporated into smart homes, therefore assisting residents in adopting a sustainable way of life and reducing their overall energy consumption. In addition, we will concentrate on the many different smart house technologies that are now on the market, the advantages such technologies provide, and the ways in which they may be used to structure homes that are more environmentally friendly. Furthermore, we will study the residents' perspectives about the adaptability of living in smart home, and finally, we will investigate the best ways to promote the concept of a smart home to the residents in the Kingdom of Bahrain.

## 2 Literature Review

### 2.1 *Concept of Smart Home*

The concept of a smart house for the benefit of comfort and convenience can be traced back quite a way, to the time when electricity was first made available in the residences of wealthy people near the tail end of the nineteenth century. Yet, the idea of a smart house that requires little work and is fully automated did not begin to take shape for the mass market till the last part of the twentieth century. Computer resources and automated home appliances are becoming more common at the same time. Around the same time, "smart" equipment was being installed in power transmission networks so that computer-aided control could be used to manage it. This process eventually moved to lower-voltage distribution networks and to major industrial clients, and it wasn't until it became practical to view relatively small end-uses as ready for automation, interconnection, and remote control that it was possible to deem them ready. (An early example of this is the use of electrical storage heating.) By the end of the twentieth century, user-centered and system-centered ideas of automated control were therefore beginning to converge, at a minimum on some level (Gram-Hanssen and Darby 2018).

With the increase in the availability of wireless networks, a drop in the price of sensor technology, and the widespread use of smartphones all contributed to a surge in interest in smart homes. Now, the size of the smart home market is expanding based on a B2C model that delivers integrated services through individualized and diverse devices (Smart Home Report 2021 2021). Now, a platform ecosystem is being

developed by collaborative efforts between several businesses, including the information technology industry, the manufacturing of semiconductors, and the automobile industry, with a particular emphasis on smart homes. The formation of the cooperative ecosystem brought to the necessity of ensuring interoperability among various product lines to increase the number of devices that will undoubtedly be connected. The open architecture of smart home technology enables third-party manufacturers to create new, extra functional modules, which can then be readily connected to one another. This open interface is provided to those manufacturers by smart home technology (Chang and Nam 2022a, b).

The idea behind smart homes is to use the residence as a platform for the integration of life-related facilities and devices. This is accomplished by making use of a variety of technologies, such as electrical connections, computers, network service, automated control, security systems, and interactive media, to create a residential facility that is both intelligent and efficient (Chatzigiannakis 2016). Building a smart home ecosystem requires that hardware, software systems, and cloud computing platforms be integrated into a smart home. This is made possible by the abundance of internet-of-things (IoT) technologies. Finally, smart homes can provide users tailored living services because of the gathering and analysis of data relating to user behavior (Li et al. 2021a, b).

## 2.2 *Smart Home Technologies*

The most important technological component for developing smart homes is a wireless home automation network. This network consists of sensors and actuators that collaborate to share resources and are connected to one another. The Internet of Things (IoT) is an architecture that incorporates home automation into the concept of a “smart house”. “Users can remotely monitor and control the linked appliances and devices in their homes if they have enabled Internet connectivity for such items (Girija Rani et al. 2018). These include light switches that can be turned on and off by using a smartphone or by voice command, thermostats that will adjust the indoor temperatures and generate reports about energy usage, or smart irrigation systems that will start at a specific time of the day, on a custom monthly schedule, and will thus control water waste. These are just a few examples. In recent years, there has been a significant rise in demand for smart-home solutions.

One of the most significant benefits of home automation systems is the simplicity with which they can be managed and controlled using a variety of devices. These devices can include smartphones, laptops and desktops, tablets, smart watches, and voice assistants. Home automation systems provide several solutions like automated temperature control; automated door locks; security cameras; automated appliance and lighting control (Stolojescu-Crisan et al. 2021).

Many research studies have identified smart technologies for many building systems and elements, including lighting, plug loads, window coverings, heating,

ventilation, and air conditioning (HVAC), water heating, smart thermostats, and home energy management systems (King 2018a, b).

The smart lighting system is one of the technologies for smart homes. Timothy discussed the smart lighting as a solution used for energy conservation, which can be accomplished by adjusting lighting to the conditions of the surrounding environment and by turning lights on and off or dimming them in response to user demands, which reduces the amount of energy that is consumed thoughtlessly. Using less energy is one of the best ways to cut costs. LEDs, which are a type of solid-state lighting, or IP-enabled bulbs are two options for implementing smart lighting (Internet or wireless controlled).

Then he addressed how smart appliances are designed to gather data on the condition of other appliances and make it simpler to control them locally or remotely. Moreover, jobs can be planned to run at a given time and can incorporate several appliances while being executed. Smart home appliances conserve time and energy.

Another example of smart home technology is the intrusion detection system, which alerts the user of an interruption by email and text message. The application that detects intrusions might provide the user with a comprehensive report that includes images, audio, or video.

This program's primary objective is to watch out for any suspicious activity in a user's smart home and then alert that user so they can take any necessary safeguards. Applications utilized in the smart home have also been developed to encourage safe and healthy living. gas and smoke detection in the event of a fire or smoke, it can alert the closest fire station and notify the user through email or text message of any potential health risks (Malche and Maheshwary 2017).

Keeping track of the weather outside and turning on or off the heating and cooling system as required. The system is equipped with the ability to identify a leak in the supply of cooking gas, activate an alarm to notify the occupants, and send a text message warning to those occupants. The capacity to track the weather report and, if there is a chance of precipitation, make sure that all the windows in the house are closed is one of the technologies that may be implemented into a smart home.

Furthermore, the occupant of the house can decide whether it is day or night outside and, in accordance, turn on or off the house's exterior illumination thanks to smart control. Motion detectors should be set in each room of the house as an additional layer of defense against home invasions. Get the firefighting pumps flowing as soon as you spot even the smallest indication of a fire. Watering the garden in a method that considers the soil's current relative humidity (Sahrab and Marhoon 2022).

Various studies illustrated the importance of smart speakers in the smart home. Rapid innovations in artificial intelligence and natural language processing have made a substantial contribution to an improved experience with home automation. This enhancement has been made possible by the introduction of smart speakers.

Users can utilize voice commands to manage the smart home gadgets in their houses when using a smart speaker like the Amazon Echo or Google Home. These speakers come with an artificial intelligence-powered digital assistant integrated right

in. We will be able to ask a digital assistant question, play music, and make phone calls using the smart assistant device, among other things.

It is difficult to imagine a smart house in the modern day without voice control. The three speech assistants with the most users right now are Apple Home Pod with Siri, Google Home, and Amazon Alexa (Choi et al. 2019; Dokhnyak and Vysotska 2021a, b).

For elders, especially those who have trouble with upper extremity agility due to diseases like diabetes or tremor and may have historically found it more difficult to operate hardware devices manually, hands-free voice control may make smart homes more usable and accessible. Those who have a general movement handicap would benefit from this specifically. For younger people who have mobility issues, voice control that doesn't require the use of hands might make the smart home more functional and accessible (Choi et al. 2019).

Modern homes have several systems that enhance people's comfort. However, continual maintenance and monitoring of how well everything is working are still necessary. Manually, with a screwdriver and a flashlight. So why not make use of the technology that is currently available. While removing some of the human interaction in the process (Harum 2018). Smart house management solutions can simplify human life and make it safer. In the reality of contemporary humans, all home system monitoring systems can run automatically up until a certain point when everything is operating as it should (Steane and Radcliffe 2019). To maintain and keep an eye on such systems, certain human resources are also required. An entire administrative unit must ensure the smooth operation of all systems and timely debug them because such systems are complex in and of themselves. Voice assistants can help to cut down on costs and service fees because of this. Learn to interact with all sensors for lighting, ventilation, and water supply in the home or flat in an appropriate manner with the aid of artificial intelligence systems. Such assistants may undertake analysis, monitor the entire administrative division, and alert the homeowner or renter if something went wrong in the house or flat (Dokhnyak and Vysotska 2021a, b).

### ***2.3 Benefit of Smart Home***

Many studies have discussed and identified the benefits of smart home technologies that motivate residents to adapt smart home technologies such as: (a) Efficient energy management; (b) Better home-based; healthcare services; (c) Potential financial savings and benefits, and (d) Enhanced quality of life (Li et al. 2021a, b).

#### **Environmental Benefit**

Benefits to the environment included a decrease in waste, pollution, or carbon emissions, which were attained by a combination of better monitoring, better energy management systems, and increased control over the sources of domestic carbon

emissions. Applications and screens that can be accessed remotely are expected to result in energy savings since they will increase household knowledge of their energy usage, allow reaction from a distance, and enable real-time notifications. Also, by utilizing data analytics, utility providers, architects, and urban planners may be able to better understand demand patterns for planning and maintenance purposes. ICT was found to be responsible for the avoidance of emissions, per the findings of a report written by Accenture for the Global e-Sustainability Initiative (GeSI), an international trade group for the information and communications technology industry (Sovacool et al. 2020).

“Smart houses” are innovative technology when it comes to reducing and monitoring energy use in a household setting. New threats like climate change and global warming as well as changes in the price of energy can be blamed for the rising interest in complex systems. The use of energy-efficient tools and cutting-edge technologies has made it feasible to reduce energy consumption, which is crucial to meet the rising demand and usage of power (Marikyan et al. 2019).

Most of the technology that goes into creating smart homes is wireless, making it simple to integrate this technology into pre-existing homes. Although they are constantly in network standby mode, they have their own unique energy needs to run their sensing, communication, and control capabilities. As a result, it’s possible that any additional energy savings made in contrast to traditional technologies may be lessened. Every time one evaluates the practicality of a smart technology in terms of the quantity of energy it requires, this element must be considered (King 2018a, b).

## **Economic Benefit**

Smart home technology can be used to maximize efficiency and reduce costs. Many studies proved the economic benefits of smart home technologies.

McIlvennie and Pritoni (2020) illustrated a model that describes the relation between the smart home system and the user to accomplish a variety of different energy impacts by deploying various technologies for use in smart homes. The various ways in which different agents inside the system might interact with one another using the system’s information and control functionalities to produce different kinds of effects on the environment. Because of the flow of information between the smart home system and the user, the user may come to a deeper understanding of their own energy use and, as a result, alter their behavior. This adjustment in behavior may lower peak energy use (load management), contribute to energy conservation (energy savings), and each of these benefits may result in a reduction in the user’s energy bill (cost savings). Therefore, the initial information transferred between the user and Smart home system has the potential to result in all five of the expected outcomes of energy education, behavior modification, load management, energy savings, and cost savings.

Marikyan et al. (2019) in most cases, the financial benefits of smart houses are linked to the environmental and health-related benefits of having a smart home. The

immediate advantage of effective management of energy consumption is a reduction in the cost of electricity, while the long-term advantage of using energy-saving devices is that they lead to the preservation of the environment. The monetary advantages can be obtained in either of two methods. To begin, the use of smart electric appliances and smart meters leads to a greater awareness of consumption habits, which is achieved through the consistent monitoring of the amount of energy that is used (Buallay et al. 2021; Balaji and Edward 2023; AlDhaen 2022). Additionally, the visibility of energy usage makes it feasible to evaluate and contrast the prices charged by various energy suppliers (Balaji and Edward 2023; Suri et al. 2022). The perceived financial benefits, on the other hand, have been researched as a unique group of characteristics that drive users' motivation and intention to transition from standard home appliances to smart ones. This contrasts with the potential benefits.

### Health Care Benefit

The aging population, vulnerable persons, and people with chronic ailments can all benefit from the assistance that technology for smart homes can provide, both inside and outside of the home (Reeder et al. 2013). When technology is used to execute the services of operational efficiency (comfort), monitoring and management, and consultancy, it is possible to gain health-related benefits (Marikyan et al. 2019).

The functional capabilities, the accessibility and availability of treatment, and the users' safety are the key benefits of this technology for users who have health issues, which eventually leads to better healthcare. The second function of the smart home in terms of the users' overall health is monitoring and disease management (Marikyan et al. 2019; Long-term care services and support systems for older adults: The role of technology 2016).

Several studies (Research guidelines for the Delphi survey technique 2000; Wu and Fu 2012) discovered that a majority of participants believed that in order to achieve their goal of healthy aging, they would need to get professional aid for safe and independent living (Long-term care services and support systems for older adults: The role of technology 2016). In this context, "remote real-time monitoring" refers to the monitoring and sharing of a person's physical activity levels with potentially beneficial entities to obtain effective emergency aid and to reassure family members. These factors combine to make it possible to contribute to an overall improvement in health, because of the elderly participants' favorable perceptions of the benefits they receive.

For example, sensors such as webcams (Amiribesheli 2015; Literature review on monitoring technologies and their outcomes in independently living elderly people 2015), floor sensors (Kim et al. 2013), and accelerometers (State of the art of smart homes 2012) (Hosseini et al. 2017) have been utilized quite frequently in earlier studies to detect falls in the smart homes of senior adults. Electrocardiogram (ECG) (Alam et al. 2012), body temperature (Saad al-sumaiti et al. 2014) and galvanic skin response (GSR Lillis et al. 2015) sensors are some examples of the types of



bio-medical sensors that can be used in smart homes to provide remote healthcare monitoring for the elderly.

Applications for virtual reality (VR) and augmented reality (AR) were first developed for use in the gaming sector; but, in more recent years, researchers have begun to investigate their potential use in the medical field. Some of the earliest studies in this field investigate the use of virtual reality (VR) applications for movement recovery for older adults. The findings of these studies suggested that VR applications may be able to assist older adults in improving their static and dynamic balance and lowering their risk of falling. Research has examined the use of virtual reality (VR) systems to assist older persons with chronic pain, depression, and social isolation (Lin et al. 2018; Choi et al. 2019).

Virtual reality (VR) applications could provide strategies to reduce pain in a non-pharmacological manner, minimize mobility barriers, and enhance older adults' enjoyment of various social adventures in the convenience of their home homes. This is important given the prevalence of pain, decreased mobility, and decreased social connections among older adults.

### **Improvement of Life Quality**

Smart home technologies provide users with the ability to control their home appliances from a distance and lightens the load of day-to-day tasks around the house (Marikyan et al. 2019; Amiribesheli 2015). Connected devices offer residents of smart homes the option to regulate their energy use more efficiently, thereby improving their convenience and comfort throughout the course of their daily routines (Sharida et al. 2020). Fully automated devices have the potential to improve the quality of life of residents and encourage independent living, especially for an aging population through constant health management; furthermore, these devices even provide virtual medical assistance if it is required (Marikyan et al. 2019).

Smart homes are characterized as “houses that offer their residents a comfortable, secure, and energy-efficient environment with the least feasible expense.” What defines a “smart home,” according to the Smart Homes Association, is: “The fusion of services and technology through home networking for a higher standard of living” (El-Azab 2021).

## **2.4 Technology Adoption Theories and Models**

There is no benefit to be gained from technology unless it is adopted by society and used by consumers. Acceptance is a crucial factor in determining a technology's level of success because, in the absence of perceived advantages for the user, the technology will not be utilized (Georgiev and Schlögl 2018).

Many research initiatives have been carried out to identify the elements that are encouraging the adoption of smart homes to aid in the efficient supply of smart home

technology. Technology acceptance models, often known as TAMs, were developed because of efforts made in the 1980s to encourage more widespread use of breakthrough technology among workers (Chang and Nam 2022a, b).

The models are predicated on the concept that determining the characteristics that contribute to the formation of an intention to use a technology and then modifying those factors will accelerate the acceptance of technology and increase the amount of time that people spend using it. Some studies that aimed to broaden the scope of the study model surrounding TAMs explored the influence that unique smart home features had on adoption by employing a theory called innovative transmission. Brown and Venkatesh developed a model of acceptance of technology in homes in 2005 (Brown and Venkatesh 2005), and Venkatesh and his colleagues later developed a unified theory of acceptance and usage of technology in 2012. A tool that, primarily based on product attributes, forecasts consumers' intentions to adopt new technologies and make purchases. The Technology Acceptance Model considers an individual's perception of how useful technology is as a primary antecedent of their intention to utilize the technology (Consumers' intentions to purchase smart home objects: Do environmental issues matter? 2019).

There are two fundamental beliefs in this model, namely, that PU and perceived ease of use (PEOU) primarily determine the attitudes concerning technology and the actual acceptance of it. PU focuses on the user's individual chance of increasing the performance when adopting a technology, whereas PEOU refers to the user's anticipation that using the technology is free of effort (Hubert et al. 2018). The two fundamental constructs that TAM focuses on are perceived usefulness and perceived ease of use. The focus of TAM is on these two key constructs. The term "perceived usefulness" refers to the extent to which an individual believes that making use of a particular system will lead to an improvement in that individual's level of performance (Georgiev and Schlögl 2018).

Several studies discussed the extended unified theory of acceptance and use of technology (UTAUT2). It is a different theory about IT adoption that names seven concepts as aspects that influence behavioral intention and/or use behavior: (a) performance expectancy, (b) effort expectancy, (c) social influence, (d) facilitating conditions, (e) hedonic motivation, (f) price value, and (g) habit. The next three elements, known as e, f, and g, were added to the UTAUT, or unified theory of acceptance and use of technology, to adapt the model to a consumer usage environment. It is also conceivable to draw the conclusion that most researchers believe that theories of technology acceptance and/or usage, such as TAM and UTAUT2, may not be sufficient to understand the experience of smart home technologies. Thus, a lot of authors have included elements like confidentiality, automation, safety, or environmental beliefs in their models. They have additionally been shown to be significant forces in the adoption and use of smart home technologies.

## 2.5 Sustainability Through Smart Home Utilization

Smart houses are primarily focused on the use of intelligent technology, but they are also developed with the intention of achieving sustainability through the development of intelligent building design. In fact, one of the main objectives is to control energy performance while also raising users' general quality of life (GhaffarianHoseini et al. 2013). Smart home technologies can improve comfort and save energy in the home. Some technologies interact, working together to achieve savings for the same system (e.g., HVAC) (King 2018a, b).

Blumendorf (2013) highlighted in his research that the Prototype Sustainable House uses high-tech equipment in addition to ordinary appliances with minimal energy usage to reduce its overall ecological impact. This includes a space heating system, an electricity generation system, and an air conditioning development control system that uses a heat pump and a generator. This also includes thermostat-controlled smart meters and home energy display monitors. The quantity of high-tech appliances used in homes reflects the varying degrees of comfort that are offered to the residents by the various architectural concepts.

The smart home of the future has arrived, bringing with it the possibility for higher levels of ease, energy efficiency, comfort, safety, and security. Yet, how people engage with these technologies has a big impact on how energy-efficient they are and how sustainable they could be in general.

Although product manufacturers have, to a limited extent, involved end users in the product design process, the focus is usually on developing items that customers will buy, and consumer behavior is not usually the major component that is taken into consideration. This is since end users have a useful role to play in the process of product design. Also, the ways that customers interact with products after buying them and the results of these interactions have received comparatively little study.

To achieve future sustainability goals, he argued that it is crucial to look beyond technology in and of itself and consider the complicated human factors that affect how those technologies are adopted and used (Sintov and Wesley Schultz 2017).

## 3 Conclusion

Based on the literature review that was conducted, recent years have seen rapid advancements in the technology behind "smart homes." Several studies have investigated a range of sustainability-related areas, such as energy management, environmental advantages, health benefits, financial advantages, and quality of life, and have concluded that smart home technologies offer the necessary tools to advance sustainability. The implementation and utilization of these smart home technologies by residents is a critical factor in achieving sustainability. To understand why smart implementation is still not widely used, various studies have examined the

theories surrounding the adoption of technology, including the Technology Acceptance Model (TAM) and the extended unified theory of acceptance and use of technology (UTAUT2) framework, and shown that the framework constructs, including Performance Expectancy, Effort Expectancy, Social Influence, Perceived Usefulness, Hedonic Motivation, Price/Value, and Habit, with moderating demographic inputs: gender, age, level of education, are effective predictors of adoption. Due to the ability for prediction, the model's potential for forecasting user adoption up to the applicable dimension of the theoretical approach has been solidly established as a common framework within the technology business. A model that is useful for analysis in the areas of new technology adoption is supported by the huge number of studies that have been produced. This approach has led to several proposals for promoting smart home technology and encouraging residents to embrace them.

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# Factors Affecting the Practice of Public Relations in the Middle East Institutions



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**Abstract** The study aims to define the concept of digital public relations in the Middle East institutions, its roles, and tasks, identify the reality of digital public relations in various institutions, reveal the nature of the relationship between e-government and digital public relations, and clarify the technical aspects related to content management in digital public relations, and the study reached many results, from The most important of them: the importance of the role of public relations in the era of digital media and the strengthening of the interactive relationship between the public and institutions, the importance of the integrated communication process in a transforming digital world, and the role of modern digital means of communication in improving the work of institutions. The results also revealed that digital public relations in the Middle East institutions are responsible for creating and managing content creation. Digital, this is then used to attract the target audience.

**Keywords** Digital public relations · Technology · Practice

## 1 Introduction

The information revolution has affected the public relations profession, especially like other communication professions, as its strategies have changed in light of the emergence of citizen journalism represented in social networks (Bennett 2016). Four channels are: paid channels such as digital ads, published coverage by influencers and bloggers, participation channels such as social media, and owned channels such as content, blogs and the website (Gan et al. 2015).

In the past, public relations focused on the print press because it has a significant impact on societies, and in light of its decline and the emergence of “citizen journalism represented in social networks and its influencers, these have become the

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influencers (Petrovici 2014). Activists in social media as well as bloggers are encouraged to exchange, publish and share digital content (Al-Jenaibi 2015). Collaborating with influencers in digital platforms is a new trend in the practice of public relations for their ability to market content and promote and spread brands (Arief 2019). Advertising with influencers uses three types: Collaboration with celebrities such as art and football players (Dozier et al. 2016). Advertising by influencers in the media, and advertising through social network activists (Permatasari et al. 2021).

Digitization in the world has become one of the basic needs of scientific life (Ayman et al. 2020). New communication technologies such as websites, e-mail, social networking sites, photo and video sharing sites, etc., have greatly affected the practice of the public relations profession, which gave it a new feature and a new dress than it was before (Permatasari et al. 2021). Modern digital public relations offers wider opportunities to reach those audiences faster, and in a more accurate manner, which has had a significant impact on the development of their performance (Ayman et al. 2020).

Digital public relations is the use of various media on the Internet and social media, to create and share content about the institution or person (Alexander 2016), and to reach the target audience and communicate with it through electronic media, that is, it is building and managing the reputation of the institution, and this is because forming the correct image of the institution in the minds of people is a matter very important in conveying the brand or organization to a distinct and pioneering identity (Zerfass et al. 2014).

In light of the development of social media and its communication networks, and the increasing use of them by the business sector, the media, with modern technologies, have thus contributed to highlighting the work of public relations in various sectors and institutions on both the private and public levels (Gan et al. 2015). In light of this development—the development of “digital media—represented in the professional use of social networks and their employment in the service of public relations (Hong 2013), the digital public relations crystallized in the transition of relationship management and communication with the public from the traditional stage to the modern stage emerged that keeps pace with the era of technology and its users (Çelebi 2018b). It is no longer limited to media public relations and the sending of press releases only, but today “digital public relations has become an art of integrating what was limited to working with traditional media and channels with new digital-marketing content (Tsetsura and Kruckeberg 2017), which serves the goals of the institution through what it publishes and communicates today (Çelebi 2018b). On social media platforms and networks, which was reflected positively on the institution itself in search engines across the Internet (Ngondo 2019).

With the development of the field of media and communication, and the increasing speed of the Internet’s dominance in all fields and sectors, digital public relations is more comprehensive and more diverse, giving public relations and communication officials tremendous possibilities in conveying their message to the target audience in an effective manner (VanDyke and Lee 2020). This strategy is not limited to mastering the methods of speaking and rhetoric, in order to improve the image of the institution, but goes beyond it to work on knowledge collection and analysis,



keeping pace with the requirements of the times, and focusing on value, speed and creativity by relying on modern technologies (Hill 2011).

## 2 What is Digital Public Relations?

Is the use of Internet tools such as (websites - social networks - blogs), in order to communicate with the audience of the institution and employing and harnessing modern communication technologies and digital media channels to implement its activities (Çelebi 2018c).

## 3 Reasons for the Widespread Use of Digital Public Relations Practice in Institutions

In the past two decades, the topic of communication and social networking techniques on the Internet has become a subject of great interest to public relations practitioners for reasons including:

The wide spread of smartphones and tablets among consumers, which witnessed a remarkable transformation in the process of daily communication in human lives (Arisanty et al. 2020). According to some international studies and reports, the Kingdom of Saudi Arabia ranks first in the world in terms of the number of mobile phone users (Çelebi 2018c). It became easy to receive, send and publish information and news in a casual and timely manner among users (Çelebi 2020). In addition to the mobile applications that smart phones work on, which have become an integral part of using the mobile with its various content, whether it is communication networks or related to political news or those that are interested in entertainment aspects such as gaming applications and others (Gifford 2010). It became important to take advantage of this digital technology and work on direct communication instead of mass communication (Tsetsura and Kruckeberg 2017).

The expansion of the presence of companies and institutions on the Internet, which created a suitable environment for communicating with the public and internal customers (Weber et al. 2017). The feature of direct two-way communication via the Internet provides the service to the public of the organization through e-mail, receiving advice and objections (Permatasari et al. 2021), and getting to know the public opinion and its impressions of the organization (Çelebi 2018a). The Internet also helps to provide the necessary information materials, information and statistics about the organization (Moreno et al. 2021). In addition to the speed of interaction and transfer of official organization data in the face of crises faced by the organization through continuous follow-up of developments and their repercussions (Amodu et al. 2019).

The increase in social networking sites on the Internet, which has become attracting different interests to lovers of micro-blogging, sharing photos, exchanging audio files and short or long videos (Gan et al. 2015), in addition to the places that users visit during their day and others through virtual gatherings (Çelebi and Bilir 2019). For example, the prevalence of social networks such as Twitter, Facebook and YouTube among users in the Arab year reached 70 million, and more than 20% of the world's population is now linked to one or more accounts on these networks (Çelebi 2018c). Therefore, these gatherings represent a central point for the process of direct communication and dialogue with the public (Bennett 2016).

These networks have become a primary visitor for the smartphone user who spends time either as a participant, viewer or publisher of the content provided (Amodu et al. 2019). With the increase in users and those interested, social networking platforms have become a fertile ground for mass communication and the use of the technologies of those networks, which contributes to the arrival of the direct communication and media message to users (Johansson and Larsson 2015).

## 4 Marketing Content Via Blogs

Content marketing is defined as the process of creating and distributing valuable interactive material, whether it is an article, an infographic, a video or an image in order to attract, acquire and engage the target audience (Verhoeven et al. 2018). The main objective of marketing content through blogging is to achieve the highest possible level of communication and interaction with the target audience, in order to maintain customers and create new leads (Moreno et al. 2021). Marketing content has different types, and each target group prefers one type over the other (Çelebi 2020). There are also many types of blogs, and ways to deliver the information or message to the audience (Ayman et al. 2020), but the best way to get the best results is to work on creative and new materials and use attractive image and video links (Bennett 2016).

## 5 Online Reputation Management

With the beginning of the Internet, the technical team was directly responsible for this task in the organization (Nyagadza et al. 2018). But today, with the expansion of the digital ecosystem and the pivotal role of the Internet and social media in communication and public relations, the process of managing online reputation falls to the shoulders of public relations, marketing and communication officials (Bennett 2016). If a company wants to advertise through an editor or journalist, the first thing most of them do is research the company (Verhoeven et al. 2018). Because they receive hundreds of ads a day due to the high numbers of contributing writers, they may only have a few seconds to search for them (Amodu et al. 2019). Thus, they

either admire her biography and follow her accordingly, or quite the opposite (Arief 2019).

If someone finds that the content provided is valuable and of high quality, and represents her brand, experience and company, then she has passed the test successfully (Gan et al. 2015). To enhance the management of a company's online reputation and get its message across to the right audience, it is important to create and publish effective content (Çelebi 2018b).

The focus should be on developing social media pages through effective influence on the target audience, and not only by increasing the number of followers (Verhoeven et al. 2018). The exclusion of negative brand supporters, with easy access to social media, anyone could share their bad experience on the web (Nyagadza et al. 2018). To prevent this in public relations, we need to take some measures to avoid negative experiences in the first place and train the team to deal with situations and experiences effectively (Moreno et al. 2021); We have to build a close relationship with each of followers on social media pages and follow and respond to them constantly (Çelebi and Bilir 2019). But that does not mean that we try to please all the followers, as they are not all loyal to your brand, and the goal of some sometimes is to direct negative, non-constructive criticism, to offend company only (Hong 2013).

According to a report by the Content Marketing Institute, more than 50 percent of marketing professionals turn to social advertising to post content (Permatasari et al. 2021). Estimates of its effectiveness have increased, which means that the number of marketers and communication experts has increased (Arief 2019). This is what public relations experts concluded that communication experts should also look for new ways to invest in paid advertising and reach new categories that have not been reached before (Çelebi 2018b). Blogs on social networking sites, especially (Instagram), are important and great in attracting customers, as social ads are increasing in importance little by little (Weber et al. 2017).

With the development of the field of media and communication, and the increasing speed of the Internet's dominance in all fields and sectors (Bennett 2016), digital public relations is more comprehensive and more diverse, giving public relations and communication officials enormous possibilities in delivering their message to the target audience in an effective manner (Alexander 2016). This strategy is not limited to mastering the methods of speaking and rhetoric, in order to improve the image of the institution (Dozier et al. 2016), but goes beyond it to work on knowledge collection and analysis, keeping pace with the requirements of the times, and focusing on value, speed and creativity by relying on modern technologies (Çelebi 2018c).

## **6 Artificial Intelligence and Digital Public Relations Practice**

Today, artificial intelligence has become an important part of our daily lives, especially for public relations professionals (Dozier et al. 2016); So, we strongly support the development of their skills in how to use this feature; To automate a number of repetitive tasks that will save time for both the team and the client (Alexander 2016). And honestly, I don't like the anxiety that goes so far as to fear losing jobs; The spread of this feature due to artificial intelligence and digital tools (Ayman et al. 2020); Because these characteristics will remain far from the path of creativity, innovation, and human critical thinking, which is still the engine of this sector (Arisanty et al. 2020).

Content marketing is an essential part of a digital PR campaign (Ayman et al. 2020). Today's savvy consumers have more choices than ever before, and brands that are able to communicate with them in a meaningful way are likely to be more successful (Arief 2019); Therefore, content marketing is a paradigm shift when considering traditional PR strategies versus digital (Tsetsura and Kruckeberg 2017).

As the communications industry is undergoing rapid change, PR firms in the Middle East are embracing digital transformation, bypassing traditional PR activities, conferences, exhibitions, and press releases. Riding the wave of technology, these companies are developing integrated digital marketing campaigns (Permatasari et al. 2021); To maximize website traffic and accessibility, which means focusing on improving target consumer interaction, and elevating the landscape of marketing campaigns (Amodu et al. 2019). Growing talent in the PR industry is gaining multiple expertise in mobile and online advertising, search engine marketing and optimization, social media strategies, analytics, and website development (Gifford 2010). Today, digital transformation has become more of an economic necessity than just an option for public relations companies in the Middle East, especially as the clients of these companies are waiting for them to launch their promotional campaigns, marketing content, and simultaneously redraw their brand images through multiple communication channels (Verhoeven et al. 2018).

## **7 The Impact of Digital Media on Public Relations in the Middle East Institutions**

There is a great development with regard to digital media and its reflection on the field of public relations, as many institutions specialized in the field of public relations seek to shed light on this increasing and active employment (Dozier et al. 2016). In addition to websites and e-mail communication (Bennett 2016), we find that social networks such as Facebook and LinkedIn These and other networks include pages created and managed by public relations institutions (Petrovici 2014).

Both Wang & Yang indicated that both profit and non-profit institutions use digital media to establish and establish relationships with their audiences, and by analyzing the content of more than 6000 tweets, they concluded that there are significant relationships between the interaction of followers on Twitter and the institution (Johansson and Larsson 2015). The results of the study conducted by Donald Wright on the development of the use of public relations for social networks during the twelve years that were studied, indicate that the changes that occurred as a result of the emergence of these means and techniques used, have already affected on a large scale in the strategies of mass communication, as they were presented to institutions various ways of communicating with audiences internally and externally (Çelebi 2018c).

Through social media, institutions can get to know the public and know their reactions, by getting to know the public's files as well as knowing their feelings, whether positive or negative, in addition, public relations practitioners can examine the extent of public satisfaction, and the credibility of the organization towards its audience, compared to other institutions competition. At the same time, consumers are more empowered to share their opinions widely through social media channels (Çelebi 2020).

## 8 The Reality of Digital Public Relations Practice in the Middle East Institutions

Public relations institutions need to set precise goals for the public relations apparatus, and such goals can only be determined or set through the planning mechanism (Çelebi and Bilir 2019). For these reasons, institutions and public relations departments resort to planning their activities and programs (Petrovici 2014).

Planning means that mental activity that is directed to choosing the optimal possible use of the available set of energies to achieve certain purposes in a specific period of time (Hill 2011). From this we conclude that the basic variables that govern the planning process are: the purposes or objectives, resources, or capabilities, and the time available for or specified for implementation (Permatasari et al. 2021).

These elements can be employed in the field of digital relations as follows:

1. **Objectives:** Create and maintain a good online reputation (search engines and social media platforms) (Amodu et al. 2019).
2. **Available resources and capabilities:** All available modern forms of communication (the organization's website, pages and murals on social media, Android applications, blogs and forums, e-mail), and to achieve this, the public relations apparatus must consist of cadres that control communication and electronic editing techniques, creating and managing interactive content is a key factor in this process (Çelebi and Bilir 2019).
3. **Time:** Choosing the right time and maintaining the electronic identity for a longer period of time (Weber et al. 2017).

## 9 The Importance of Practicing Digital Public Relations in the Middle East Institutions

- Helping the organization to identify the digital environment in which it operates, and to reveal the attractive opportunities available to it, and the restrictions, threats and risks that affect its work, and to identify the competing institutions and their audience (Nyagadza et al. 2018).
- Develop long-term strategies to improve the organization's cyber reputation management and respond to attacks (Permatasari et al. 2021).
- Achieving a balance in the performance of public relations inside and outside the cyberspace (Hong 2013).
- Helping public relations officials to identify the size of the target audience, know their desires, and measure their opinions (Tsetsura and Kruckeberg 2017).

## 10 Digital Transformation in the Field of Digital Public Relations in Institutions in the Middle East Institutions

With the revolution of digital technology and its impact on the media, recent statistics have indicated the extent to which these media influence public relations practitioners and their theoretical frameworks (Çelebi 2018c). And public relations as an independent science, cannot remain isolated from modern technology and its new developments, otherwise it will find itself ineffective and affected by all segments of society (Alexander 2016). The power of public relations in social media has made it easier to communicate and interact with others faster through devices and electronics (Bennett 2016). Now every person has more than one computer, and more than one smartphone, connected directly to the Internet, and has the full ability to publish and share information and news, not only in his surroundings, but also to all countries of the world within a few minutes (Gifford 2010); Therefore, the Internet and digital applications, have revolutionized many aspects of public relations research and practice (Çelebi 2020). The Internet, with all the means of communication available in it, has provided unique opportunities for practitioners in the field of public relations, whether in terms of gathering information, monitoring public opinion, access to direct dialogue with their target audience and strategizing for them on a variety of issues (Arisanty et al. 2020). In addition to the power of the impact of these digital social media in reaching a wide segment of the audience (Gifford 2010), and through which they can influence the opinions of these audiences, whether on social or political issues (Johansson and Larsson 2015). According to recent reports, new media continues to evolve until digital content and applications in the twenty-first century are larger and embedded in economic well-being than power was in the twentieth century (Arisanty et al. 2020). The multiplicity of practice areas in which new media has changed in the past decade has led to an increased demand for digital presentation everywhere, and for presentations of the most important events

(Çelebi 2020); This made access to the Internet and integrating elements through it essential, focusing exclusively on computer technology and digital content production (Permatasari et al. 2021). Public relations practitioners, here, are responsible for coordinating and producing this material, and the PR units in every organization need to accommodate this type of new demand (Hill 2011). Because new media are distinguished by the elements of real-time and interactive, compared to other traditional media, it has become the preferred term for a huge range of media practices that use digital technologies (Zerfass et al. 2014). This digital public relations trend may create new expectations about providing content that small or unqualified institutions may not be able to easily meet, and this would reduce the share of institutions that are less funded (Johansson and Larsson 2015), or institutions that lack the role of public relations in their management (Gifford 2010). The areas of digital public relations practice are as follows (Çelebi 2018b).

## 11 Appreciation of Cultural Values

Public relations companies in the Middle East are working on studying and understanding the demographics, which is the main element in their strategies (Çelebi 2018c), especially since the region is home to many ethnically, linguistically and religiously diverse communities (Hong 2013), which necessitates the selection of appropriate content that takes into account cultural diversity and enhances awareness brand and reputation (Moreno et al. 2021). However, the scene in the Middle East, known for its diverse traditions, its renewed social behavior and its unique cultural heritage, provides huge potentials for experts of public relations companies in the region (Verhoeven et al. 2018). Therefore, public relations companies work in preparing accurate and comprehensive studies to understand the requirements of the target audience (Dozier et al. 2016), to be able to prepare public relations campaigns that emulate their characteristics, culture and provide them with a positive experience with which they can interact (Petrovici 2014).

## 12 Data Analysis

Like other sectors, the adoption of digital technologies is playing a fundamental role in bringing about fundamental changes in the public relations industry around the world (Petrovici 2014), with many public relations companies taking advantage of the huge potential of data analytics in order to gain market insights, make more wise decisions, and prepare strategies focused on “Return on investment” (Çelebi 2018b), and the level of audience interaction is maximized (Hill 2011). PR companies also use the results of data analysis to determine the optimal media platform to implement media and advertising campaigns (Ayman et al. 2020).

### **13 Innovation, Diversity & Inclusion**

PR firms strategize according to an understanding of the demographics and audience trends of each generation in order to ensure brand loyalty and enhance brand awareness (Alexander 2016). For example, a high priority in future plans for brand campaigns is to address Generation Z (post-millennials, who are very tech-savvy) (Hong 2013). Therefore, public relations companies focus on the quality of content that leads to customer interaction in the digital and real worlds, in addition to preparing innovative public relations campaigns that embody diversity and inclusiveness to address a wide range of audiences and are based on an extensive study of trends and interests (Moreno et al. 2021).

### **14 Perfect Media Relations**

The challenges brought about by the pandemic and the accelerating digital transformation process have forced a change in the way media work in the world (Alexander 2016), so that customized and thoughtfully designed media has a greater potential to achieve the desired results compared to traditional media (Dozier et al. 2016). Therefore, many media institutions are now increasingly interested in what is called people's journalism and/or contributing articles (written by people outside the media organization) to go along with the new business models (Tsetsura and Kruckeberg 2017). Since media relations are one of the most effective strategies for maintaining a brand's reputation (Arisanty et al. 2020), it is necessary for brands to build close relationships with journalists and a deeper understanding of their experiences, and brands cannot achieve this without the help of PR experts (Johansson and Larsson 2015).

### **15 Influencers on Social Media**

PR experts when developing campaign strategies on social media sites consider that social media influencers are a suitable target for paid brand marketing campaigns, as they have high user engagement and can create more potential customers (Hill 2011). Experts also view social media influencers (sports, artists, etc.) as having the ability to create full brand awareness among a more focused and conscious audience (Zerfass et al. 2014).



## 16 Internal Communication

With the major shifts in business ecosystems, the spread of mass resignations, and the readiness for the post-pandemic era, effective corporate communication strategies with employees have become an essential component of business methodology (Dozier et al. 2016). Institutions can take advantage of public relations companies to address concerns of employees (Arief 2019), and public relations experts can help corporate management build closer relationships with employees, due to the adoption of scientific and innovative methods of communication within the strategic plans of bulletins and internal messages (VanDyke and Lee 2020).

## 17 Conclusion

The results revealed that the great change that occurred in the field of communication and public relations in the Middle East institutions did not make public relations no longer confined to developing media relations and sending press releases as it was in the past decade. Revenue models, as new communication channels are being multiplied.

The future of public relations is the Internet, of course the transition from traditional public relations to digital public relations is an important and necessary stage, based on three pillars, namely:

Repurpose content through social media and integrate marketing content into the communication programs of a particular organization or person is to repurpose previously prepared content and transform it into new interactive material.

Marketing content through social media networks, creating and distributing valuable interactive material, whether it is an article, infographic, video, or image... in order to attract, acquire and engage the target audience.

Online Reputation Management.

The process of managing online reputation has become the responsibility of public relations, marketing and communications officials.

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# A Comparative Study of Artificial Intelligence Applications in the Healthcare Sector



Yusuf Ajoor and Muneer Al Mubarak

**Abstract** Artificial intelligence (AI) represents a challenging subject for countries around the globe to apply within different sectors such as education, economy, and healthcare. Today, AI is being used to assist in the diagnostic and administrative process. However, since the COVID-19 pandemic, there has been an emergence in utilizing AI and robotics to protect healthcare workers from patients. The aim of this study is to evaluate the use of AI to improve the working conditions of healthcare workers; healthcare workers are at significant risks of not only disease, but abuse and stress as well. This study reviews AI applications and AI strategies for the healthcare sector in Bahrain and AI contribution to marketing, and achievement of Sustainable Development Goals (SDGs). Benchmarking will be done with AI applications of healthcare for other countries. The study findings have revealed that Bahrain has an outstanding achievement in AI which will have the leverage to meet SDG goals 3 of “Good Health and Well-Being”, 11 of “Sustainable Cities and Communities”, and 15 “Life on Land” of 2030 Bahrain’s vision. On the other hand, further studies will be required for the development of applying AI to surgical precise treatment procedures to avoid human mistakes. In addition, an application should be launched for scheduling of delivery timing of medicine to patients. Furthermore, applying complex AI machine learning should be done within radiological scans sooner the better for identifying and defending malignant tumors.

**Keywords** Healthcare · Artificial intelligence · Sustainable development goals · COVID-19 · Machine learning · Internet of Things · Cybersecurity · Artificial neural network

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## 1 Introduction

### 1.1 *Artificial Intelligence: Between Concepts, Ways, and Applications*

Nowadays, artificial intelligence (AI) represents a fast-growing topic that attracts researchers, private companies, and governments alike to explore and doing several investments in such a field. AI is referred to as “The focus of the area is on what potential uses for computers execute “intelligent activities” like to those performed by humans, such synthesizing vast volumes of data or drawing conclusions from a scenario” (Terry et al. 2022).

The applications of AI to primary healthcare have been discussed and include outcome prediction, data exploration and description, and recommendation or decision assistance. For example, AI can be used for identifying risks in earlier stages, studying, and analyzing the workforce, and the ease of gathering data from databases. Furthermore, AI has been used widely with radiology products and predicting health-related diseases using either conversational tools like chatbots (Terry et al. 2022) or information gathered from filled e-surveys.

### 1.2 *AI Between Baseline and Developments in Bahrain*

The Kingdom of Bahrain has done a good effort to AI in many sectors such as the Economy, Infrastructure, Education, and finally Healthcare. Focusing on healthcare, Bahrain has published the application of “Isehha” in collaboration with Indra Company, it has been highly used for providing healthcare services up to 57,326 patient records, 142,566 appointments, 24,887 pharmacy appointments at Salmaniya based on 2018 data. Many data records of patients like X-ray scans can be accessible through “Isehha” application. In collaboration with the Ministry of Youth and Sports and the Innovation Centre, the Ministry of Health (MOH) has also designed and developed robotics that analyzes COVID-19 test samples in 2020 (Al Shehab and Hamdan 2021).

MOH has also published “BeAwareBh” application which has supported residents for many healthcare services like registering for vaccination, quarantine symptoms record, viewing results of COVID-19 infection tests, and more as COVID-19 pandemic precautions (Fig. 1). Furthermore, MOH has also worked on operating robots for nursing admitted patients in Ebrahim Khalil Kanoo Health Centre isolation facility during the COVID-19 pandemic (Fig. 2) to reduce the risk of infection of its staff. However, MOH is working on further strategies for operating nursing robotics within health centers in Bahrain in collaboration with countries the of Gulf region which will result in a healthy society by avoiding health exposures (bahrain.bh. 2022).



Fig. 1 Features of BeAware Bahrain app (bahrain.bh. 2022)



Fig. 2 Robotics during COVID-19 pandemic (bahrain.bh. 2022)



Fig. 3 Sustainable development goals

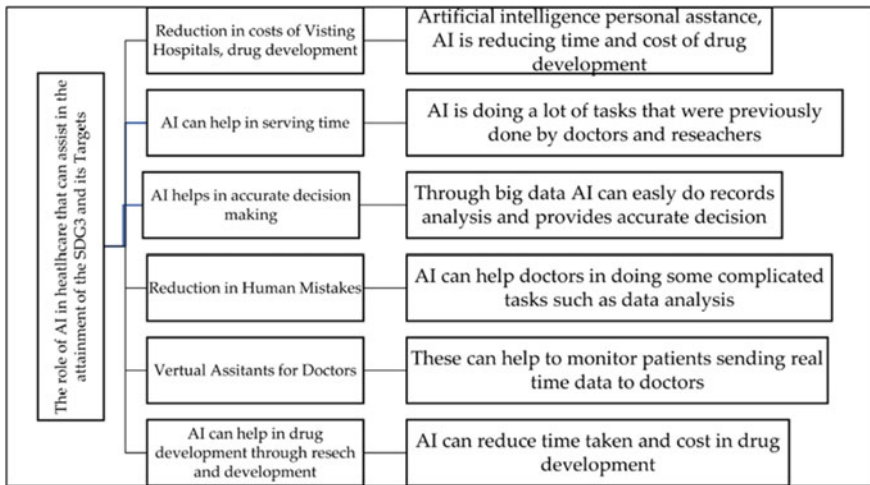


Fig. 4 Roles of AI in Healthcare sector for achieving SDGs (Mhlanga 2022)

### 1.3 Research Focus and Problem

The most famous applications of AI in healthcare are centered around patient care and diagnostics, however, this research paper will focus on how AI and relevant technologies can be used to assist healthcare workers in various segments of the healthcare system. Healthcare workers all over the world face various problems and working conditions that not only expose them to physical diseases, but also psychological problems brought on by stress and anxiety. With regards to diseases, the most recent increased risks came with the COVID-19 pandemic. In terms of positive COVID-19 testing, the general community had a 0.33% Incidence while

frontline healthcare workers had 3.96%. The predicted incidence rates were 5.63% and 12.1% respectively for the general community and frontline healthcare workers. These numbers show significant physical risks to healthcare workers with regards to disease exposure.

On the other hand, examples of psychological or mental health problems can be seen in research conducted in Colombia. It that showed that ICU staff are 97% more likely to suffer from severe depression symptoms and are at an up to threefold increased risk in for severe stress (Failed 2022). These conditions are not only brought up by the nature of their work, but also due to the human interactions with the patients. A study was held in Bahrain for the emergency department of Bahrain Defense Force Royal Medical Services showed that 78% of staff experienced verbal abuse (like shouting etc.) from patients or their family members; the study attributes this behavior mostly to patients feeling entitled or cheated by the healthcare system (Rafeea et al. 2017). The study also mentions incidents of physical abuse as well (Rafeea et al. 2017). From that, many consequences have been faced by emergency department staff such as finding difficulties sleeping, considered to quit their job, and facing problems within their social life (Rafeea et al. 2017).

While AI cannot reduce these shocking numbers to zero at this day and age, it can be used to improve care delivery, improve operations, increase protection, and reduce overall pressure faced by healthcare workers.

## ***1.4 Need for the Research***

The research will provide a great addition to national Bahrain's vision of 2030, as it will analyze the gaps between the practices of artificial intelligence in Bahrain and other countries around the world. Furthermore, the research will also review the sustainable development goals to be if new technologies of artificial intelligence were suggested. Finally, such research of implementing artificial intelligence will create a healthy and sustainable society.

## **2 Literature Review**

### ***2.1 Sustainable Development Goals of Artificial Intelligence in Health Care***

Sustainable Development Goals (SDG 17) has been established in 2015 by United Nations for considering multiple aspects within three sustainability pillars: economy, society, and environment (Palomares et al. 2021). However, such a study was aiming to estimate a cumulative view and SWOT analysis for achieving SDGs by 2030 using AI technology. The study findings that AI will have the leverage to achieve Goal 3 of



“Good Health and Well-Being”, as it will provide specific supporting AI systems in healthcare, development of medicines and vaccinations, public health management, and so on. In addition, many AI tools like social media were utilized for enhancing awareness of society and also could provide a consultation remotely. Furthermore, AI will support the idea of smart cities which is focusing on gathering information and utilizing it in sensor technologies like (IoT) against diseases, assurance of estimating earlier stages of diseases before it happens or developing and will provide an action to be taken to defend it (Palomares et al. 2021).

Another study was held in Sweden in 2020 to assess the role of AI in achievement of SDGs and it has revealed that human being is part of ecosystem and achieving goal 14 “Life Below Water” will contribute to a healthy society, as AI can create and develop new systems for estimation of oil spill incidents which save marine life from contamination hazards. Another goal to be achieved is goal 15 “Life on Land”, as AI-developed technologies for identifying either are of green coverage or areas to be threatened by desertification. However, the study has also suggested that AI plays a huge role in achieving goal 11 “Sustainable Cities and Communities” since it provides different sustainable initiatives like smart cities, circular economy, and low carbon footprints which will create a healthy society (Vinuesa et al. 2020).

A study in South Africa was done in 2022 for building strategies for using AI targeting goal 3 “Good Health and Well-Being” after the experience of the COVID-19 pandemic. The methodology was a qualitative study by analysis of journal articles contents including the AI addressing of negative impacts of COVID-19 pandemic, the content were analyzed was 100 published journal articles since year of 2000, 25 published reports like UN and the world bank, 25 media articles from different countries, and finally 55 other supportive reference were considered based on research-related ideas. The research revealed that AI has high contribution during COVID-19 pandemic for aggressive research for treatment procedures and also understanding the virus itself. It also has been utilized for communications with customers during the pandemic for management, control, and monitoring purposes against infections with virus. The study has also mentioned that AI requires a deep assessment process in order to make sure it does not conflict of SDGs achievement strategy. Furthermore, an AI was providing a fast containment and control of COVID-19 spread and this has been shown clearly during the pandemic. However, it has been suggested to countries to have a regulatory framework supporting AI for achieving SDGs (Mhlanga 2022).

In Spain, a study was held in 2021 for assessing application of Internet of Things (IoT) to implementation of SDGs. The methodology of the study was focusing on gathering data from literature and real case study scenarios of IoT initiatives. The study has mentioned IoT applications which has leverage to achieve goal 3 “Good Health and Well-Being”. One of these is the utilization of intelligent medical systems, sensors, developed medical equipment, and collaboration between modern healthcare facilities in rich countries and medical institutions in poor nations. The study has also mentioned that IoT and intelligent systems play a great role in vaccination development with high standards, vaccination control, health & safety, and data management. Furthermore, IoT and other technologies have the leverage to access a new area around the world that requires healthcare within their community. Finally,

online training of healthcare staff has contributed a lot to reducing infection risks and this required an integrated intelligent system and other technologies for avoiding attending in person instead (Verdejo Espinosa et al. 2021).

Last but not least, a study was performed in Taiwan in 2021 for assessing awareness of AI and relating it to SDGs. The survey was distributed to 1018 educated people and resulted in a positive relationship of awareness in Taiwan against AI, but also revealed that AI is risky. Furthermore, the study has considered different SDGs such as goal no. 3 “good health and well-being”, which has shown a high rate for AI-SDG relationships due to the high quality of healthcare services in Taiwan. However, some data were gathered, and the result was out of it is that education plays a great role in innovation for AI, which has leverage to create a healthy society by working on enhancing the quality of clean energy supply, circular economy, and clean water resources (Yeh et al. 2019).

## ***2.2 Artificial Intelligence in Health Care Around the Globe***

Starting with Japan, a study was done in 2020 for reviewing Japan’s strategy and efforts were done from a healthcare perspective. The approach specifically focuses on productivity, health, and mobility with commensurate expenditures in R&D, talent acquisition, open data, and start-up businesses. The council’s plan was unveiled in 2017 along with a roadmap broken down into three phases: (1) the development and deployment of AI across a range of domains, (2) the public use of data and AI across those domains, and (3) the establishment of ecosystems that connect domains. According to estimates, the AI industry in Japan would expand from JPY 3.7 trillion (USD 35 billion) in 2015 to JPY 87 trillion (USD 821 billion) by 2030, and the goal of the program is to solve a lack of AI engineers by leveraging already-existing R&D partnerships between business, academia, and government. Additional advantages of healthcare are provided by this material and social infrastructure. “My Number” System and the Next Generation Medical Foundation Law, are both recently invented and give Japan the chance to collect the data of its 125 million citizens into a single, anonymous storehouse. This would be one of the biggest central libraries of curated material to date and a significant asset in the creation of a medical AI strategy on a national and worldwide level. Japan has also created a framework for the triage of patients suffering from acute ischemic stroke in the field by having a platform and a database that includes all local stroke clinics and evaluates them based on whether they can offer endovascular or systemic thrombolytic therapy. A clinically tested questionnaire, real-time traffic data, and the ability to find the closest stroke facility are used to prioritize patients. More than that, a collaboration was done with one of the highest social media called “Line” for creating a healthcare platform with a consultation service and creating a new medicine delivery service that makes use of its current network of pharmacist members. These collaborations between diverse industrial sectors support the blending of behavioral and health data, enabling access to health information through a tool that is already widely used by the populace.

However, launching such services and tools though it has the leverage to decrease the administrative stress on all healthcare levels, will also cut costs of human resources (Ishii et al. 2020).

Another study was held in the US in 2019 to review the potential of AI in the healthcare sector, machine learning is a statistical method of AI for 'learning' through 'teaching' models with data and fitting models to data. One of the most complex types of AI is machine learning; in a 2018 Deloitte study of 1,100 US managers whose organizations were already exploring AI, 63% of the businesses were using machine learning in their operations. There are various variations of this broad method, which lies at the heart of several approaches to AI. Precision medicine, which determines which treatment procedures are likely to be effective on a patient based on a variety of patient traits and the context of the therapy, is the most popular use of classical machine learning in the healthcare industry. Another complex method of machine learning is a neural network, which has been widely utilized for the categorization of diseases, such as figuring out if a patient would have a specific illness. Thirdly, deep learning, or neural network models with many levels of features or variables that predict results, is one of the most complicated types of machine learning. These models could contain thousands of hidden elements that today's graphics processing units and cloud systems can more quickly process. Deep learning is frequently used in the healthcare industry to identify possibly cancer's malignant tumors in radiological pictures. Radiomics, or the identification of clinically significant patterns in imaging data beyond what the human eye can see, is a field in which deep learning is being used more and more. Finally, physical robots have been utilized in factories and warehouses, for carrying, lifting, assembly activities, and transporting supplies among hospital departments. More recently, robots have improved their ability to work together with people and are simpler to teach by having them do the desired activity. Additionally, they are developing greater intelligence due to the integration of various AI capabilities into their "brains," which are their operating systems. It would appear reasonable that over time, physical robots would include the same advancements in intelligence that we have seen in other types of artificial intelligence (Davenport and Kalakota 2019).

### ***2.3 The Role of AI Within Marketing Aspects***

AI has been a huge addition to our entire life, many innovations were involved in different perspectives which cannot be limited. Starting from a study held in India in 2020 to review the role of AI in business marketing, deep learning networks have developed many organization systems and it has leverage to shift to AI-based organizations due to their efficient and developed services or product. The study has defined the term "Start-ups" which are viewed as the economy's main sources of innovation and development in a knowledge-based society and studying them might provide important new information on how AI will affect firms. It has also listed the startups which mainly drive the global economy from 22 perspectives, education

and health perspectives were low in AI applications which cybersecurity having the highest based on data being gathered from India. Moreover, AI start-ups will provide technological and process-oriented improvements that will increase efficiency and open new business prospects. The top six industrial sectors mentioned above include some of the processes that will drive technological changes in the global marketplace. These include robotic surgery, medication research, virtual nurses, health monitoring, and medical image analysis. In addition, many investments were made in AI which represents how investors are interested in such a hot topic, especially with human-machine interaction which represents one-quarter of investments. Based on location, United States is the highest place for investments in AI (Soni et al. 2020).

Another study was done in India in 2021 for trial of two AI techniques, Artificial Neural Network which (ANN) which means models of the biological central nervous system. The network is made up of several, intricately linked processing units called neurons that collaborate to address a particular issue. The primary benefits of neural networks are their capacity to manage imperfect, missing, or noisy data, their non-parametric nature, their ability to map any complicated non-linearity, and/or their ability to approximatively represent any continuous function. On the other hand, the fuzzy logic technique is utilized for uncertain and complicated processes and offers a mechanism for modeling imperfect forms of reasoning, such as common-sense reasoning. Fuzzy set theory uses approximate knowledge and uncertainty to make conclusions, much like human thinking. The fundamental benefit of fuzzy control theory is its capacity to address a wide range of real-world issues that cannot be satisfactorily addressed by traditional control techniques. Fuzzy models are based on rule-based system identification, where the connections between variables are represented by if-then rules with ambiguous predicates. The model is then operationalized by using fuzzy sets to specify the variables more clearly. However, the study revealed within sales forecasting that both techniques ANN and fuzzy logic are capable to predict to accurately anticipating the price of the index, proving that stock prices in the past have predictive value and may be used to forecast stock prices in the future. The study has also resulted in the segmentation of doctors of an entire organization a better target understanding of the drug—doctors—by grouping them into smaller groups based on their gender, age, specialty, and like-minded individuals, from which can then design targeted marketing campaigns. This helps the business to focus on the intended audience and produce appropriate and successful outcomes (Tiwari et al. 2020).

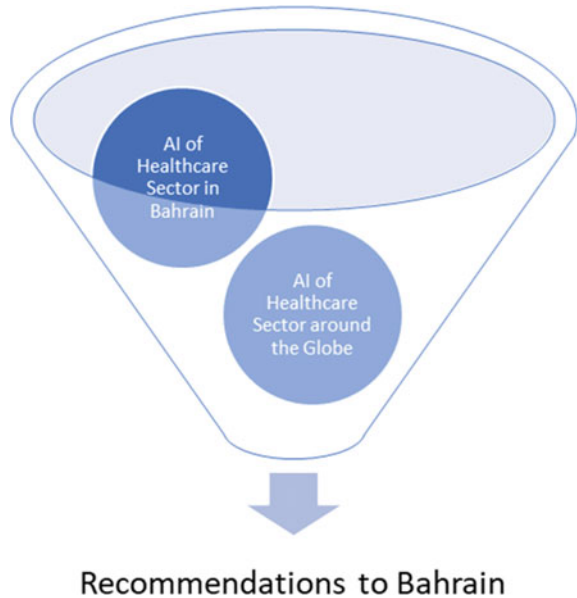
A third study was done in Taiwan in 2021 for the strategic framework within the utilization of AI from a marketing perspective. Starting with customer understanding, data about customers' feelings, moods, and emotions can be obtained directly from customers' interactions with AI (such as conversational bots) and then analyzed using feeling analytics (such as posts on social media, voice recordings of customer interactions, and chat transcripts). Feeling analytics can easily and at scale find customer information. Understanding clients in context offers greater insights about who they are and what they want since emotional data are contextual and personal. Secondly, under market analysis, new method for gaining marketing insights is based on big data and machine learning. Data in the form of text, images, audio, or videos may be

mined to uncover online opinions, habits, and reviews. When the subject at hand is obvious (for example, a mature brand), supervised machine learning may be used to perform theory-driven analysis, but unsupervised machine learning can be employed to acquire data-driven insights when the question at hand is uncertain (for example, a new brand). Last nor least, targeting extremely represents accurate segmentation by thinking AI to suggest the aimed optimum segment(s). Given that the strength of thinking AI is personalization, it is extremely probable to be a portion of one. Targeting is an emerging activity that is more frequently done at the individual consumer level due to the capacity to segment the market in countless ways (Huang and Rust 2021).

### 2.4 Scope of the Study

The scope of the study is a benchmarking between Artificial Intelligence (AI) practices in the healthcare sector in Bahrain and other countries around the globe. Data will be collected from published research papers to analyze the gap in practices in AI for the healthcare sector. From that, a recommendation will be suggested for further development (Fig. 5).

**Fig. 5** Concept of the research



## ***2.5 AI Application in Personal Protective Equipment***

A recent study explored using AI to monitor healthcare workers while wearing - donning- and removing -doffing- PPE. Donning and doffing of PPE are critical in ensuring that healthcare workers are properly protected and insulated as much as possible from hazards such as viruses. The procedures of donning and doffing are done in pairs or a buddy system, which can be time consuming as well as requiring additional manpower, and let alone the responsibility and extra stress of being responsible for the safety of your colleagues. The researchers in this study created an AI system that was fed video data and simulations of proper donning and doffing procedures to be used as a virtual buddy for in-field applications. The donning process is comprised of 8 steps while the doffing process has 11. The system used comprises of a camera that monitors the healthcare worker in their locker rooms while doffing and donning and evaluates the worker's compliance and then produces a pass or fail output. The study was conducted in a cohort of 74 healthcare workers. The results of this study were very promising: with over 98% sensitivity during the donning phase and over 85% during the doffing phase. It is worth mentioning that buddy assistance was sometimes required for things like tightening the gown straps or thumb placement and minor things that were limited by the camera's line of vision. Some of the errors that were produced by the AI were attributed to certain mismatches between the expectations of the AI and the regulations and guidance that the sampled healthcare workers were expecting or accustomed to. This tool, even though it cannot yet be used to replace the buddy system fully, it can be deployed to ease the burden of compliance or be used as an educational tool for future healthcare workers according to the researchers (Preda et al. 2022).

With regards to applying it in Bahrain's atmosphere, considering the large number of volunteers who have little to no experience with PPE, such a tool would be extremely helpful in times of pandemics to ease the burden on experienced healthcare worker, as well as reduce the donning and doffing time of inexperienced volunteers. An expansion of this project can include different types of PPE such as industrial PPE in companies that operate in oil and gas, aluminum, or lab settings where proper PPE protocols are critical for safety (Preda et al. 2022).

## ***2.6 AI Application in COVID-19 Case Analysis***

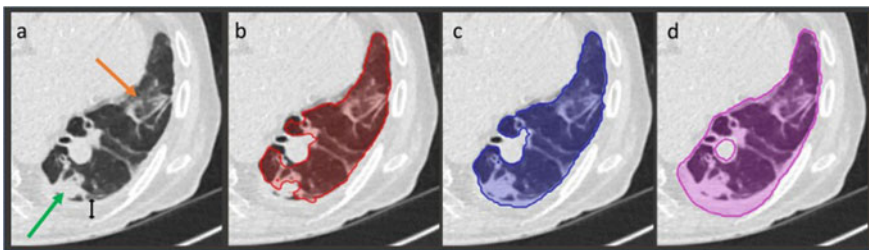
Many researchers have tried to help during the pandemic by analyzing covid related data and providing insights using AI and Machine Learning. I will be looking at two studies, the first in Germany in 2020 by Constantin Anastasopoulos and the second is in the Netherlands in 2020 by Joep Hermans.

## Germany

The German team developed an AI Image Analysis Tool to analyze chest CT scans; the development of this tool took 10 days. Their body of work was in an educational hospital with a team of data scientists working with medical personnel. The data was acquired from 152 Patients with confirmed COVID-19 cases. The team used a deep convolutional neural network (DNCC), which are deep learning algorithms used mostly for analyzing images, to analyze the chest CT scans. The first step in developing their algorithm began with created the images using package software and identifying the ranges of interest based on opacity using a unit called Hounsfield units. Percentage of Hounsfield unit Areas between  $-600$  and  $0$  was calculated and 45 images were created (Anastasopoulos et al. 2020).

They started developing their algorithm in-house with a training baseline segmentation method with the 45 images; the developers simplified the model to make it run on a regular graphics processing unit. The algorithm produced of the first learning was called A1. The following step relied on the medical professionals on the team to segment the lung and manually create the images for the algorithm to learn from. The algorithm produced of the second learning was called A2. The last step was using open-source lung segmentation software developed by another unrelated team to create more images for the DNCC algorithm to learn from. The algorithm produced of the last learning was called A3. Figure 6 shows the results of applying the algorithms to the same chest CT scan (Anastasopoulos et al. 2020).

The developed algorithm was clinically acceptable. Dice coefficient for the algorithm used was 0.97, which shows great matching between human performance and AI performance. The Dice coefficient is a number that gages the similarity between two data sets and ranges from 0 to 1. However, it is worth noting that the algorithm only quantifies but does not classify the opacities. In that, the algorithm was deemed a success in the quantification process. There was a slight 1.8% underestimation but the algorithm itself was not dependent on opacity load in the picture as a whole, making it more suitable for follow-up. This study was limited by the data sets as they do not constitute a full cohort and the algorithm was human dependent in the case



**Fig. 6** a Shows the image of the lung. b–d Shows the results of algorithms A1–A3 respectively. It is noted that A3 was the least accurate (Anastasopoulos et al. 2020)



of A2. Overall this research showed potential for combining AI with clinic package software to develop and deploy solutions rapidly (Anastasopoulos et al. 2020).

**Netherlands**

The Netherlands team developed an AI Image Analysis Tool to analyze chest CT scans. This team of researchers focused their data sample on emergency department patients; the data samples were acquired from 319 patients who had both CT and PCR tests done. The study’s aim was to compare the results of chest CT and PCR testing in identifying COVID-19 during a time where PCR testing in the Netherlands was lacking in quantity and speed. The Netherlands team had a different approach, they were not using image analysis, instead they were using CO-RADS scores produced by radiologists (Hermans et al. 2020).

CO-RADS is a 1–5 scoring system based on the CT scan to standardize reporting; a score of 4 or higher was considered a positive COVID-19. The team also included additional variables from the patients such as demographic information as well as “vital signs, laboratory, microbiology”. The team used the available data to feed a Classification Logistic Regression AI to determine if a patient had COVID-19. The PCR test was considered to be the true indicator of a viral infection. The researchers created 4 outcomes as seen in Fig. 7 to describe the combinations of AI predictions and PCR results (Hermans et al. 2020).

As can be seen from the flow chart, of the 133 patients who had positive PCR tests, 13 patients were not identified by the algorithm. This constitutes a 9% error. To understand these errors associated with the CT scan, researchers found that during the first two days of viral onset, 56% had normal scans, while 9% had normal scans up to 5 days since onset. Furthermore, not all data points were available for all patients. The strength of this approach is that (with 90% sensitivity) it takes much less time than a PCR test; 60 min compared to 5–12 h. The dice coefficient for this study was 0.93.

**Comparison**

	Germany	Netherlands
AI method	Deep convolutional neural network	Classification logistic regression
Application	Quantifying opacities in COVID-19 CT scans	Predicting COVID-19 status in patient
Data used	Patient CT scans images	CO-RAD scores, demographics, lab results and assays
Patient sample size	152 patients 500 chest CT scans	319 patients 319 Chest CT Scans & PCR
Dice coefficient	0.97	0.93



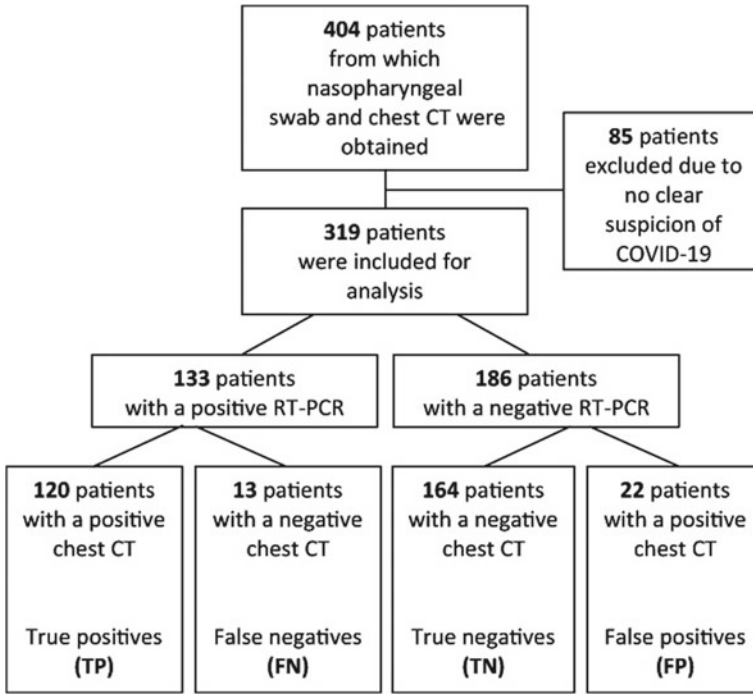


Fig. 7 Flowchart of study results (Hermans et al. 2020)

### Potential AI Applications in Bahrain

Bahrain can benefit greatly from these experiences, especially since these AI applications were designed to be run on data that is already present in clinical software packages that any machine has access to. For example, the Netherlands experiment algorithm could be tuned with BeAwareBH position data predict who has high probability of being infected and those individuals could be targeted for precautionary testing. The German study which showed the speed at which custom AI software could be deployed using pre-existing software packages along with a few experienced hands to create manual learning; these individuals who may be able to create such applications are already present in universities in Bahrain which offer degrees in computer science, software engineering, and machine learning.

**Table 1** SWOT analysis of AI in health care sector

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• For many medical prediction and diagnosis applications, predictive machine learning is an excellent tool</li> <li>• Medical prediction has made remarkable improvements due to deep learning on medical picture data</li> <li>• Methods for making interpretable decisions based on data in critical care, including with infant patients</li> <li>• AI to maintain distant regions’ minimal healthcare resources</li> </ul>	<ul style="list-style-type: none"> <li>• Without proper supervision, drug development automation is likely to make mistakes</li> <li>• The public is not fully in favor of having chatbots that tackle sexual health</li> <li>• A need of continuous data collection is necessary for the prediction of some parameters</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Infectious viruses’ prevention through social media trend analysis</li> <li>• Smart cities use social media, mobile devices, and sensors to identify epidemic diseases early</li> <li>• Availability of devices for recording data and tracking activity</li> <li>• Educating medical personnel on reliable AI to improve decision-making</li> </ul>	<ul style="list-style-type: none"> <li>• Overuse of AI technologies during surgical procedures might result in the loss of human expertise</li> <li>• AI ethical dilemmas about "whom to blame" for unsuccessful decision results</li> <li>• False-positive results in cancer diagnosis or high-risk pregnancies may increase death rates</li> </ul>

### 3 Conclusion

#### 3.1 SWOT Analysis of Artificial Intelligence in Health Care

SWOT analysis was done for strategic planning of utilizing the AI within healthcare sector as following (Table 1) (Palomares et al. 2021).

#### 3.2 Conclusion

To sum up, Bahrain has great achievements in AI within its healthcare sector like applications of nursing robotics, “BeAwareBh”, and “Isehha”, which will have the leverage to increase social responsibility and achieve different SDGs like goal 3 “Good Health and Well-Being”, goal 11 “Sustainable Cities and Communities”, and goal 15 “Life on Land” by Bahrain’s 2030 vision. On the other hand, many countries around the globe like Spain, Germany, Netherland, US, Taiwan, and Japan has an advanced AI technology. As several studies was done in this perspective and shown that countries mentioned earlier has did a great job in utilizing AI technology for storing medical-related data of residents in a smart platform, R&D, machine learning

within providing healthcare services, image scans and analysis, and for personal protective equipment.

However, there should be further developments in AI strategies in order to fulfill gaps in comparison with AI applications other based on literature. Since these AI applications were established to be used with data that is already present in clinical software packages that are accessible to all machines, Bahrain may greatly benefit from these experiences.

Finally, by dividing them into smaller groups according to the gender, age, specialization, and similar people, the study has also helped an entire organization—doctors—develop a better understanding of the drug. From this insight, personalized marketing campaigns may be created. This aids the company's ability to concentrate on its target market and generate suitable results. Furthermore, applying AI in healthcare will enhance the social responsibility of Bahrain's government which is clearly being focused on with its 2030 vision.

## **4 Recommendations**

Though great efforts of AI were done in the healthcare sector with Bahrain, the following development needs to be kept into consideration within strategic thinking of AI:

- Bahrain should study the adoption of more AI devices or robotics with surgical and precise medical treatment procedures in order to avoid any faults that may happen.
- AI needs to be applied to normal healthcare services in order to reduce the stress on medical staff and enhancement of quality assurance.
- the current system implemented within the delivery of medicines service needs to be developed to schedule delivery timings instead of calling each patient and managing with him a suitable delivery time.
- Complex AI machine learning should be utilized within radiological scans for accurate identification of malignant tumors to defend it sooner the better.

## **5 Research Limitations and Future Work**

### **Research Limitations**

- The research represents a benchmark between Bahrain's practices in AI of the health sector and other countries.
- This research is only focusing on Artificial Intelligence in the Healthcare sector, as another sector is to be considered as future work.
- The entire research is restricted to an introduction and literature review only.

- SDG goals achievement was described in general, and indicators of each goal are excluded from the research scope.
- Research is tackling some aspects of Marketing to be reflected in the main title.

### Future Work

- A technical study should be done on adoption of 'AI and machine learning in Bahraini healthcare services.
- A technical study should be done on reviewing the current AI performance and efficiency with comparing it to other countries.
- A study should be held for utilizing AI technologies in order to assist healthcare workers in various segments of the healthcare system.

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# Factors Affecting the Use of ChatGPT in Mass Communication



Abdulsadek Hassan

**Abstract** The research discusses the sudden and significant development in the applications of artificial intelligence (GPT chat) in the field of mass communication, prompting us to study this application with the considerations raised by this application. As it is within a few years, media professionals may turn to these applications to accomplish their work, and they may also have negative effects on reducing the human media workforce and relying on it to accomplish various works. The results indicated that this application has been used to power chatbots, allowing them to provide more personalized responses and improve the user experience.

**Keywords** ChatGPT · Mass communication · Artificial intelligence

## 1 Introduction

Chatbots have become increasingly popular in mass communication due to their ability to provide quick and efficient responses to users. With the advent of GPT (Generative Pre-trained Transformer) technology, chatbots have become even more sophisticated, providing personalized responses and improving the user experience. This research paper aims to explore the usage of ChatGPT (Chatbots powered by GPT) in mass communication (Carvalho and Ivanov 2023).

Mass communication is the process of communicating with a large audience through various channels, such as television, radio, newspapers, and social media (Biswas 2023a). With the increasing number of people using social media and messaging apps, organizations have turned to chatbots to engage with their audience more efficiently (Ufuk 2023). Chatbots can provide 24/7 customer service, personalized recommendations, and real-time news updates, among other services (Lee et al.). ChatGPT is a type of chatbot that uses GPT technology to provide more natural and human-like responses to users (Rivas and Zhao 2023). GPT is a type

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of machine learning algorithm that has been pre-trained on large amounts of data, enabling it to generate text that is indistinguishable from that written by humans. This technology has been used to power chatbots, allowing them to provide more personalized responses and improve the user experience (Biswas 2023b).

Since the eighties, mankind has entered a new phase, the most prominent feature of which is the flowing torrent of information that is beyond comprehension of its size, type, and intensity of transmission (Mitrovic et al. 2023). It is currently difficult for any country to prevent the flow of media and information coming to it from outside its borders via the Internet, satellites, satellite channels, and others (AlAfnan et al. 2023).

As a result of the progress in communication and media technology, a global (multinational) information system has been formed linked to the new and multiple media on the network, where various messages flow, all translated into the global language of numerical numbering, to transcend borders, and to establish a (multinational) information system (Rivas and Zhao 2023).

Also, the development of the phenomenon of mixing media devices, telephones, and television, and mixing moving images, sound, texts, and data, enabled them to enter homes, institutions, and forums through a variety of interactive networks and multimedia (Raman et al. 2023).

Virtual reality was able, for the first time, through the GBT chat program in the history of mankind, to break the barriers of time and space, where the time of virtual reality is a moving time that seeks to reach stability, to the absolute one, and in digital time there are only two dimensions or two pillars, which are speed and time, and it is absent even (Sibagatulina 2023). The distance factor is negated, where distance is an end that approaches zero, where speed equals time (Mitrovic et al. 2023), where time equals one, and where the only two numbers that exist are zero and one, and in this society its members live and interact with each other in virtual reality (Biswas 2023a).

## 2 Definition of ChatGPT Program

ChatGPT is a program based on artificial intelligence (AI) that automatically generates answers to questions asked by users (Carvalho and Ivanov 2023). He answers very diverse questions, has a very huge database that enables him to answer what you want, starting with solving mathematical questions, moving on to writing an article and creating the content you want, and he may write you a specific plan or show you how to use a specific tool and other research that is asked on him (Feng et al. 2023).

ChatGPT, or Generative Pre-trained Transformer, is a type of conversational AI technology that leverages deep learning techniques to generate human-like responses to customer queries and interactions (Haensch et al. 2023). In the context of e-commerce, ChatGPT can be used to provide automated customer support through chatbots or virtual assistants (Oviedo-Trespacios et al. 2023). ChatGPT is pre-trained on large amounts of text data, which allows it to understand natural

language and generate responses that are contextually relevant and grammatically correct (Santandreu-Calonge et al. 2023). This technology can be used to answer common customer queries, provide product recommendations, and even assist with the purchase process (Dai et al. 2023). ChatGPT can provide several benefits for e-commerce businesses, including improved customer engagement, increased efficiency, cost savings, and data collection and analysis (Rathore 2023a). By providing personalized and relevant responses to customer queries (Raman et al. 2023), ChatGPT can help businesses improve customer satisfaction and loyalty (Choudhury and Shamszare 2023). Additionally, by automating certain customer support tasks, ChatGPT can help businesses save on labor costs and improve efficiency (Oviedo-Trespalacios et al. 2023).

Chatbots powered by GPT (Generative Pre-trained Transformer) models can be used in ecommerce to provide personalized customer support, improve conversions, and enhance the Final customer experience (Rathore 2023b).

### 3 Evolution of ChatGPT Program

The history of technology development will record that 2023 is the year of the artificial intelligence revolution par excellence; The rapid global spread of the “ChatGPT” platform—and then the developed version of it, “GPT4”—caused a major revolution in most fields of work and at the level of education, as well as within the various media, which opened up an endless debate about the credibility of the content it provides (Alshurafat 2023).

Chat GBT has sparked a storm of controversy in the technology community and in the media alike. Instead of generating images and videos, it produces copies of its own articles. However, this technology has faced a complex legal problem related to the property rights of images, articles and studies that copy. from the Internet and regenerate it (Rathore 2023b). First of all, it significantly reduces response times. Traditional customer service channels, such as email or phone support, may take hours or even days to provide a solution (Huang and Tan 2023). With ChatGPT-4, customers can receive immediate assistance through chatbots or other AI-powered communication tools, eliminating the need to wait for a response (Crawford et al. 2023). Not only does this improve the customer experience, but it also frees up human customer service agents to focus on more complex or sensitive issues that require a personal touch (Oviedo-Trespalacios et al. 2023).

Another important feature of ChatGPT-4 is its ability to handle a large number of client queries simultaneously (Rahimi and Abadi 2023). As e-commerce and online retail businesses continue to grow, the number of customer interactions increases exponentially (Santandreu-Calonge et al. 2023). This can put a strain on customer service teams, leading to longer wait times and lower quality of service (Rathore 2023b). However, ChatGPT-4 can manage multiple conversations simultaneously, ensuring that each customer receives immediate attention and support (Biswas 2023a).



In addition to improving response times, ChatGPT-4 also has the potential to improve the Final quality of customer service (Alshurafat 2023). By leveraging advanced language understanding capabilities, the AI model can provide more accurate and relevant answers to customer inquiries (Oviedo-Trespalcacios et al. 2023). This means that customers are more likely to receive the information they need to solve their problems, which leads to increased satisfaction and loyalty (Raman et al. 2023).

Moreover, ChatGPT-4 can learn from past interactions and adapt its responses accordingly (Li et al. 2023). The continuous learning process allows the AI model to become more efficient and effective over time, further improving the quality of customer service it provides (Raman et al. 2023).

Finally, the implementation of ChatGPT-4 in servicing e-commerce customers can lead to significant cost savings for businesses (Oviedo-Trespalcacios et al. 2023). By automating a large portion of customer interactions, companies can reduce their reliance on human customer service agents, resulting in lower labor costs (Sakirin and Said 2023). Furthermore, the increased efficiency and effectiveness of customer service supported by ChatGPT-4 can lead to higher customer retention rates, ultimately boosting company profits (Rathore 2023a).

In conclusion, ChatGPT-4 revolutionizes e-commerce and online retail customer service by dramatically reducing response times and improving the Final quality of support (Dai et al. 2023). As more companies embrace this cutting-edge AI technology, customers can expect faster, more accurate, and more satisfying interactions with their favorite online retailers (Li et al. 2023).

#### **4 Is This Development a Positive Thing or a Threat to the Future of the Media?**

Many studies have referred to threats to the press, including a study published by the American “Future Today” institute about an “existential threat” posed by artificial intelligence to the media in the near future, but I have an opinion, that every new media outlet we feel threatened by the previous one, and yet the means coexist and do not negate each other (Pavlik 2023). When the radio appeared, they claimed that it would eliminate the press, and after the appearance of television, they said that it would eliminate the radio and the press (Rathore 2023b). With the advent of the Internet, they said that it would eliminate all of the above, which did not happen and will not happen (Li et al. 2023).

Artificial intelligence has become a tangible reality that cannot be ignored in the fields of media, and therefore it can only be evaluated and used as one of the mechanisms to facilitate the media profession, but it will not in any way eliminate human need and human creativity (Oviedo-Trespalcacios et al. 2023), only editors should develop their skills in using new technologies, as they develop Their editing skills and they benefit from the enormous potential provided by artificial intelligence

journalism (Rahimi and Abadi 2023), because it is not a “science fiction movie”, but rather a technology that if we were able to get acquainted with it, we would advance journalism in a new, accurate and scientific way (Huang and Tan 2023).

Of course, it will have some effects, such as ethical issues related to publishing, so it is necessary under all circumstances that the presence of the human journalist continues to achieve that balance (Choudhury and Shamszare 2023).

## 5 The Use of GPT-Based Chatbots in Mass Communication

The use of GPT-based chatbots in mass communication is a relatively recent development, with the technology only becoming widely available in the last few years (Rathore 2023a). However, since their introduction, GPT-based chatbots have been rapidly adopted by businesses and organizations for a variety of purposes (Korzynski et al. 2023). One of the earliest examples of GPT-based chatbots being used in mass communication was in the field of customer service (Haensch et al. 2023). In 2016, Facebook introduced its Messenger Platform, which allowed businesses to use chatbots to provide customer support through Facebook Messenger (McCashin and Murphy 2023). This led to a surge in the use of GPT-based chatbots for customer service, with businesses using them to handle customer inquiries and complaints in real-time. Over the years, the use of GPT-based chatbots has expanded to other areas of mass communication, including news and information delivery, marketing and advertising, language translation, and mental health support (Rahimi and Abadi 2023). For example, news organizations have used GPT-based chatbots to deliver news updates to subscribers, while marketers have used them to engage with customers and provide personalized recommendations (Ray 2023). Language translation chatbots have been used in international communication, while mental health chatbots have been used to provide counseling and support to people struggling with mental health issues (Pavlik 2023). The use of GPT-based chatbots in mass communication is still evolving, and new applications are being developed all the time (Sakirin and Said 2023). As the technology improves and becomes more sophisticated, it is likely that we will see even more innovative uses of GPT-based chatbots in the future (Carvalho and Ivanov 2023).

## 6 Applications of GPT-Based Chatbots in Mass Communication

There are several applications of GPT-based chatbots in mass communication. Some of them include.

## 7 Customer Service

GPT-based chatbots can be used to handle customer queries and complaints in real-time (Taecharungroj 2023). This can help improve customer satisfaction and reduce the workload on customer service representatives (Lee et al.).

## 8 News and Information Delivery

GPT-based chatbots can be used to deliver news and information to users in real-time (Biswas 2023a). They can be programmed to provide updates on specific topics, such as weather, sports, or finance (Rathore 2023a).

## 9 Marketing and Advertising

GPT-based chatbots can be used to engage with customers and provide personalized recommendations based on their preferences. This can help improve customer loyalty and drive sales (Alshurafat 2023).

## 10 Language Translation

GPT-based chatbots can be used to translate text from one language to another in real-time (Biswas 2023a). This can be particularly useful in situations where users need to communicate with people who speak a different language (Santandreu-Calonge et al. 2023).

## 11 Mental Health Support

GPT-based chatbots can be used to provide mental health support and guidance to users (Korzynski et al. 2023). They can be programmed to provide coping mechanisms and resources for users who are struggling with mental health issues (Biswas 2023b).

Finally, GPT-based chatbots can be a valuable tool in mass communication, providing real-time support and information to users (Rathore 2023b). However, it is important to recognize their limitations and ensure that they are used appropriately in different contexts (Feng et al. 2023).

## **12 Factors Affecting the Use of ChatGPT in Mass Communication**

### ***12.1 Standards of Accuracy, Objectivity and Journalistic Ethics***

This new capability opens up huge opportunities for ChatGPT4 in the field of media, as it can be used to quickly and effectively edit newspaper articles, provide accurate and comprehensive news reports, and develop innovative content for websites and social media platforms, and it will also play an important role in producing Movies, TV shows and electronic games (Shahriar and Hayawi 2023).

However, this new development raises some issues and challenges, as it must be ensured that the content produced by Chat GBT4 adheres to the standards of accuracy, objectivity, and journalistic ethics, and this requires periodic monitoring and review of the published content to ensure its quality and compatibility with media standards (Lecler et al. 2023).

In addition, the news and information published by ChatGBT4 must be handled with care and precision, as it still needs human monitoring and scrutiny by professional editors and journalists (Oviedo-Trespalacios et al. 2023).

## **13 Balance Between Artificial Intelligence Capabilities and Human Skills**

There must be a balance between the capabilities of artificial intelligence and human skills to ensure the publication of media content of high quality and reliability (Feng et al. 2023).

The media business capability of ChatGPT4 is getting a lot of attention from many media companies and press organizations, and using this model in the media field is an opportunity to improve the speed and efficiency of content production and expand media coverage (Rivas and Zhao 2023).

Therefore, the future ability of ChatGPT4 in media work is an impressive development in the field of artificial intelligence and media (Crawford et al. 2023). This technology must be used carefully and responsibly, while preserving journalism standards and professional ethics (Mitrovic et al. 2023). This development will have a significant impact on the media industry and transform the way we obtain and consume information in the era of modern technology (Santandreu-Calonge et al. 2023).

## **14 Advantages of ChatGPT Program in Mass Communication**

There are several advantages to using ChatGPT or similar language models in mass communication:

### **15 Personalized Interactions**

ChatGPT can be trained to generate responses tailored to individual users, providing a personalized experience that can help build relationships and increase engagement (Choudhury and Shamszare [2023](#)).

### **16 Scalability**

ChatGPT can handle a large number of conversations simultaneously, making it an efficient way to communicate with large audiences (Biswas [2023a](#)).

### **17 24/7 Availability**

ChatGPT can be programmed to operate around the clock, providing an always-on support channel that can help users whenever they need it (Ufuk [2023](#)).

### **18 Cost-Effective**

Using ChatGPT can be more cost-effective than hiring and training a large team of human agents to handle customer inquiries, particularly for businesses with a global reach (Dai et al. [2023](#)).

### **19 Consistency**

ChatGPT can be programmed to provide consistent messaging across all interactions, ensuring that users receive the same level of service and information regardless of who they interact with (Rahimi and Abadi [2023](#)).

## 20 Data-Driven Insights

ChatGPT can collect and analyze data from interactions to provide insights into customer behavior, preferences, and pain points, which can be useful for improving products and services (Crawford et al. 2023).

Finally, ChatGPT can be a powerful tool for mass communication, providing a personalized, scalable, and cost-effective way to engage with large audiences and build relationships with customers (Shahriar and Hayawi 2023).

## 21 Disadvantages of ChatGPT Program in Mass Communication

While GPT-based chatbots can be useful in certain situations, such as customer service or providing quick answers to common questions (AIAfnan et al. 2023), there are some limitations to their use in mass communication.

## 22 Lack of Personalization

GPT-based chatbots are designed to provide generic responses based on the input they receive. They do not have the ability to personalize their responses based on the user's individual preferences or needs (Dai et al. 2023).

## 23 Limited Dialogue Flow

GPT-based chatbots rely on pre-programmed responses and do not have the ability to engage in free-flowing conversation (Mitrovic et al. 2023). This can make it difficult for users to get the information they need or feel understood (Rivas and Zhao 2023).

## 24 Inability to Handle Complex Inquiries

GPT-based chatbots are limited by their programming and may not be able to handle complex inquiries or requests (Alshurafat 2023). This can lead to frustration for users who are seeking more detailed information (Ufuk 2023).

## 25 Lack of Emotional Intelligence

GPT-based chatbots do not have emotional intelligence and may not be able to understand or respond appropriately to a user's emotional state (Taecharungroj 2023). This can be particularly problematic in situations where users are seeking emotional support or guidance (Haensch et al. 2023).

## 26 Limited Language Proficiency

GPT-based chatbots may not be able to understand or respond accurately to certain dialects, slang, or variations in language (Crawford et al. 2023). This can make it difficult for users who speak non-standard forms of a language to communicate effectively with the chatbot (Carvalho and Ivanov 2023). Finally, while GPT-based chatbots can be useful in certain situations, they are not a substitute for human communication and may not be suitable for all types of mass communication (Dai et al. 2023).

## 27 Threats of Using ChatGPT in the Field of Mass Communication

While there are several benefits to using ChatGPT in mass communication, there are also some potential threats to consider:

### 1. Biases

ChatGPT, like any other machine learning model, can be subject to biases based on the data it is trained on (AlAfnan et al. 2023). If the training data is biased, the model may generate biased responses, which can have negative consequences for users (Rivas and Zhao 2023).

Generative models lack diversity, she says. "This is part of the problem with big tech being monoculture," not a problem that newsrooms using these technologies can easily avoid (Biswas 2023a).

The company employs Moderation API technology; To reduce hate speech, racism, bias and inappropriate content, which is the challenge faced by previous chatbot applications, and this technology will play a supportive role for workers in the field of journalism, content industry, marketing in addition to software and other fields, but it will not replace the place of employees who will continue to bear the responsibility of analytical thought and decision making (Lee et al.).

### 2. Lack of empathy

ChatGPT may not be able to provide the same level of empathy and emotional support as a human agent, which can be important in certain types of mass communication, such as mental health support services (Huang and Tan 2023).

### 3. Misinformation

ChatGPT may generate responses that are not accurate or based on incorrect information, particularly if it has not been trained on the latest data or if it has been trained on biased data (Korzynski et al. 2023).

### 4. Security and privacy risks

ChatGPT may collect and store sensitive user data, which can pose security and privacy risks if the data is not properly secured and protected (McCashin and Murphy 2023).

### 5. Unintended consequences

ChatGPT may generate responses that have unintended consequences, such as inadvertently promoting harmful or discriminatory behavior (Alshurafat 2023).

### 6. Legal and ethical concerns

The use of ChatGPT in mass communication raises legal and ethical concerns, such as the responsibility of businesses to ensure the safety and well-being of users, as well as the potential for misuse or abuse of the technology (Ray 2023).

7. Undermining the foundations and standards of the governance system, As for the decision-making process and governance standards, although ChatGPT's AI technology is smart and efficient in generating ideas (Alshurafat 2023), making decisions, easing business burden and reducing bureaucracy by speeding up routine and automated tasks, it has some risks related to the possibility of undermining the pillars and standards of the governance system, whether within governments or companies and organizations because the program learns how to type by scanning millions of pages of text that already exists, there are concerns about plagiarism (McCashin and Murphy 2023).

8. New media professionals and other content writers looking to make a quick buck turn to the program to help create and publish online articles through websites (Lee et al.).

9. The program seems ready to revolutionize this field, and hundreds of tutorials have appeared on YouTube and TikTok that explain how to write a book via GPT Chat within a few hours (Pavlik 2023).

10. Deepfakes have their places in deepfake video and audio, but the real danger lies outside the realm of immediate deception that can be easily debunked (Raman et al. 2023). It lies in technologies capable of creating all this confusion by flooding cyberspace with material that overshadows the truth or at least drowns out more balanced viewpoints (Ufuk 2023).

11. Creating content is very troubling. For newsrooms that consider it unethical to spread falsehoods, it's difficult to use GPT chat without a lot of human editing and fact-checking (Shahriar and Hayawi 2023).



## 28 The Future of Using ChatGPT Software in the Mass Media Industry

The future of using GPT chat software in the mass media industry looks promising. As technology continues to evolve, businesses are increasingly turning to AI-powered chatbots to enhance their customer support and engagement strategies (Haensch et al. 2023). Here are some potential ways GPT chat software may be used in the mass media industry:

### 1. News delivery

GPT chat software can be used to deliver personalized news updates to users based on their interests and preferences (Lee et al.). Users can receive news updates via messaging apps or social media platforms, making it easier for them to stay up to date on the latest news (Li et al. 2023).

### 2. Customer support

GPT chat software can be used to provide customer support to users, answering their questions and providing assistance 24/7 (Huang and Tan 2023). This can help media companies to provide a better customer experience, while also reducing the workload on human customer support agents (Biswas 2023a).

### 3. Content recommendations

GPT chat software can be used to recommend content to users based on their interests and preferences (Rathore 2023a). This can help media companies to increase user engagement and retention, by providing users with content that is relevant and interesting to them (Feng et al. 2023).

### 4. Audience engagement

GPT chat software can be used to engage with audiences in real-time during live events, such as sports matches or award shows (Oviedo-Trespacios et al. 2023). This can help media companies to increase audience engagement and provide a more interactive viewing experience (Biswas 2023b).

### 5. Advertising

GPT chat software can be used to deliver targeted advertising to users based on their interests and preferences (Li et al. 2023). This can help media companies to increase advertising revenue, while also providing users with more relevant and useful ads (Shahriar and Hayawi 2023).

Finally, the future of using GPT chat software in the mass media industry looks promising, with a wide range of potential applications for enhancing customer support, engagement, and revenue generation.

## 29 Can ChatGPT Replace Google?

ChatGPT is an artificial intelligence (AI) technology developed by Google to automate conversations between people and computers (Lee et al.). This technology can replace Google in some ways, as it can provide conversations that are more accurate, natural, and easy to use (Carvalho and Ivanov 2023).

ChatGPT is powered by a deep learning model that gives it the ability to understand language like a human (Mitrovic et al. 2023). It can process natural language input, interpret it correctly, and generate a response that appears to be spoken by a real person. This means that it can be used to replace Google in many scenarios where users need to communicate with a computer (Rathore 2023a). For example, ChatGPT can be used in customer service systems to provide more natural and intuitive conversations with customers (Huang and Tan 2023).

In addition, ChatGPT has the potential to improve the accuracy of search engine results by understanding user queries better than traditional search engines (Alafnan et al. 2023). This may lead to more relevant search results tailored to individual users' needs (Lecler et al. 2023).

Finally, ChatGPT is an exciting technology that has the potential to revolutionize the way we interact with computers and search engines. Although it may not completely replace Google in all scenarios, it can be a powerful tool in many areas of computing.

## 30 Conclusion

The usage of ChatGPT chatbots in mass communication has the potential to improve the user experience and increase engagement and satisfaction. This research aims to provide insights into the usage of ChatGPT chatbots in mass communication, the advantages and disadvantages of using them, and how organizations can optimize their usage. The findings of this research can help organizations to develop more effective mass communication strategies using ChatGPT chatbots.

The results indicated that ChatGPT can be a powerful tool in mass communication, it is important to consider these potential threats and take steps to mitigate the risks. This includes ensuring that the model is trained on unbiased and accurate data, implementing appropriate security and privacy measures, and monitoring the technology for unintended consequences.

The world must be preoccupied with the possibility of establishing regulations and laws that should control the use of generative artificial intelligence, at a time when Japan has prepared itself to keep pace with some recent technological trends, including advances in artificial intelligence and robotics to maintain productivity as its population declines.

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# The Usage of Artificial Intelligence in Education in Light of the Spread of ChatGPT



Abdulsadek Hassan

**Abstract** ChatGPT have been gaining popularity in the education sector worldwide, and many universities and other educational institutions have been exploring their potential benefits. One potential benefit of using ChatGPT in Gulf universities is to provide students with personalized assistance and support, particularly for those who face language barriers or other challenges. ChatGPT can help students navigate university systems and processes, answer questions about coursework or exams, and provide timely feedback and support. Another potential benefit is that ChatGPT can help alleviate the workload of university staff, freeing up time for more complex tasks. ChatGPT can handle routine inquiries and tasks, allowing faculty and staff to focus on more critical issues and provide more personalized support to students. However, it is essential to note that the implementation of ChatGPT in universities should be carefully planned and executed, taking into account the specific needs and circumstances of each institution.

**Keywords** ChatGPT · Artificial intelligence · E-learning · Plagiarism

## 1 Introduction

In recent years, the rapid advancement of artificial intelligence has become a focal point for innovation and disruption in various industries (Chen 2023). One of the most groundbreaking developments in artificial intelligence is the emergence of generative models, which have the potential to revolutionize the way we live, work, and communicate (Kung et al. 2023a).

One of the main benefits of Generative Pre-trained Transformer (ChatGPT) is its ability to understand and respond to natural language input (Lund et al. 2023). This means that users can communicate with ChatGPT using the same language and syntax that they would use when talking to a human (Fitria 2023). ChatGPT is also

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able to understand and respond to context, allowing it to generate more appropriate and relevant responses to user input (Skavronskaya et al. 2023).

ChatGPT” program—which has been very popular since its launch last November—posed various challenges, also it is a unique program that is able to shorten the time and effort of people in creating good content and creating texts that respond to needs or respond to inquiries (Baidoo-Anu and Owusu Ansah 2023). While it can produce high-quality content and support the innovation system, it will cast a shadow over the disappearance of some professions, as well as its negative use in the education sector (Eysenbach 2023).

With the advent of ChatGPT”, talk began about the impact of a new kind of artificial intelligence effects on education, which is the impact of ChatGPT” on education (Stokel-Walker 2023). This technology, which is the closest technology—so far—to simulating human language, is expected to have a profound impact on the present and future of education, as it contributes to the performance of new educational tasks, such as writing essays, drafting presentations, building lesson plans and setting learning goals, and the like (Malinka et al. 2023), which some considered a new way to support the process of developing education, while others saw it as a new threat to the future of education and teachers (Kung et al. 2023b).

An extrapolation of this development indicates a number of facts (Chen 2023). The first is the rush of educational institutions in the country to take advantage of the latest developments in the field of technology and artificial intelligence (Lund et al. 2023). This new tool, which was launched in November 2022 (Lund et al. 2023), found its way to the university shortly after its appearance, which indicates the vitality and modernity of the educational system, and its keeping pace with the latest technologies (Dergaa et al. 2023).

Among these facts is also the availability of a comprehensive understanding of the requirements of technical development, and that the regulatory aspect is one of the most important aspects that must be present at all times, and that the rules for the ethical, safe and disciplined use of technology are a guarantee for taking full advantage of its advantages and reducing the chances of exposure to its disadvantages and problems (Bozkurt et al. 2023).

The study discusses the identification of ChatGPT technology and its use in the field of education and the benefits and drawbacks that it will cause in this field and the future developments that it will cause (Mijwil et al. 2023).

## 2 What Is ChatGPT?

ChatGPT is a variant of the GPT (Generative Pre-trained Transformer) model that is specifically designed for chatbot applications. GPT is a type of deep learning model that uses a transformer architecture to process sequential data, such as natural language text (Rahman and Watanobe 2023). It has achieved state-of-the-art performance on a range of language tasks, including language generation, question answering, and dialogue generation (Adiguzel et al. 2023). ChatGPT takes the GPT

model and fine-tunes it on a large corpus of conversation data, such as chat logs or customer support transcripts (Dergaa et al. 2023). This allows the model to learn the patterns and nuances of natural language conversation and generate responses that are more appropriate and engaging in a chatbot context (Chiu et al. 2023). ChatGPT can be used to build chatbots for a variety of applications, including customer service, virtual assistants, and social chatbots (Dergaa et al. 2023).

ChatGPT technology was developed by San Francisco-based artificial intelligence research firm Open AI (Rudolph et al. 2023). The company is run by Sam Aultman, and its backers include Microsoft and tech mogul Elon Musk (Eke 2023). ChatGPT is a robot or a program that works using artificial intelligence, as it dialogues with the user and answers the questions asked in detail and remembers all the questions asked of him before during the dialogue that takes place as if between two people (Malinka et al. 2023). It also allows the user to correct it if it makes a mistake and apologizes for those mistakes (Du et al. 2023).

The company has trained that model using vast amounts of information available on the Internet and other public sources, including dialogues and conversations between people, so that it can produce human-like texts by learning algorithms that analyze huge amounts of data, and it works in a way that resembles a human brain (Choi et al. 2023).

Although the idea of a chatbot or chatbot is not new, what distinguishes ChatGPT Chat from others is its superior and immediate ability to explain complex concepts in simple words, and to produce content from A to Z without directly quoting from other sources—it should be noted here that it is not It is connected to the Internet, even if it has been fed with data available on it (Dai et al. 2023).

ChatGPT is a powerful language model that has the potential to revolutionize education. Through its ability to understand and respond to natural language input (Choi et al. 2023), it can be used in various ways to enhance the learning experience for students and provide support for educators (Health 2023).

### 3 The Technologies that Paved the Way for ChatGPT

ChatGPT is an artificial intelligence-based language model that aims to create human-like dialogue (Opara et al. 2023). The beginning of ChatGPT can be traced back to early work on Neural Language Models and Sequence-to-Sequence Models Neural language models were introduced in the early The 2000s served as a replacement for traditional n-gram models (Koubaa et al. 2023), which had limited ability to capture long-range dependencies in text, while sequence-to-sequence models were introduced in the mid-2010s as a way to model sequence data, such as text and speech (Lund et al. 2023).

The first significant development of the ChatGPT came in 2015 with the introduction of the first generative chat bot known as the Seq2Seq model (Rahman and Watanobe 2023). This model used an encoder and a decoder to generate responses to user input (Du et al. 2023). The encoder encodes the user's input into a fixed-length

vector, which is then used by the decoder to generate the response (Adiguzel et al. 2023).

Then, the next significant development came in 2017 with the introduction of the transformer's architecture as an improvement on the Seq2Seq model, allowing for better text modeling, at which point the transformer's architecture was used in the development of various NLP applications, including language modeling, machine translation, and question answering (Opara et al. 2023).

## 4 GPT Architecture

The concept of GPT, which stands for Generative Pre-trained Transformer, stands for Generative Pre-trained Transformer for Different Language Tasks (Curtis 2023). It is a deep learning algorithm that can generate human-like text by predicting the next most likely word given a string of input words (Rospigliosi 2023). It is a model Generative, which means that it creates new text by learning patterns in large datasets of existing text (Ventayen 2023).

The GPT architecture is based on the technique of Transformers to improve model performance and increase accuracy, introduced in 2017 by Vaswani et al., which has proven to be a very effective technique in natural language processing tasks (Rahman and Watanobe 2023), because the transformer's architecture is a neural network architecture that uses self-attention mechanisms to process data string, then GPT extends the transformer architecture to support generation tasks, in which the model is trained to predict the next word in a text sequence (Rudolph et al. 2023).

The GPT architecture consists of multiple layers of adapters, they pass the input to the first layer and then this layer processes the input and produces the output, which is then passed to the next layer for further processing, and so on until the final layer produces the final output of the data to the model (Chen 2023).

The self-attention technique is used in the transformer model, which allows the model to know which words in the sentence are most relevant to the task at hand, and this evaluates the importance of each word in the sentence based on its relationship to other words, and this also allows the model to focus on the most relevant words in the sentence, Which leads to more accurate and contextually relevant results (Eke 2023).

## 5 The Origins and Stages of Development of ChatGPT

The chatbot was developed by Open AI, which was founded in 2015 and is based in San Francisco by a group of entrepreneurs, scientists and engineers working in the field of artificial intelligence, such as: Elon Musk (who later resigned in 2018 while remaining a donor), Sam Altman, Greg Brockman, and Ilya Sotnikov (Curtis 2023).



And John Shulman and Wojsikh Zaremba, after which the developments continued to be referred to in the following:

In June 2018, the company released a GPT-1 model that contained 117 million words or parameters. It was able to generate long, well-stylized texts, but the model's performance in producing coherent, context-appropriate text was limited (Health 2023).

In February 2019, the company launched the GPT-2 model, which is much larger than GPT-1, had 1.5 billion parameters, and was able to generate better quality, more diverse, and more persuasive text (Rudolph et al. 2023).

In June 2020, the company launched the GPT-3 model, which is larger than GPT-2. It has been trained on a huge amount of data (over 175 billion words), including books, web pages, and other text sources, making it one of the largest and most powerful models (Pavlik 2023a). Existing linguistic data This large amount of data has enabled the model to generate highly coherent text in a language that is as close to human natural language as it is machine-generated the model can also perform a wide range of natural language processing tasks, such as text classification, language modeling, and answering Questions, translation and content creation (Pavlik 2023a).

In July 2021, the company launched the GPT-3.5-turbo model, an upgrade of the GPT-3 model that added new features, such as support for languages other than English (Koubaa et al. 2023).

On March 14, 2023, Open AI announced that the new GPT-4 model had become available to developers and ChatGPT Plus subscribers, with Microsoft confirming that the new Bing browser now operates using the GPT-4 model, which is a large size model (how much data it trains is not officially announced) (Kung et al. 2023b). It has the model, and the reported size of the data is 100 trillion parameters is just speculation) multimedia, as it can accept image and text inputs and produce text-only output (Bozkurt et al. 2023).

## 6 Usage Modes with Examination Categories

### Full Text Exam

For full text exams, the ChatGPT was used purely in Copy&Paste mode.

Test. As ChatGPT provides both the responses and explanations, it is possible to improve the results by interpreting them. We thus examine two scenarios, Copy Paste, and interpretation of responses.

### Term Essays

Two levels of usage to write essays are available: completely written by AI, help from AI. In the second case, we replaced some parts of the student's paper with ChatGPT written text (Malinka et al. 2023).

### **Programming Assignments**

As in most cases, ChatGPT is used as an assistant; instead of implementing numerous assignments, we carefully examined the code generated by ChatGPT and its recommendations on how to solve the given problem. Using this knowledge and comparing it with the original student's work, we estimated the range of points gained by ChatGPT. We also evaluate the usability of ChatGPT to solve these CTF-based projects. Because of this setting, we evaluate only the overall usability instead of awarding points.

## **7 Advantages of Using the ChatGPT Program in Education**

### **Automated Teaching**

ChatGPT can be used as a robotic tutor to provide students with instant feedback and support. Educators can program ChatGPT to answer questions about specific topics, such as math or history, and provide students with detailed explanations and additional resources to help them understand the material (Crawford et al. 2023). It helps students who need additional support and can also be a valuable resource for students who are self-studying (Halaweh 2023).

### **Personal Notes**

It can also be used to provide personal feedback to students, for example, teachers can use it to categorize tasks and assignments, provide constructive criticism and make suggestions for improvement, and this can help students see areas where they need to improve and give them motivation to keep achieving (Pavlik 2023b).

### **Interactive Tests**

It can be used to create interactive quizzes for students as it can be programmed to ask questions, provide answers and even provide additional information to help students understand the material better and this can help engage students and make learning more interactive and fun (Gabrielson et al. 2023).

### **Virtual Classroom Help**

The teacher can use it to provide support to students in the virtual classroom and in distance learning (Choi et al. 2023). For example, teachers can use it to answer various students' questions in the chat box during live lectures, provide various additional resources, and will be a support for students who have difficulty keeping up with the pace and speed of their classmates (Curtis 2023).

Getting started with ChatGPT in education is as simple as registering on the site with an email, and educators can integrate it into their existing education platforms and start using it to improve the learning experience for their students (Gabrielson et al. 2023). Additionally, there are a number of similar and previously developed educational applications that make it easier for teachers to get started with this technology (Pavlik 2023c).

On the other hand, there is no doubt that the excessive use of this technology reduces the chances of developing critical thinking skills among students and may have helped them to copy research and reports without making an effort to explore and collect information (Kung et al. 2023a). Hence, the role of the teacher and educational institutions is to revise and control the use of intelligence tools in a way that guarantees obtaining the positives of these tools without their negatives (Floridi and Chiriatti 2020).

### **Content Creation**

Including writing creative scripts, composing songs, writing scripts for video clips, etc., which also allows content producers to get a better version of their scripts in terms of style or practice writing scripts and creative content (Cooper 2023).

### **Create Creative Images from Text**

Open AI develops a cutting-edge AI model capable of converting text into DALLÉ-2 images (Gabrielson et al. 2023).

### **Explain Complex Topics Simply**

It is one of the most prominent ways that can be used from the linguistic artificial intelligence model, ChatGPT (Adiguzel et al. 2023), where it is possible to request an explanation of any of the complex topics or that the user does not know about in a simple way or in a way suitable for a child, the user only has to ask: “Explain to me (a subject, a quantum computer for example) as you would explain to a five-year-old”, or “Explain me quantum physics in certain simple points”, and when using the English language in which ChatGPT is much more proficient, it is possible to rely on “Explain me (topic) link i am in 5” (Qureshi 2023).

### **Summarize Long Articles in Bullet Points**

And if you do not have time to read many long articles that interest you, you can rely on ChatGPT to get a summary or summary of it, all you need to do is request: “Summarize this article for me: (article link) at specific points or simply.” (Dergaa et al. 2023), or “Summarize me this article:(link)”, and ChatGPT displays a summary in Arabic also when requesting to summarize an article even if it is in another language such as English or any other language (Shidiq 2023).

### **Correction of Linguistic Errors**

The linguistic artificial intelligence model, ChatGPT, can also be relied upon as an alternative to language correction tools such as Grammarly (Baidoo-Anu and Owusu Ansah 2023). The user only has to copy and paste any text he wrote and ask to correct it or find errors, but the model works much better with English-language texts (Crawford et al. 2023).

### **Suggest Titles for Articles or Videos**

And while ChatGPT can also be relied upon to suggest titles for articles or videos, such as a request: “The best suggested titles on (a topic)”, which is a feature that

works efficiently with both the English and Arabic languages (Sng et al. 2023), it is better not to rely on the final titles it provides. And modify them according to the context or what suits each content (Bonsu and Baffour-Koduah 2023).

### **Challenges Facing the Use of the ChatGPT Program in Education**

Despite the many benefits that a ChatGPT chat bot offers us, there are limits to what it can do, below we will discuss some of the limits and challenges of ChatGPT.

#### **Contextual Understanding**

ChatGPT lacks contextual understanding which means that it cannot fully understand the meaning behind the conversation, while it can respond to individual inputs with human-like text (Baidoo-Anu and Owusu Ansah 2023), it cannot understand the intent or meaning behind the conversation meaning it is currently unable to understand between the lines, and this can lead to responses that are not relevant or accurate to the user's needs (Talan and Kalinkara 2023).

#### **Emotional Nuances**

ChatGPT has a limited ability to understand emotional nuances, for example it cannot understand sarcasm or other forms of graphic language which can lead to inappropriate or inaccurate responses, additionally ChatGPT may not be able to understand a user's emotional state, which may lead to insensitive or inappropriate responses (Cotton et al. 2023).

#### **Limited Knowledge**

While ChatGPT has access to a huge amount of information, its knowledge is still limited by the data it has been trained on, and it is only updated to 2021 (Wang et al. 2023), so it may not be able to access the latest information, or it may not be able to provide accurate answers to complex or specialized topics (Bonsu and Baffour-Koduah 2023).

#### **Unlearning**

ChatGPT is unable to learn from new experiences or adapt to changing contexts, it can only provide responses based on the data it has been trained on, which means it may not be able to provide accurate or relevant responses to new or unique situations (Sng et al. 2023).

### **Areas of Using ChatGPT in Education in the World**

There are several potential areas of using ChatGPT (Generative Pre-trained Transformer) in education in the world. Here are a few.

#### **Language Learning**

ChatGPT can be used to develop chatbots that can help students learn Arabic or English as a second language (Eysenbach 2023). These chatbots can engage students in conversations, provide feedback, and offer personalized language learning experiences (Chiu et al. 2023).

### **Academic Support**

ChatGPT can be used to develop chatbots that can answer students' questions about specific subjects or provide academic support (Wang et al. 2023). For example, a chatbot could help students with their math homework or provide guidance on how to write an essay (Pavlik 2023a).

### **Student Engagement**

ChatGPT can be used to develop chatbots that can engage students in interactive learning experiences (Halaweh 2023). For example, a chatbot could act as a virtual tutor, providing quizzes, games, and other learning activities to keep students engaged (Curtis 2023).

### **Teacher Support**

ChatGPT can be used to develop chatbots that can assist teachers in their day-to-day work. For example, a chatbot could help teachers grade assignments, answer students' questions, or provide suggestions for lesson plans (Sng et al. 2023).

### **Personalized Learning**

ChatGPT can be used to develop chatbots that can provide personalized learning experiences based on students' individual needs and learning styles (Sng et al. 2023). For example, a chatbot could provide different learning activities to different students based on their strengths and weaknesses (Talan and Kalinkara 2023). Overall, the use of ChatGPT in education has the potential to revolutionize the way students learn and interact with technology in the world (Rudolph et al. 2023).

### **Gamification**

Chatbots can make learning more engaging and fun by incorporating game-like elements, such as quizzes and challenges (Du et al. 2023).

### **Assessment**

Chatbots can be used to assess students' knowledge and understanding through interactive quizzes and assessments (Eysenbach 2023).

Finally, ChatGPT-powered chatbots have the potential to make learning more accessible, engaging, and effective for students of all ages and backgrounds. However (Pavlik 2023b), it's important to note that chatbots are not a substitute for human interaction and support and should be used in conjunction with other forms of teaching and learning (Du et al. 2023).

### **Types of Technologies, Software or Tools of ChatGPT Have Used eLearning**

eLearning has used a variety of technologies, software, and tools to support online learning (Fitria 2023). Some of the most commonly used ones include:

#### **Learning Management Systems (LMS)**

These are software platforms that manage and deliver eLearning content, as well as track and report on learners' progress (Sng et al. 2023).

**Authoring Tools**

These are software programs that allow eLearning developers to create and publish interactive content such as eLearning courses, quizzes, games, and simulations (Malinka et al. 2023).

**Virtual Learning Environments (VLE)**

These are online spaces that allow learners to engage in collaborative activities, participate in discussions, and access learning resources (Bozkurt et al. 2023).

**Video Conferencing and Webinar Tools**

These are tools that enable live, real-time communication and collaboration between learners and instructors, and may include features such as screen sharing, whiteboards, and breakout rooms (Curtis 2023).

**Mobile Learning Apps**

These are apps that allow learners to access eLearning content on their mobile devices, and may include features such as gamification, social learning, and microlearning (Gabrielson et al. 2023).

**Augmented Reality (AR) and Virtual Reality (VR)**

These technologies allow learners to engage in immersive learning experiences, such as simulations, virtual field trips, and interactive 3D models (Stokel-Walker 2023).

**Artificial Intelligence (AI)**

AI-powered tools can be used to personalize learning experiences, provide real-time feedback and assessment, and support adaptive learning (Chiu et al. 2023).

Finally, E- Learning technologies, software, and tools continue to evolve and improve, providing new and innovative ways to support online learning (Qureshi 2023).

**Disadvantages or Limitations of ChatGPT**

While ChatGPT-powered chatbots have the potential to enhance learning experiences (Skavronskaya et al. 2023), there are also some potential disadvantages to their use in education and learning:

**Lack of Empathy**

Chatbots lack the emotional intelligence and empathy of human teachers and tutors, which can be particularly important in supporting students who are struggling with emotional or mental health issues (Wang et al. 2023).

**Limited Understanding**

Chatbots can only respond to questions and prompts that they have been programmed to understand, which may limit their ability to provide comprehensive and nuanced feedback (Skavronskaya et al. 2023).

### **Inability to Handle Complex Problems**

Chatbots may struggle to handle complex problems that require human judgment and decision-making skills (Qureshi 2023).

### **Technical Issues**

Chatbots may encounter technical issues, such as server downtime or connectivity issues, which could disrupt learning experiences (Eysenbach 2023).

### **Ethics and Privacy Concerns**

There are ethical and privacy concerns associated with the use of chatbots in education and learning, particularly around data privacy and security (Dergaa et al. 2023).

Overall, while ChatGPT-powered chatbots have the potential to enhance learning experiences, it's important to be aware of their limitations and to use them in conjunction with other teaching and learning methods (Halaweh 2023).

### **The Future of Scientific Research with Chat GPT**

Academics face many challenges that push them to abandon the field of scientific research entirely (Baidoo-Anu and Owusu Ansah 2023). The most prominent of these challenges were the weak financial return, the escalation of competition, and the length of time required to produce an academic product that is appreciated by the knowledge society (Stokel-Walker 2023). It is expected that the knowledge production of artificial intelligence will be terminated, and individuals will be directed to work in the field of scientific research, as long as they do not possess supernatural capabilities that qualify them to add more capabilities and updates to artificial intelligence (Adiguzel et al. 2023). It seems that the same dilemma will face those working in the field of programming, as the machine enters this field from its widest gates, and it has already performed many of the duties of traditional programming (Skavronskaya et al. 2023).

The most dangerous thing is the effect of the dominance of the machine on the labor market on the extent to which individuals are interested in science and learning (Baidoo-Anu and Owusu Ansah 2023). A large part of individuals joining the educational path is related to their desire to join the labor market at the end of this path, or to produce something that improves the condition of humanity (Zhai 2022). In the event that there is no need for people to do various jobs, or to participate in the process of accumulating knowledge (Bozkurt et al. 2023), then the need for education will disappear among a large segment of individuals, so that they will pay attention instead to new and rapid sources of income, which are also sponsored by advanced technological companies and operators of social media (Lund et al. 2023).

The program has limited awareness after 2021, which means that its awareness of the developments and events that the world witnessed after this date is very weak. Everything that results from it has not developed and is not yet complete (Bozkurt et al. 2023). It is possible, for example, that this program provides devastating medical advice (Kung et al. 2023a); Because he is not a doctor, and he lacks medical experience, especially since his answers are general and abstract and he may stray from specialized knowledge in topics he does not know (Talan and Kalinkara 2023). And

it can be used in ways that may create challenges and problems for scientific research and education, such as using it for students to prepare the research that is required of them (Wang et al. 2023).

## 8 Scientific Plagiarism

Plagiarism is the act of using someone else's work without giving proper credit or permission (Curtis 2023). In academic settings, it is considered a serious offense as it undermines the integrity of the academic process and can result in severe consequences, including failing a class, being expelled from school, or even facing legal action (Rahman and Watanobe 2023). As for chatbots powered by GPT (Generative Pre-trained Transformer) models in learning, they can be useful tools for students to enhance their learning experience (Dai et al. 2023). These chatbots can provide personalized assistance, answer questions, and provide feedback to help students improve their understanding of a subject (Pavlik 2023b). However, it is important to note that chatbots should not be used to cheat or plagiarize (Malinka et al. 2023). Some students might be tempted to use chatbots to generate essays or assignments for them, which can result in plagiarism (Lund et al. 2023). It is essential to emphasize the importance of academic integrity and the consequences of plagiarism to students (Kung et al. 2023a). Additionally, teachers can use plagiarism detection software to catch instances of plagiarism and discourage students from engaging in such behavior. In summary, chatbots powered by GPT models can be beneficial in learning, but they should not be used to cheat or plagiarize (Dergaa et al. 2023). Students should be educated on academic integrity, and teachers should take steps to prevent plagiarism in their classrooms (Kung et al. 2023b).

Everyone knows, in universities and research centers, that scientific plagiarism or academic plagiarism is a serious violation of scientific and academic integrity, and it is a violation that scientific communities do not tolerate in any way (Fitria 2023). Nevertheless, this type of plagiarism is frighteningly widespread, especially among university students' researches (Bonsu and Baffour-Koduah 2023). We also know that universities use many applications to detect plagiarism, and allow a certain percentage of plagiarism, but the problem will become more complicated with the development of ChatGPT technology, as it will be difficult to know the percentage of academic plagiarism in articles and research written with this technology, especially in advanced applications such as Open AI applications (Skavronskaya et al. 2023).

The use of ChatGPT technology in academic writing or scholarly research can lead to accusations of plagiarism if the ideas or original texts of others are used without properly implying them. If the texts that were created by others, taking it without mentioning it is scientific theft, but the ChatGPT texts have a great degree of innovation and difference in terms of wording (Lund et al. 2023).

There are a few ways that educational institutions can determine if students have used the tool to write their work. One way is to use phishing software such as IThenticate, which scans articles and compares them against a database of other



texts, including pre-submitted articles and online content (Rahman and Watanobe 2023). If the program detects a high level of similarity between the article and other text, it may indicate that the article may be plagiarized. However, it should be noted that this plagiarism detection software is not foolproof and may not always identify content generated by a chatbot (Pavlik 2023b).

Another option to work on is for teachers to review the articles themselves carefully, looking for any signs that might indicate the use of this type of tool (Bozkurt et al. 2023). This can include things like an unusual level of sophistication in the language used, lack of personal perspective or depth of analysis, etc. (Adiguzel et al. 2023).

It is true that it can be difficult to determine whether a student has used a chatbot to write content. But by using a combination of plagiarism detection software and careful review by teachers, usage can be reduced relatively (Sng et al. 2023).

Recently, the US Princeton University has developed the “GPT Zero” chat tool, which uses statistical properties to determine whether a text is written by a human or an artificial intelligence (Sng et al. 2023). According to Tian, the application analyzes various features of the text, such as the fluidity of the syntax, the presence of patterns in punctuation or the length of sentences, and the repetition of certain words (Rahman and Watanobe 2023). He has posted several case studies on Twitter. However, these technical solutions are also not without some caveats (Chiu et al. 2023). The more massive and capable the training models, the more difficult it is to build software capable of distinguishing between texts written by humans and those written by machines (Bozkurt et al. 2023).

Technology has always had its pros and cons. It is the responsibility of the users how to deal with it (Pavlik 2023b). Considering ChatGPT as a threat to education may be an opportunity to rethink the educational system and review current procedures, regardless of the justifications of critics of this tool (Crawford et al. 2023). Educational institutions can seriously consider initiating this change, making learning meaningful for students, and more attractive by changing teaching methods, and matching with technical developments so that artificial intelligence does not become a real threat to them (Halaweh 2023).

## **9 Experiences of Using ChatGPT in Education in the United Arab Emirates**

Abu Dhabi University, as part of its continuous efforts to provide the latest educational technologies in its programs, has launched the guidelines for using the "GBT Chat" application, with the aim of helping its students and faculty members to make the perfect use of the latest artificial intelligence tools. This announcement comes as a translation of the university's commitment to developing teaching methods and student learning experiences. And improve their research capabilities using the latest innovative artificial intelligence technologies.

The principles directed to both students and faculty members emphasize the responsible and ethical use of the "GBT Chat" application in line with the policies and procedures of Abu Dhabi University, stressing the need to understand that the content provided by the platform may not be accurate, and it must be reviewed and dealt with on this basis (Zhai 2022). And refrain from plagiarism and other methods of misuse to ensure the proper use of the application, as this technology provides students with the opportunity to explore new tools and methods that can be employed to develop their research and scientific skills.

Faculty members can also benefit from GBT Chat by including artificial intelligence technology in their curricula to enrich teaching methods, enhance student learning and support their success. Abu Dhabi University will provide the necessary training courses to develop the artificial intelligence skills of its faculty members.

Abu Dhabi University has started training the advanced version of GPT Chat, which is GPT-4 Chat, on its data and services, and it has now been integrated into the university's systems. The inclusion of this new technology will contribute to supporting students, faculty and administrative staff by providing advanced and effective services, while setting a modern standard for educational technology (Abu Dhabi University launches guidelines for the use of "GBT Chat" in education, Al Bayan UAE newspaper 2023).

## 10 Conclusion

The impact of e-learning quality on Gulf universities can be significant. E-learning has become increasingly popular in Gulf universities, especially in light of the COVID-19 pandemic. The quality of e-learning can have a significant impact on student engagement, satisfaction, and academic performance.

High-quality e-learning programs can provide students with a flexible and convenient learning experience, allowing them to access course materials and interact with instructors and classmates from anywhere and at any time.

However, low-quality e-learning programs may have the opposite effect, leading to disengagement, frustration, and poor academic performance. Therefore, it is essential for Gulf universities to ensure that their e-learning programs meet high standards of quality, including effective instructional design, engaging and interactive course materials, and adequate technical support. Overall, the impact of e-learning quality on Gulf universities can be significant, and investing in high-quality e-learning programs can benefit both students and the universities themselves.

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# **Blockchain and Financial Technology**

# Implementing Central Bank Digital Currency and Financial Industry's Stability: Literature Review



Muna Ali and Allam Hamdan

**Abstract** Managing risk is crucial to maintain the financial industry stability. The past lessons learnt from previous financial crisis and bank failures bring the changes to financial risk management practice. Emerging technology carry new risks that threaten the financial industry if is not managed properly. The Central Bank Digital Currency (CBDC) is a replacement of the fiat currency to a digital currency. The financial risks expected to be affected positively or negatively by CBDC usage. Financial risk includes which include liquidity risk, cybersecurity risk, market risk, credit risk and operational risk. Basel framework and the central bank rulebook set the standards of financial risks management in the financial industry. The standards used to manage the financial risks include several types of risk measurements that the bank required to follow in order to adhere to the risk management standards. This measurement includes Value at Risk ('VAR'), coverage ratio ('LCR') and net stable funding ratio ('NSFR'). In this paper the measurement of the risk analyzed to understand the relationship between CBDC and the risk, and then the methods of assessing the risks used to test the applicability of usage of current financial risk management methods on the new introduced CBDC. Keywords: CBDC, Financial risk, risk management, CBB rulebook.

**Keywords** CBDC · Financial risk · Risk management · CBB rulebook

## 1 Introduction

The traditional wisdom stated that the financial crises were hastened and caused by hided plain sight risks. The last financial crisis in 2008 revealed a failure on the risk management causing the financial system to collapse (Karp 2018). Public lost their trust on the financial industry and respond by developing a decentralized crypto currency traded in a blockchain. Following the crisis as a corrective action the financial regulator focused on managing the risk by optimizing risk management and

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revising Basel Accord (McAleer 2013). Additionally, the covid-19 crisis's danger of paper money carry germs and transform infection shifted the payment habits to electronic contactless payment. These two reasons pressured central banks to cope with public demand by initiating the central bank digital currency (Denecker 2022). Lastly, the collapse on Silicon Valley bank which consider first big collapse after 2008 shows the importance of risk management to maintain the financial stability (Ali 2023). Central Bank Digital Currency is new form of money exists in electronic form only and linked to the issuing country's official currency, it is government-backed money, legally an obligation of the central bank. (EDPS 2019). Due to the fact that the CBDC Initiation aims to minimize and mitigate the risk, this research paper will study the effect of CBDC one financial risk management practices in the financial industry.

The Risk management framework in the financial industry will be affected by moving to CBDC and banks as well as Central bank will need to reconsider the existing risk management models used and update their risk management procedures and policies. There are different types of risks the banks are facing and they can be divided to two categories financial and non-financial risk. Financial risk includes liquidity risk, Credit risk, operational risk and Market risk. The non-financial risk includes reputational risk, conduct risk, compliance risk and legal risk. This study is important because decision maker in central banks and risk managers in the financial sector need to consider the financial risks associated with the CBDC and compare it with the potential benefits as CBDC could raise similar effects and risks but in less controllable way.

## 2 Literature Review

### 2.1 Theoretical framework

The concept of electronic form of money existed for many years as "central bank reserve" that hold by financial institutions at the central bank in order to ease the electronic settlement at Real Time Gross Settlement system (RTGS). Although the Central bank digital currency (CBDC) defined as digital/electronic central bank money, it has several differences than reserve. The central bank digital currency has specific criteria which are (i) accessible to public (ii) has higher functionality for retail transaction compared to the cash (iii) has a distinct operational structure in comparison to other form of central bank money (iv) can be interest bearing. (Bech and Garratt 2017).

This research paper considers an economy-wide CBDC system model which assume that the CBDC will be available to all stakeholders in the economy including corporate's, non-financial firms and households. In this model the CBDC will be considered as government issued legal tender which can be used like cash and bank

deposits in being medium of exchange and storing value (Kanan et al. 2023, Turki et al. 2020).

Risk management defined as prevention and management of potential risks that can affect a bank's finance and overall operations. The main reasons of risk management are to the bank to prevent any loss, comply with laws and regulations, ensure survival and protect their reputation and protect the bank's credit ratings (Thompson 2022). There are several types of risks facing the financial industry under two categories financial and non-financial risk. Financial risk is defined as the probability of financial/capital loss on a business or investment decision. Financial risk arises because of losses, volatility and instability in the financial market. There are numerous financial risks, such

Credit risk: is the risk that the counterparties ranging from retail to trading companies will default on payment.

Liquidity risk: is the risk that the financial intuitions will be unable to meet/pay its short-term financial obligations as liabilities.

Operational risks: risk that a loss will be caused due to failed or inadequate system, internal process, people or external event.

Market risk: Is the risk driven by the market variables including commodities, equities prices, currency and interest rate movement. (Skoglund and Chen 2015).

Cybersecurity risk: is the probability of exposure or loss of control on the confidentiality or integrity or the availability of data, sensitive information that will have a potential adverse effect on the operation of the financial institution. This could arise from cyber attack or phishing attack, poor compliance management or breach with the network.

### 3 CBB Rulebook Risk Measurement and Assessment

#### 3.1 *Liquidity Risk Measurement*

Loan to Deposit ratio ('LDR') is a measurement to assess the financial institutions' liquidity through comparison between the total loans that institution fund with total deposits for the same period. The main purpose of the LDR is to help in the determination of reliance level on the short-term or more fluctuated fund source for lending purposes, and help to ascertain the credit growth level.

The LDR computed using the below formula

$$\frac{\text{Net Loans}}{\text{Nonbank Deposits}}$$



Net loans is defined as aggregation of gross credit portfolio amounts including advances and loans other than to financial institutions deducted from it any provision related to such advances and loans. While Nonbank deposits defined as all deposits from retails, governments, companies and other nonbank firms excluding interbank balances deposits. The collaterals value is excluded for LDR ratio calculations purposes so it is not reducing the book value of the advances and loans. In accordance to the CBB rulebook the financial institutions required to not exceeds 75% at all times and should report that to CBB in quarterly basis.

### 3.2 *Liquidity coverage ratio ('LCR')*

LCR is a ratio that aims to improve the resilience of the financial institutions short term liquidity profile through ensuring the sufficiency of high-quality liquid asset level to meet the forecasted net cash outflow over a thirty-calendar day period. Or in other words, it is the requirement of holding an amount of high-quality liquid assets that sufficient to fund cash outflow for thirty days. In accordance to CBB the financial institutions should meet a minimum of 100% LCR on daily basis. The formula is as below

$$\frac{\text{Stock of High Quality Liquid Assets}}{\text{Predicted Net Cash Flow over the next 30 calendar days}}$$

**Assets considered as High-quality liquid Asset when they are a source of available liquidity that can be immediately and easily converted to cash with minimum or no loss of value under stress conditions.** LM-11.2.5 | Rulebook (thomsonreuters.com).

### 3.3 *Net Stable Funding Ratio ('NSFR')*

NSFR is a liquidity standard that required financial institutions to hold sufficient stable funding to meet the long-term asset duration. The NSFR assesses how well a bank's funding sources align with the liquidity risks associated with its assets and activities over a one-year period. It considers the composition and maturity of the bank's funding in relation to its assets and off-balance sheet exposures.

To calculate the NSFR below formula

$$\frac{\text{Available Stable Funding (ASF)}}{\text{Required Stable Funding (RSF)}}$$

The ASF represents the stable funding sources the bank has, including retail deposits, long-term wholesale funding, and capital. The RSF represents the amount

of stable funding needed to support the bank's assets and off-balance sheet exposures, with each type of asset given a specific weight based on its liquidity characteristics.

The NSFR aims to ensure that banks have a sustainable funding structure by reducing reliance on short-term and volatile funding sources. By maintaining a stable funding profile, banks are better equipped to withstand liquidity shocks and financial crises. CBB required at least 100% or more to satisfy the requirement.

## **4 Liquidity Risk Assessment**

### ***4.1 Cash-Flow Management Approach***

According to CBB financial institutions required to adopt cash flow approach in order to manage liquidity risk. This means a robust framework must be in place in order to comprehensively predict future cash flow arising from liabilities, assets and off-balance sheets items over an appropriate time period. This framework will monitor the net funding gaps on daily basis under normal business conditions and will conduct a cash flow analysis regularly for several stress scenarios.

### ***4.2 Stress Testing and Scenario Analysis***

According to CBB stress testing allow financial institutions to evaluate and quantify adverse unpredicted outcomes related to several risks and ease the decisions of setting up risk mitigation plan to safe its soundness and safety. Stress testing is a risk assessment technique used to simulate scenarios that aimed to mimic unfavorable conditions. These scenarios include severe market collapse, economic crisis and interest rate shocks.

### ***4.3 Cybersecurity Risk Measurement***

Dark web surveillance used in order to detect any conspiracy for cyber-attacks through searching and tracking information on the dark web. There are many methods of dark web surveillance including the following

1. Crawling and indexing which is a web crawlers and specialized software used to dark web scan and information collection from several websites to identify any possible threat and prohibited activities
2. Exploiting vulnerabilities: vulnerabilities discovering and exploiting of vulnerabilities in the dark web infrastructure in order to have access into any hidden information.

## 5 Cybersecurity Risk Assessment

### 5.1 *Consistent Risk-Based Approach*

A consistent risk-based approach refers to a systematic risk assessment and management method across the financial institutions. Consistent risk-based approach includes identifying possible risks, evaluating their possibility and possible impact, and applying appropriate measures to effectively mitigate or manage those risks. There are key elements of a consistent risk-based approach including risk identification, risk assessment, risk prioritization, risk mitigation, Risk monitoring and review, Integration into decision-making and Compliance and governance. This approach helps proactively to assess and manage the cybersecurity risk.

### 5.2 *Market Risk Methodology*

**Value at Risk (VAR):** is measurement used to quantify any potential losses on a financial assets' portfolio over a period of time. This measure provides estimation of the maximum loss that portfolio or financial institution will experience at a given confidence level. VAR used as market risk measurement and monitoring tool in order to make appropriate decision and determine the adequate capital reserve amount. Additionally, it helps to understand the potential exposure to adverse market movements and help in ensuring the resilience and stability of their portfolios.

**Marking to Market or Marking to Model:** these two methods used to assess the market risk in the financial market.

Market to Market or MTM is valuation of the financial instrument based on the current market prices. In this method the asset and liabilities as amended daily to reflect the change in the market price. MTM considers as transparent way of assessing market risk because of its reliance on the actual market price.

Marking to Model (MTM): is valuation of financial instruments based on mathematical models and assumptions in case the market prices not available or the instruments is illiquid or complex. This model considers factors such as interest rate, correlations, fluctuations and underlying asset value to come up with the estimation.

## 6 Previous Studies

### 6.1 *Market Risk and CBDC*

Many governments started issuing CBDC, which is electronic version of the fiat money, therefore CBDC is centralized currency and considered as liability in the central bank balance sheet, which limit the counterparty credit and liquidity risk. The Board of Governors of the federal reserve system stated that although U.S backed CBDC would lead to higher accessibility to banking and reduce transaction fees, CBDC could lead to systematic risk to the financial system. For example, the risk-free nature of CBDC could encourage redemption of money market mutual fund during financial crises and transfer their money to into CBDC investment, which will lead to liquidity issue aggravation in in the financial market and disintermediation risks creation for Money Market Funds (Dunbar 2023).

The research paper used the methodology of DY connectedness index which is based on Value at Risk modelling in order to evaluate the potential systematic risk spillover related to CBDC uncertainty and its connectedness to the equity market, the currency exchange market, the global bond market and commercial banking sector. The result of the research paper shows that adopting CBDC in the financial system will introduce new systematic risk as digital currency news is important indicator of CBDC risk. The hedging behavior of currency futures market participants is reflective of agents' reactions to the news and central bank policies around CBDC. Thus, the behavior of market participant in hedging could be more informative than news as it gives better understanding of the interconnect of CBDCs to the financial market as this interconnection allows institutions that use currency future for hedging to be protected from these potential risks. Thus, ensure sustained liquidity in currency markets and access to currency futures contracts as agents to hedge CBDC's uncertainty. Research paper finds that hedging behavior is more informative than news because it reflects agents' time-varying risk aversion (Dunbar 2023).

### 6.2 *Bank Run Risk and Liquidity Risk*

A research paper done by Jooyong Jun and Eunjung Yeo in 2021 on Central bank digital currency, and bank failure risk using Xavier and Kebin (2014)'s global game bank-run model shows that adopting CBDC will change the people's preference for liquidity from cash or checking account to CBDC account. Thus, if the CBDC introduced with economy wide accessibility, there will be two affects which are, first, there will be reduction on the cost of issue and circulating currency as CBDC will reduce the need of handling physical cash. Second, the CBDC attract liquidity unlike the conventional demand deposit, that bank used to finance their loan and maintain their liquidity reserve at lower cost. Assuming that CBDC and demand deposits are substitutes and by introducing CBDC, money moved from demand deposit to CBDC

account, the bank will face difficulties as the amount that can be used to fund loans go down and the bank ability to secure more liquidity reserve will tightly be limited to amount available on demand deposit (Tashkandi 2023). The bank failure risk will go up with using CBDC because CBDC attract liquidity away from demand deposit which decrease bank liquidity reserve. Consequently, the loan supply will go down, this encountered with the rate of return for both loan and term deposit going up. However, as long as the loan rate of return is lower than specific threshold, there will be no significant change in the banking, however if the rate of return above specific threshold the bank failure risk will increase threaten the banking stability (Jun 2021).

Barbara Meller and Oscar Soons in 2023 studied how the introduction of CBDC would impact central bank and banks' balance sheet. The methodology was stimulating the impact of a fictitious digital euro introduced in third quarter of 2021 using data from around 2000-euro area banks. The simulation quantifies how the Eurosystem and on banks' balance sheet affected by changing two factors which were different liquidity risk tolerance and different levels of deposit outflows assuming that €3000 digital euro holding limit per person is fixed. The results shows even under extremely pessimistic scenarios the liquidity risk will be contained and banks' funding structure would not have changed extraordinarily (Soons 2023).

from another perspective a study done by Ali in 2023 studied the impact of introducing the CBDC on Silicon Valley Bank (SVB) collapse shows that CBDC will potentially affect the stability of the financial system by disrupt traditional banking systems, however, the feature of real-time monitoring and oversight in the CBDC could help on the prevention of bank failure and strengthen financial stability (Kumar et al. 2023). The paper starts by analyzing the three main causes of SVB collapse which were lack of investment diversification, high interest rate and exposure to higher risk of interest rate as their investment portfolio mostly in government bonds. The finding was that CBDC could be the solution for any upcoming bank failure and the adoption of CBDC become critical for policymaker to ensure the resilience in the economy and financial stability. This is mainly due to CBDC will give the central bank the real time monitoring capabilities which will breach the real time information gap between investors, bank, customers and regulators. Additionally, CBDC will provide the central bank with visibility and control over financial activities (Ali 2023).

### ***6.3 Cybersecurity Risk and CBDC***

Cybersecurity risks and central banks' sentiment on central bank digital currency: Evidence from global cyberattacks research written by Shu Tian, Bo Zhao, Resi Ong Olivares found that central bank sentiment regarding CBDC decreased because of increased cyberwarfare attacks that could t underscored systematic risk to the financial system. The methodology used in this research is measuring Central bank sentiments on CBDC based on polarity of words in the central bankers' speeches through filtering CBDC-related sentences by keywords. In the months without speech

sentiment is interpolated using nearest neighbor method. Using post var Granger causality test at the 95% confidence level confirms that cyberwarfare attacks increased leading CBDC to be less desirable to central bankers.

In 2021 Bank of international settlement raised cyber security concerns as the study done on 21 central banks around the world revealed that introducing CBDC could add difficulties to the IT environment and require greater resources devoted to cybersecurity. The survey done in this study shows that 60% of emerging market central bank believe CBDC will lead to 10–20% raise in cybersecurity budget. with more than 30% of them estimating an increase between 20 and 50% in cyber budgets because of a CBDC.

Cybersecurity risk for CBDC is a type of operational risk as according to Basel Committee on Banking Supervision (2022) operational risk defined as “potential loss resulting from inadequate or failed internal processes, systems, and people or external events”. So, according to the definition cybersecurity can be considered as operational risk. Hence, the operational risk management framework is applicable to challenge the cybersecurity risk to financial intuitions dealing with CBDC. Basel Farmwork has three methodologies to compute operational risk capital requirement which are advanced measurement approaches (AMA), Basic Indicator Approach and Standardized Approach and financial institution can choose the methodology based on risk exposure and the institution’s capabilities. Results shows that when there is minimum of operational risk data then scenario analysis will be useful for the estimation of operational risk capital needs (Almeraya-Herrera 2022).

## 7 Conclusion

To conclude, there was a gap in the research on studying how the CBDC will affect the financial risk management practices. The last adverse movement on the market and bank failures bring more attention to the importance of risk management practices in the financial industry. In order to manage the financial risk of CBDC, assessment needs to be carried to the current risk management measurement and tools approved by CBB rulebooks. The current measurements and tools need to be updated to keep with the changes brought by the CBDC. Studying the relationship between each financial risk and CBDC reveal that CBDC will change the base of financial risk as it will reduce some risks while in the other hand it will bring huge risks to the sector such as cybersecurity risk. The methods of measuring and assessing all type of financial risk understood theoretically and applied technically to CBDC to reach the results and help the financial institutions to manage their risk effectively.

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# Blockchain Technology and Audit Profession



Ghadeer Buhussain and Allam Hamdan

**Abstract** The technology known as blockchain has gained significant traction as the foundational infrastructure supporting the digital currency known as Bitcoin. Nevertheless, the advantages of this technology extend beyond its role in facilitating cryptocurrencies. Blockchain is a digital ledger that enables the recording of transactions between multiple parties in real time. It functions as a decentralized database where each participant maintains an identical copy of the ledger. The attractiveness of blockchain technology lies in its decentralized peer-to-peer network architecture, coupled with its cryptographic functionalities. The integration of this amalgamation empowers users to carry out transactions in the absence of a reliable third-party intermediary. According to (Alarcon and NG in Pennsylvania CPA J, 26–29, 2018), the potential advantages of blockchain technology in the field of accounting are particularly noteworthy. This is due to the fact that blockchain can facilitate a triple-entry accounting system, wherein all transactions are recorded in real-time, encrypted, and immutable with a time stamp. The objective of this Project is to conduct a comprehensive examination of existing literature pertaining to blockchain technology and evaluate its influence on the field of auditing.

**Keywords** Blockchain · Auditing · Audit profession · Accounting · Smart contracts · Digital technologies · Innovation

## 1 Introduction

Since its debut in 2008, blockchain has rapidly evolved into one of the most highly publicized and discussed technologies. IDC, which stands for International Data Corporation, is a company that specializes in market information. According to the results of a study conducted on two hundred commercial banks, nine out of ten financial institutions are investing in blockchain solutions for their individual customers, while fifteen percent are building commercial blockchain applications. In

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a similar vein, investors have poured close to \$1.5 million into blockchain companies so far this year (Myers 2017).

Blockchain is simply a digital ledger that keeps track of events between multiple parties in real-time and acts as a decentralized database where each member has a copy of the ledger. Transactions can be settled without the help of middlemen, and confirmation is done by many users. Once the network has agreed to a transaction, all copies of the record are changed. Multiple transactions are put together into “blocks,” which are then linked together (hence the name “blockchain”) and can’t be changed or removed. Because of this, blockchain has a number of benefits, such as the ability to verify peer-to-peer transactions and keep an automatic, protected, and real-time record of them (Bible et al. 2017).

Fanning and Centers (2016) Researchers think this technology could change a number of fields, including inspection. This is especially true because blockchain will provide a triple-entry accounting system in which all transactions are permanent and have been time-stamped, stored in real-time, and encrypted (Alarcon and Ng 2018). So, it shouldn’t be a surprise that the Big Four accounting firms have been looking into this technology, doing studies, and putting out a lot of studies and polls on the subject. Even though there is still a lot of room for improvement in the development of blockchain-based accounting and auditing solutions and, more importantly, the general adoption of blockchain has not yet been seen (O’Neal 2019), scholars and practitioners must stay on guard. This paper’s input is to give an up-to-date look at how blockchain is affecting the auditing field, including new risks, changes to processes, and more possibilities.

## 2 Conceptual Framework and Literature Review

To begin, let’s discuss what the blockchain is, what its properties are, and how the technology really works. The application of this concept to the subject of auditing will be the topic of our next discussion.

### 2.1 *The Blockchain: Evolution, Compensations, and Categories*

In 2008, Bitcoin was the first cryptocurrency, and it was Bitcoin that introduced the blockchain. The use of blockchain technology in cryptocurrencies like Bitcoin makes it possible for people to engage in peer-to-peer transactions directly with one another. This eliminates the requirement for a trusted third party.

Some scholars have defined “blockchain” as a network of nodes (i.e., users’ computers) working together as peers to produce an immutable transaction history that can be made viewable to the public” (Swan 2015; Tapscott and Tapscott 2016;

Drescher 2017; Sheldon 2018). These definitions can be found in Swan (2015), Tapscott and Tapscott (2016), Drescher (2017), and Sheldon (2018). As a result, the blockchain is a protocol for storing and exchanging digital information. It is now feasible, as a result of the development of this technology, to trace the history of each piece of information and locate the place from where it originated. Each new transaction is recorded in a block that is linked to all of the other blocks that provide information about previous transactions. This keeps the ledger organized and easy to follow. Therefore, a blockchain is created when several blocks are added to an existing chain in the proper order. As a consequence of this, the need for a middleman in financial transactions is no longer necessary thanks to blockchain technology (Gruber 2013; Singh 2015). According to Delahaye (2014), this technology may be compared to a big notepad or open book that can be viewed by anybody, at any time, for free and without limitation, but in which data cannot be updated or erased. This technology also allows for free and unrestricted access to the information contained in the book.

### **The Characteristics and Benefits of Blockchain Technology**

When we investigate the many definitions of blockchain, we find that it possesses the following three primary characteristics:

- a. **Transparency and replicability:** Once data is shared on a blockchain, it cannot be changed once it has been distributed to users. In addition, the blockchain maintains an immutable record of all transactions, which makes it simple to determine the history of any particular piece of data at any given point in time. In point of fact, the longevity and consistency of the system are ensured by repeating the record that it creates in the memory of autonomous computers in one of the other computers that make up the network (which are referred to as nodes). More transparency and the capacity to conduct audits would strengthen the confidence of users.
- b. **Security or data protection:** Due to the fact that blocking reduces the chance of errors brought about by friction, any and all data that are saved on the blockchain are both cryptographically encrypted and validated, making them immutable. In point of fact, the need for validation by a network of nodes enables a significant cutback in the risk of malicious operations like hijacking or hacking. The fact that the nodes are able to exert some kind of self-control on one another makes this scenario plausible. In addition to this, the identity of users may be disguised.
- c. **Decentralization:** Using the blockchain makes it straightforward to conduct transactions independently of the network that governs and controls them. In point of fact, the chain itself acts as the validator of the events that were recorded, rather than any one person in particular. We are able to eliminate the requirement for a third party to arbitrate financial transactions between two parties by incorporating smart contracts into this system and so automating the transfer of value between those parties. Therefore, eliminating intermediaries may result in a gain in production and efficiency, as well as a reduction in transaction costs

such as fees for inspection and certification. Blockchain technology is a game-changing invention that may drive firms to reconsider their operational structures and strategy. These aspects make blockchain technology a game-changing innovation. According to (Beck and Müller-Bloch 2017), the blockchain is not an incremental technology (which consists of adding some functionalities to a technology that already exists) but rather a radical innovation (Utterback and Acee 2005; Betz 2011) because it has established new functionalities that go beyond the existing technologies and practices. This is because the blockchain has established new functionalities that go beyond the existing technologies and practices.

It is possible for the transaction to be recorded as a single event on the blockchain, which is subsequently validated by the younger generation. This strategy is beneficial to companies because it removes the need for duplicate data input, which in turn reduces the amount of time spent as well as the likelihood of fraudulent activity.

Although this technology has the potential to offer firms a competitive advantage, it is not without risk owing to the need for large organizational changes, new skills, new tools, and new ways of working that could overturn existing norms (Dewar and Dutton 1986; Adams et al. 2006). According to Lepak et al. (2007) and McLean (2016), blockchain technology has the potential to shake up a number of industries in the same manner that the Internet did when it was initially made available to the public. Therefore, the use of blockchain technology will need companies to become more innovative and will compel them to reassess their business plan or face the possibility of being extinct.

### **Blockchain Types**

Public blockchains and private blockchains, sometimes referred to as “permissioned blockchains” and “permissionless blockchains,” are the two types of blockchains that are studied in the research literature the most frequently. A blockchain that is open to the public is one in which anybody may see the underlying code and participate in transactions without the need for any additional authorization. According to O’Leary (2017), using a public blockchain enables everyone to take part in the system by allowing anyone to see or send transactions. Blockchain technology is used by cryptocurrencies such as Bitcoin, for example (O’Leary 2017; Smith 2020).

In a private blockchain, the ledger and transactions are hidden from users who are not part of the approved group. Because of this, the network nodes that verify transactions, as well as the parties who are participating in a transaction, are subject to limitations. As instances, we may utilize transactions that take place between groupings of corporations or transactions that take place inside a company involving its subsidiaries. Reference Smith (2020) suggests that the company may be the one to select whether workers are permitted to join the blockchain and what advantages they would have if they do so. Price reductions in the cryptocurrency market in 2018 (Burns 2019) make it conceivable to contemplate the potential of the blockchain and, in particular, the applications of this technology in real-world settings. Smith (2020) contends that, from a commercial and an implementation point of view, the

model that has been accepted would be preferable. However, dividing blockchains into public and private networks is an oversimplification of the situation. The criteria that are used in order to classify a system might vary from those that are strictly technical to those that are concerned with its management.

## 2.2 Literature Review

In recent years, blockchain technology has garnered the attention of a growing number of specialists in a variety of fields, including finance, marketing, supply chain, and others. However, to the best of our knowledge, only a very small number of research initiatives have investigated its possible applications in auditing (Al Shbail et al. 2023; Hamdan 2020). Academics have, for the most part, neglected the potential of blockchain technology in the auditing and control sectors (Brender et al. 2019), despite the fact that there have been talks about blockchain in the world of finance. The research on this topic has not yet covered every angle of the possible impact that blockchain technology might have on the auditing sector. Several recent studies (Dai and Vasarhelyi 2017; Thomas and Nirmala 2023; Liu et al. 2019; Alshurafat et al. 2021) have investigated the effectiveness of blockchain technology in auditing, specifically its ability to improve upon traditional auditing processes (Dai and Vasarhelyi 2017; Thomas and Nirmala 2023; Liu et al. 2019). According to what is shown in (Yermack 2017), blockchain technology has the ability to make possible the immediate disclosure of information and to ensure the accuracy of transactions. (Kokina et al. 2017) provide an overview of the application of the technology in large audit businesses as part of their examination of the major advantages and downsides associated with blockchain technology.

Smith (2018) investigated the potential effects that blockchain technology may have on the work of accountants. In addition to this, he analyzed the relative merits of other methods in light of the pervasive use of this technology. Accounting firms invest a significant amount of money in blockchain technology across a variety of resource categories, including financial, technical, and human. However, the implementation and testing of blockchain technology are still in their infancy. As a consequence of accounting and auditing processes becoming more automated, professionals in the accounting and certification industries are confronted with both new challenges and new opportunities. As a consequence of this change, it is possible that technology may soon take over some accounting and auditing duties. This would enable accountants and auditors to concentrate their efforts on higher-level, more strategic work. According to Dai et al.'s (2019) research, there is a possibility that blockchain technology and smart contracts might reorganize the traditional auditing methods that are now in place and clear the path for the creation of Audit 4.0. They provide an overview of the use cases for blockchain technology and smart contracts that will be essential to the realization of Audit 4.0. They demonstrate how these technologies may assure the integrity of data and the seamless functioning of intelligent audit modules, which are two main challenges that must be overcome in order to deploy

Audit 4.0. They also demonstrate that the use of such technologies might open the way for the introduction of continuous and real-time audits, hence clearing the path for the establishment of a 4.0 audit (Ali et al. 2023; Mansoor et al. 2023).

Smith (2020) investigated the implications that may result from the use of blockchain technology and smart contracts in auditing processes. According to him, in order for the blockchain to be really effective, it has to be able to communicate with other computer networks and integrate itself into the more extensive technical infrastructure that is currently in place. The use of smart contracts makes it possible for the blockchain to interact with other forms of technology and makes it easier for blockchain platforms to be adopted at the corporate level.

Desplebin et al. (2018) used an approach that focused on the future in order to highlight how the innovative characteristics of blockchain technology will impact the accounting and auditing business. These authors believe that blockchain will soon become a “core technology” for internal control, giving stakeholders (including institutions, shareholders, customers, and others) complete confidence in the data they rely on. The verification procedure will become more streamlined as a result of this innovation, which will also minimize the number of chances for fraud and ensure correct reporting.

Research on the private blockchain (O’Leary 2017) looked at the many configurations of different blockchain architectures in order to gather and process transactions in a variety of sectors, including accounting, auditing, supply chain, and others. These fields include and are not limited to accounting, auditing, and others. In addition, he recommended combining blockchain with many other technologies, such as databases and data warehouses, to expedite the processing of transactions.

In a recent study (Liu et al. 2019), auditors’ perspectives on the consequences, opportunities, and limitations posed by the two types of blockchains (permissionless and permissioned) were taken into consideration. These authors suggest that the technology behind blockchains is leading to the development of new kinds of audits. Because of this, the auditor is able to verify the existence of digital assets and attest to the correctness of data that has been saved on blockchains as well as in the traditional world. In addition, as a result of the decentralized structure of the blockchain, the auditor could be required to think of unconventional methods in order to certify the property.

As part of an audit of the internal control over financial information, Sheldon (2019) discusses new areas of interest for ITGC (General Information Technology Controls) for auditors, together with the risk areas that the blockchain may remove. These new areas of interest are explored with the risk areas that the blockchain might remove. When working with blockchain technology, this author contends that firms, auditors, and regulators must all exercise great care. Since the ITGC is still a component of the IT infrastructure, the engagement and effectiveness of the ITGC are critical to ensuring the data produced by the blocking chain maintains its integrity (AICPA and CPA Canada 2017). Users who depend on this data, and especially auditors who can employ blockchain extracts, would benefit from having a comprehensive grasp of how this data is handled, queried, and extracted. Users who rely on this data.

Rozario and Thomas (2019) investigated how the paradigm of auditing financial statements may alter as a result of the rise of blockchain technology and smart contracts. The authors made an attempt to give a theoretical foundation for an external audit blockchain, one in which intelligent audit processes (a sort of smart contract) may autonomously execute audit programs and make the results of those programs public to multiple parties in close to real-time. This was one of the goals of the authors' study. They proved that the audit blockchain has the capacity to meet the expectations of auditors, financial users, and regulators by merging financial and non-financial data. This allowed them to fill the gap that had previously existed (Awwad 2021).

According to Dai and Vasarhelyi (2017), there have been various attempts made to investigate how blockchain technology may change the audit environment to allow for more transparency, real-time work, and verification. They think that the blockchain will fundamentally change the way auditing is done by making it possible to have a decentralized insurance system that is both more accurate and swifter. The implementation of smart contracts may make it possible for accounting data to be maintained securely on a blockchain, promptly shared with parties who are interested and made more verifiable overall. It's possible that new accounting information systems will be developed in order to keep track of transactions that have been checked off on official registers.

On the other hand, all of these studies are theoretical, and there has been no real study done on blockchains or audits. It would seem that the lack of research is due to the technology's complexity and the specialized nature of the markets it serves. According to Smith (2018), CPA firms are starting to investigate, develop, and use blockchain technology in their operational procedures.

### 3 Conclusions

In light of the heightened attention directed toward Blockchain, it is imperative that auditors possess a comprehensive understanding of the ramifications this technology will have on their field, and more significantly, how it can be leveraged to yield benefits. In contemporary times, the realm of commerce has become progressively intricate, thereby necessitating auditors to possess efficacious and dependable instruments that enable them to furnish the necessary assurance anticipated of them. Moreover, auditors are perceived as corporate advisors and are required to possess expertise in all pertinent technologies. Consequently, despite the limited influence of Blockchain on the field of auditing, it is imperative for auditors to possess a comprehensive comprehension of the ways in which this technology is affecting the operations of their clients. The present study has synthesized the fundamental concepts from prior research endeavors to investigate the viability of employing Blockchain technology in the context of audit procedures. By doing so, it enables readers to acquire a comprehensive comprehension of the extant research and accomplishments in the field of accountancy. The technology of blockchain is subject to

ongoing evolution, necessitating the potential for future revisions to the information presented in this project. Furthermore, forthcoming studies could concentrate on the implementation of “smart features” akin to those integrated into Smart Contracts, with the aim of furnishing the resilient controls required to meet additional assertions, including completeness, valuation, and classification. The development of such features may pose a formidable programming challenge, as it may require the replication of not only contractual clauses but also accounting norms. Nevertheless, once this challenge is surmounted, the implementation of Blockchain technology in audits will be in closer proximity to actualization.

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# The Impact of Applying FinTech in Collecting Customs Duties and Charges: Literature Review



Alya Hayel Alqahtani and Allam Hamdan

**Abstract** The incorporation of fintech technology into the customs procedure appears to be transformative in terms of how governments collect money and handle commerce. Customs departments may increase security, efficiency, and cost-cutting by using the power of technology. Fintech systems provide real-time data on trade flows, allowing authorities to trace the transit of products and collect applicable levies on time. Fintech solutions will enhance transparency and decrease corruption in customs processes. Authorities may now monitor every transaction in real time and have a clear picture of the value of commodities imported and exported by automating the collection process. This removes the chance of corruption and fraud, guaranteeing that all money is properly accounted for. This has a favorable influence on the economy since it promotes a fair playing field and reduces economic uncertainty. Finally, the integration of fintech technologies in customs has resulted in several benefits such as better efficiency, lower costs, improved security, and transparency. This study will use a quantitative, descriptive research design. To explain the current status of phenomena or to investigate correlations between two or more variables. Descriptive statistics will be used in this study's data analysis and interpretation by SPSS program. The data, including the accuracy and speed of payments and the customer experience when making payments, will be described using descriptive statistics before and after Fintech technologies' deployment.

**Keywords** Fintech technology · Customs departments · Descriptive statistics · Fintech solutions first section

## 1 Introduction

In the past ten years, the technological revolution has drastically changed how we operate in our personal and professional lives. The arrival of new technologies like Fintech, AI, and blockchain has completely changed the way we conduct business,

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and the customs sector is just one of the many areas that have been affected. Fintech systems are being utilized more frequently to simplify the collection of customs duties and fees. Fintech technologies make it simple and effective for firms to comply with customs requirements by offering an efficient and affordable means to collect and manage payments (Delina 2023). The procedure of collecting duties and fees has benefited from the implementation of fintech technology in the customs sector. These tools have enabled customs authorities to monitor and track payments more precisely and effectively, lowering the possibility of fraud and theft. Also, they have made it possible for customs officials to react rapidly to adjustments in duties and fees, ensuring that organizations continue to comply with rules. Businesses now have timely access to current information on payment requirements, which has helped to lessen their burden.

Artificial intelligence (AI) and Fintech have entirely changed the customs industry. Many customs processes, including product classification and valuation, have been automated thanks to AI technology. With AI, customs employees can rapidly process a vast number of data, improving the accuracy and efficiency of the customs clearance process. The detection and prevention of fraud, smuggling, and other criminal actions have all been made possible by AI. Customs authorities may now evaluate and predict patterns of fraudulent conduct using AI-powered technologies, enabling them to take preventative action (Raj and Upadhyay 2020). Another invention that has revolutionized the customs industry is blockchain technology. Blockchain offers a safe and open platform for data sharing and archiving. Customs officials can use blockchain to store and manage data about commodities, such as their ownership, value, and place of origin. As a result, there is a lower chance of fraud and theft because tracking and tracing commodities as they move through the supply chain is simpler. Blockchain also makes it possible for customs authorities to exchange data with other organizations and nations, enhancing cooperation and communication.

Fintech technology has enabled companies to use new payment methods while enhancing the precision and speed of customs payments. These systems can offer a range of payment choices, including contactless, mobile, and online payments. This allows businesses to make payments more swiftly, securely, and efficiently. Businesses can also obtain data-driven insights through fintech platforms, including current information on trends and payments for customs (Raj and Upadhyay 2020). Businesses may benefit from a greater understanding of the wants and needs of their clients, allowing them to customize their offerings. The whole customer experience when paying customs has been impacted by fintech technology. These systems give companies the ability to offer clients a more simplified and effective payment process as well as a wider variety of payment options. This may lessen the amount of time that clients must wait in line at customs offices and the amount of paperwork that needs to be filled out. The enhanced security of online transactions and the availability of real-time payment tracking are significant advantages for customers.

Moreover, cross-border trade and business have been facilitated by fintech technology by making international payments quicker and more affordable. Businesses may now conduct cross-border payments in real-time and with minimal transaction costs thanks to the usage of digital currencies and blockchain technology. The entry

barriers for companies wishing to extend their operations internationally have been significantly lowered. The use of digital platforms and e-commerce is another way that technology has changed the customs industry (Delina 2023). Due to the rise of internet shopping, customs authorities have had to adjust to the new methods of purchasing and selling items. Digital platforms and e-commerce sites have made it simpler for companies to sell their goods internationally. However, they have also created new difficulties for customs authorities in locating and following the movement of commodities across borders. However, thanks to technology, customs authorities can now monitor and track internet transactions more efficiently and effectively.

## 2 Literature Review

His literature review will provide an overview of the impact of Fintech systems on the collection of customs duties and charges. It will begin by discussing the customs sector's background and the challenges customs authorities face. It will then discuss the benefits and risks of implementing Fintech systems in the customs sector. Finally, it will explore the challenges of implementing Fintech systems in the customs sector and potential future directions for further development. By providing an overview of the potential benefits and risks associated with Fintech systems, this literature review will provide valuable insight into their potential impact on the collection of customs duties and charges.

### 2.1 *Background Information to the Customs Sector*

Since it is in charge of collecting taxes and fees on items that are imported and exported, the customs sector is essential to every economy. Customs authorities are responsible for collecting any necessary tariffs and fees and ensuring that firms follow the relevant rules. The customs industry has seen a significant change recently as a result of the introduction of new technologies to simplify the collection of tariffs and fees (Senyo et al. 2021). It is crucial first to comprehend the customs sector's background details to appreciate better Fintech systems' influence on the collection of customs duties and charges. Customs authorities are responsible for collecting any necessary tariffs and fees and ensuring that enterprises follow applicable laws. As well as advising and helping firms, customs authorities make sure that items are accurately declared and taxed.

When collecting duties and fees in the past, customs authorities used a lot of manual procedures. Businesses had to manually file paperwork and stand in line at customs offices to make payments, making this time-consuming and ineffective. This procedure strained businesses and was prone to mistakes and delays (Senyo et al. 2019). Customs authorities have recently used new technologies to speed up the

process of collecting duties and fees. Fintech systems are among these technologies, and they are increasingly being utilized to increase the precision and efficiency of customs payments. These solutions give companies access to data-driven insights, such as current information on trends and payments for customs. Businesses may benefit from a greater understanding of the wants and needs of their clients, allowing them to customize their offerings.

Customs authorities are adopting new payment options like internet payments, mobile payments, and contactless payments in addition to Fintech systems. Thanks to these new payment alternatives, businesses may make payments more swiftly, securely, and efficiently. Businesses now have timely access to current information on payment requirements, which has helped to lessen their burden. Additionally, these new payment solutions offer substantial advantages to customers. Internet and mobile payments have become practical tools for customers to purchase products and services online as e-commerce has grown (He et al. 2021). Due to their speed and ease, contactless payments, which let customers pay by tapping their cards or mobile phones, have also grown in popularity recently. These new payment options offer advantages for customs officials in addition to advantages for businesses and customers. Companies can improve their capacity to identify fraudulent activity while streamlining payment procedures and lowering administrative expenses. In order to increase compliance and expedite trade, customs authorities are urging companies to use these new payment options more and more.

## ***2.2 Fintech Systems***

Fintech solutions are quickly gaining popularity in the customs industry as a tool since they offer a quick and affordable way to collect and manage payments. Businesses can receive data-driven insights through these solutions, such as current information on customs payments and trends. Businesses may benefit from a greater understanding of the wants and needs of their clients, allowing them to customize their offerings (Breidbach et al. 2020). Moreover, a number of payment methods, such as internet payments, mobile payments, and contactless payments, can be offered via fintech systems. This allows businesses to make payments more swiftly, securely, and efficiently. It is crucial first to comprehend the characteristics and advantages of Fintech systems in order to comprehend how they affect the collection of customs duties and fees (Jin et al. 2020). Fintech solutions are made to give companies access to data-driven insights to understand their customers' wants and need better. Moreover, these systems can be utilized to offer a range of payment choices, including contactless, mobile, and online payments. This allows businesses to make payments more swiftly, securely, and efficiently. Moreover, Fintech systems are built with features like encryption, authentication, and fraud prevention to be highly safe.

The procedure of collecting duties and fees has benefited from the implementation of Fintech technology in the customs sector. These tools have enabled customs authorities to monitor and track payments more precisely and effectively, lowering

the possibility of fraud and theft. Also, they have enabled companies to use advanced payment options, giving customers a quicker and more streamlined payment experience. Additionally, these technologies have given companies access to data-driven insights that have helped them better understand the requirements and preferences of their customers (Jin et al. 2020). As a result, the procedure of collecting duties and fees has benefited from the adoption of Fintech technologies in the customs sector. Fintech solutions can enhance the payment experience for customers in addition to having an impact on the process of collecting customs and fees. These systems allow companies to offer clients a more simplified and effective payment process and a wider variety of payment options (Breidbach et al. 2020). This may lessen the time clients must wait in line at customs offices and the amount of paperwork that must be filled out. The enhanced security of online transactions and the availability of real-time payment tracking are significant advantages for customers.

### ***2.3 Impact of Fintech Systems on Customs Payments***

Fintech systems considerably impact the collection of customs duties and fees. The risk of fraud and misappropriation has been decreased thanks to these systems, which have improved the efficiency and accuracy of customs authorities' monitoring and tracking of payments. They have also enabled companies to use new payment methods, giving clients a quicker and more organized payment process. Furthermore, these platforms have given companies access to data-driven insights, allowing them to better comprehend the requirements and preferences of their clients (Zhang et al. 2021). Regarding payment accuracy and speed, fintech technologies have proven especially helpful. These tools let customs authorities track payments more swiftly and precisely, lowering the possibility of fraud and theft. Businesses now have timely access to current information on payment requirements, which has helped to lessen their burden.

Fintech technology has enabled companies to utilize new payment options while enhancing the accuracy and timeliness of customs payments. These systems can offer a range of payment choices, including contactless, mobile, and online payments. This allows businesses to make payments more swiftly, securely, and efficiently. The whole customer experience when paying customs has been impacted by fintech technology (Zhang 2021). These systems give companies the ability to offer clients a more simplified and effective payment process as well as a wider variety of payment options. This may lessen the time clients must wait in line at customs offices and the amount of paperwork that must be filled out. The enhanced security of online transactions and the availability of real-time payment tracking are significant advantages for customers.

Also, the effectiveness of customs agencies in processing payments has increased thanks to fintech technology. Through these systems, customs authorities may automate the payment processing procedure, minimizing errors and the need for manual involvement. A more expedited and effective procedure is also made possible by the

integration of fintech systems with other customs operations, such as tariff classification and valuation. The use of blockchain for customs payments has also been made possible by Fintech, which has the potential to completely change the payment landscape (Zhang 2021). The security and effectiveness of customs payments can be improved by using blockchain technology, which enables secure, transparent, and tamper-proof transactions. Customs authorities can guarantee that all payment transactions are secure and transparent with blockchain-based payment systems, lowering the danger of fraudulent activity. Moreover, applying Fintech to customs payments might advance financial inclusion, particularly in poorer nations. Businesses in underdeveloped nations can take part in international trade more effectively and efficiently as mobile payments, and online transactions become more prevalent. The local and global economies may gain from this improved economic growth and job creation.

#### ***2.4 Challenges of Implementing Fintech Systems in the Customs Sector***

In terms of payment accuracy, speed, and customer experience, adopting Fintech solutions in the customs industry can be advantageous. However, there are significant difficulties with these systems' implementation that must be taken into account. The expense involved in developing and maintaining the systems is one of the difficulties in implementing Fintech solutions in the customs business (Chinnasamy et al. 2021). Because of the enormous resources and specialized knowledge needed to design and manage fintech systems, these costs can be high. Fintech solutions also need much integration with existing systems, which makes them challenging to deploy. This can be expensive and time-consuming, and third-party sources can be needed.

The possibility of fraud and money laundering is another obstacle to integrating Fintech solutions in the customs industry. Businesses may have access to data-driven insights through the use of fintech technology, such as real-time information on customs payments and trends. However, there is a chance that this data will be manipulated, which raises the possibility of theft or fraud. Moreover, Fintech systems may be susceptible to cyberattacks, raising the risk of fraud even higher (Anifa et al. 2022). The absence of standardization is a third obstacle to integrating Fintech solutions in the customs industry (Mathew et al., 2023). There needs to be uniformity in the systems and technologies employed because fintech systems are so new. Because of this, it may be challenging for customs authorities to confirm that all organizations are using similar technologies and systems, making it challenging to ensure that regulations are being followed (Adeosun et al., 2023).

Fintech companies and customs officials must put strong security measures into place to reduce the danger of fraud and money laundering. This involves employing two-factor authentication, encryption, and other security measures to guard against unauthorized access to critical information and transactions. Moreover, routine audits and compliance checks can aid in spotting and preventing potential fraud. Moreover,

industry cooperation and creating uniform standards and protocols for fintech systems in the customs sector might need more standardization (Chinnasamy et al. 2021). This can ensure that all firms use comparable technologies and adhere to the same policies. Any potential ethical issues relating to the application of Fintech in the customs sector must be addressed. This covers concerns about data ownership, privacy, and openness. To make sure that the use of fintech technology in customs payments is fair and equitable for all parties concerned, clear rules and regulations should be put in place.

One last obstacle is the potential for low client acceptability of Fintech technology in the customs industry. Because Fintech systems are still in their infancy, users will not be familiar with them and will not be eager to utilize them. This could result in a lack of client acceptance, which would make it more difficult to successfully integrate Fintech technology in the customs industry (Chinnasamy et al. 2021). It is crucial that users are informed about the advantages of using these systems by customs authorities and fintech providers in order to overcome this challenge. They might offer training and support to assist users in navigating and comprehending the technology. Incentives like cheaper transaction costs or quicker processing times can also be used to entice people to use fintech payment methods. Another approach is to progressively integrate fintech systems with convenient payment options, letting customers get accustomed to the technology at their own pace (Anifa et al. 2022). Over time, this can increase acceptance and foster trust. User experience design is also very important to the success of fintech solutions. Fintech companies may make it simpler for people to comprehend and use the technology by creating intuitive and user-friendly interfaces (Mohamed et al., 2021).

## ***2.5 Future Directions***

Fintech technology could alter the way payments are processed in the customs industry by giving firms access to data-driven insights and brand-new payment options. Additional development is still required in a few key areas to ensure that Fintech systems are utilized to their fullest potential. The integration of Fintech technologies with current systems is one area that requires additional improvement (Antwi-Boampong et al. 2022). Most Fintech systems today are standalone, and successful implementation requires considerable integration with current systems (Kosack et al., 2021). This could be a time-consuming and expensive process that makes it challenging to adopt Fintech technology successfully.

There needs to be more standardization in the methods and technologies to address this problem. As a result, it would be simpler for customs authorities to check that all organizations are utilizing the same systems and technology and complying with regulations. Also, lowering the cost and complexity of integration could make it simpler for companies to adopt Fintech technology (Antwi-Boampong et al. 2022). Customer acceptance and education are other areas that need further work. Since Fintech systems are still in their infancy, users may not be familiar with them and



will not be eager to utilize them. This could result in a lack of client acceptance, which would make it more difficult to successfully integrate Fintech technology in the customs industry. More customer education on the advantages of using Fintech systems and the security mechanisms in place to protect their data is required in order to overcome this problem.

Finally, more investigation is required on the advantages and disadvantages of implementing Fintech technology in the customs industry. This study might evaluate the speed and accuracy of payments as well as how customers are treated during the payment process. The investigation could also look into chances for additional Fintech system development in the customs industry. The review could also consider how Fintech has affected the workforce in customs (Antwi-Boampong et al. 2022). Customs officials may need new training and abilities due to adopting fintech technologies, which could also result in job displacement. Determining the potential social and economic effects of fintech adoption in the customs sector is crucial.

## 2.6 Conclusion

This research has shown how Fintech systems impact customs duties and fee collection. The research has uncovered the potential advantages of Fintech systems and the difficulties that must be overcome to ensure they are utilized to their fullest capacity. The study also identified areas that need more investigation, including measuring payment accuracy and speed and looking at prospective chances to advance Fintech technologies in customs. Fintech technology could alter the way payments are processed in the customs industry by giving firms access to data-driven insights and brand-new payment options. Businesses may benefit from a greater understanding of the wants and needs of their clients, allowing them to customize their offerings. Fintech technologies can also give customers a more simplified and effective payment procedure while lowering the risk of fraud and financial misappropriation. Fintech system adoption in the customs sector has the potential to be advantageous, but there are still certain obstacles to be solved. These difficulties include the expense of creation and upkeep, the risk of financial fraud and misappropriation, the absence of standards, and the likelihood of low client acceptance. Fintech system integration with current systems, client education and adoption, and additional study into the possible advantages and risks of fintech systems require further development to ensure that fintech systems are utilized to their fullest potential.

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# Blockchain Technology and Environmental Sustainability



Hawra Alhasan and Allam Hamdan

**Abstract** Blockchain technology has become known as a groundbreaking achievement with the ability to have an impact on a wide range of sectors, including environmental sustainability. The purpose of this abstraction is to investigate the influence of blockchain technology on environmental sustainability in Bahrain. Bahrain, being a fast-expanding country, must cope with the environmental issues related to energy consumption, waste management, and carbon emissions. Blockchain technology provides a decentralized and transparency framework that can successfully solve these challenges. For instance, the immutability and transparency of blockchain enable the development of dependable structures for tracking and overseeing the environmental resources and processes. Environmental data concerning energy consumption, waste management, and water usage may be collected, validated, and shared across stakeholders in a safe and impermeable way using smart contracts and IoT sensors. Furthermore, blockchain technology makes it easier to integrate renewable energy sources and create distributed energy trading systems. Both individuals and organizations may use this to create, distribute, and exchange renewable energy, establishing a decentralized and sustainable energy environment. This literature review aims to contribute to a better understanding of the impact of blockchain technology on environmental sustainability and provide insights into the potential benefits and drawbacks of using blockchain technology for environmental sustainability in Bahrain.

## 1 Introduction

One of the most revolutionary technologies of the twenty-first century is the Blockchain technology. It is an appealing technology for many industries, including finance, supply chain management, and healthcare, due to its capacity to securely store and transport data in a decentralized manner.

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Blockchain technology is being investigated by Bahrain's government to increase the effectiveness of public services, and there is rising interest in its capacity to address issues with sustainable development. The creation of a more effective and open energy system is one way that Blockchain technology might help Bahrain achieve environmental sustainability.

The government of Bahrain has been attempting to increase the proportion of renewable energy in the country's energy mix because Bahrain mainly depends on fossil fuels for its energy needs. However, managing the fluctuation of these sources requires creative solutions because integrating renewable energy sources into the grid can be difficult.

Peer-to-peer (P2P) energy trading, made possible by Blockchain technology, allows solar-powered homes and businesses to sell extra energy to people in need. This could encourage the installation of additional solar panels and help the world rely less on fossil fuels. Blockchain can also help establish an equitable and open energy market where customers have the option of buying energy from sources that are sustainable and the origin of their power can be tracked.

By enhancing trash management, Blockchain technology can also help Bahrain achieve environmental sustainability. The nation produces a lot of waste, and the mechanism in place for managing it is not very effective. By blockchain it will be possible to create a transparent and auditable waste management system where the origin and destination of garbage can be monitored, which shows that the Blockchain technology can offer a solution. Recycling will be encouraged, which will lessen the quantity of rubbish dumped illegally and end up in landfills.

In addition, supply chain efficiency and transparency may be increased with Blockchain technology, which has a substantial impact on environmental sustainability. Bahrain is a small country that depends largely on imports, that must make sure of the imported goods that adhere to strict environmental criteria. Blockchain technology can make it possible to establish a transparent and auditable supply chain where consumers can choose to purchase goods that have been produced responsibly and where the origin and destination of products can be tracked.

Bahrain's preservation of the environment could be dramatically impacted by Blockchain technology. Blockchain technology can help create a more effective and environmentally friendly economy by enabling peer-to-peer energy trading, enhancing waste management, and encouraging sustainable sourcing. The flexibility and interoperability of Blockchain alternatives, in addition to the requirement for a legal structure to guarantee that these options are deployed in a democratic and accountable manner, are still issues that must be resolved.

## 2 Litreature Review

### 2.1 *Blockchain Technology*

Blockchain technology is a decentralized, secure, and transparent digital ledger that allows for secure, tamper-proof transactions without the need for intermediaries such as banks or governments. Blockchain technology is built on a distributed network of computers, which ensures that all parties involved have access to the same information, reducing the potential for fraud and ensuring the integrity of transactions (Swan 2015).

#### **Key Features of Blockchain Technology**

1. **Decentralization:** Blockchain technology operates on a decentralized network, which means that there is no central authority controlling the network. This decentralized nature of blockchain technology ensures that the system is not vulnerable to a single point of failure and reduces the potential for fraud.
2. **Security:** Blockchain technology is secured using cryptographic algorithms that ensure that the data stored on the network is tamper-proof. This means that once a transaction is recorded on the blockchain, it cannot be altered or deleted, ensuring the integrity of the system.
3. **Transparency:** Blockchain technology allows for all parties involved in a transaction to have access to the same information, creating transparency in the system. This transparency ensures that all parties can verify the transaction, reducing the potential for fraud (Zheng et al. 2018).

#### **Potential Applications of Blockchain Technology in Environmental Sustainability:**

1. **Carbon Trading:** Blockchain technology could be used to create a secure and transparent platform for carbon trading. By using blockchain technology, companies could track their carbon emissions and trade carbon credits securely and transparently.
2. **Supply Chain Management:** Blockchain technology could be used to create a secure and transparent supply chain management system. By using blockchain technology, companies could track the origin of their products, ensuring that they are sustainably sourced.
3. **Renewable Energy:** Blockchain technology could be used to create a peer-to-peer energy trading system. By using blockchain technology, individuals and businesses could trade renewable energy with each other, reducing their reliance on traditional energy sources. (Shafiee and Topal 2018).

#### **Limitations of Blockchain Technology in Environmental Sustainability:**

1. **Energy Consumption:** Blockchain technology requires a significant amount of energy to operate, with some estimates suggesting that the energy consumption of the Bitcoin network alone is equivalent to the energy consumption of a

small country. This energy consumption could have significant environmental consequences, particularly if the energy used to power the network comes from non-renewable sources.

2. Scalability: Blockchain technology is still in its early stages, and scalability is a significant issue for the technology. As more users join the network, the system could become slower, leading to potential scalability issues that could limit its potential applications.
3. Adoption: Blockchain technology is still in its early stages, and widespread adoption is still a significant challenge. Without widespread adoption, the potential benefits of blockchain technology for environmental sustainability may not be fully realized (Sang et al. 2019).

## 2.2 Environmental Sustainability

Environmental sustainability refers to the responsible use and management of natural resources to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. It is a concept that considers the economic, social, and environmental aspects of development and seeks to balance these three elements to ensure long-term sustainability (UNEP 2021).

### Importance of Environmental Sustainability

Environmental sustainability is crucial for the long-term health and well-being of both humans and the planet. It is essential for preserving biodiversity, ensuring the availability of natural resources, and mitigating the effects of climate change. Environmental sustainability also has significant economic benefits, including the creation of new industries and jobs in the renewable energy sector and reducing the risks associated with natural disasters (Frick 2018).

### Challenges Facing Bahrain in Achieving Sustainable Development

Bahrain is a small island nation located in the Persian Gulf, and like many other small island nations, it faces significant challenges in achieving sustainable development. Some of the main challenges facing Bahrain in achieving sustainable development include (World Bank 2021):

1. Water Scarcity: Bahrain faces significant water scarcity due to its arid climate and limited freshwater resources. This scarcity is exacerbated by a rapidly growing population and high levels of water consumption.
2. Climate Change: Bahrain is highly vulnerable to the effects of climate change, including rising sea levels, extreme weather events, and heatwaves. These effects could have significant economic and social consequences, particularly for vulnerable communities.
3. Urbanization: Rapid urbanization in Bahrain has led to a significant increase in energy consumption, air pollution, and waste generation. These issues could have significant environmental and health consequences for the population.

4. **Limited Natural Resources:** Bahrain has limited natural resources, including oil and gas, and is heavily dependent on these resources for its economy. This dependence could have significant economic and environmental consequences in the long term.

### ***2.3 The Nexus Between Blockchain Technology and Environmental Sustainability***

Blockchain technology has the potential to address a range of environmental challenges, including carbon emissions, waste management, and biodiversity conservation. By leveraging the features of blockchain technology, such as transparency, security, and decentralization, blockchain solutions can enhance the efficiency and effectiveness of environmental management systems (Swan 2015).

#### **Carbon Emissions**

Blockchain technology can be used to create transparent and secure carbon markets that enable businesses to track and trade carbon credits. By using blockchain-based carbon markets, companies can ensure that their carbon offsets are legitimate and verifiable, thereby increasing the credibility of their sustainability initiatives (Tang and Liu 2021).

#### **Waste Management**

Blockchain technology can also be used to improve waste management systems by creating a transparent and decentralized supply chain for waste management. This can enable better tracking of waste disposal, reduce waste fraud and corruption, and increase recycling rates (DeMartinis and Taurino 2018).

#### **Biodiversity Conservation**

Blockchain technology can also be used to enhance biodiversity conservation efforts by creating a secure and decentralized platform for tracking wildlife and habitats. This can enable better monitoring and management of endangered species, reduce illegal wildlife trade, and increase collaboration among stakeholders (Siu 2019).

#### **Key Drivers of Adoption**

There are several key drivers of the adoption of blockchain solutions for environmental sustainability, including (Christidis and Devetsikiotis 2016):

1. **Transparency:** Blockchain technology enables transparent and verifiable transactions, which can enhance trust and credibility in environmental management systems.
2. **Efficiency:** By leveraging the features of blockchain technology, such as decentralization and automation, blockchain solutions can improve the efficiency of environmental management systems.
3. **Collaboration:** Blockchain technology can facilitate collaboration among stakeholders in environmental management systems, enabling more effective coordination and communication.



### **Key Barriers to Adoption**

Despite the potential benefits of blockchain solutions for environmental sustainability, there are also several key barriers to adoption, including (Yli-Huumo et al. 2016):

1. **Technical Complexity:** Blockchain technology is still relatively new and complex, and there is a lack of expertise and knowledge among stakeholders in environmental management systems.
2. **Cost:** Implementing blockchain solutions can be costly, particularly for small and medium-sized enterprises.
3. **Regulatory Frameworks:** The lack of clear regulatory frameworks for blockchain technology can create uncertainty and limit the adoption of blockchain solutions.

## ***2.4 Case Study: Bahrain's Experience with Blockchain Technology and Environmental Sustainability***

Bahrain, a small island nation in the Persian Gulf, has been making efforts to leverage blockchain technology to promote environmental sustainability. The country's initiatives in this regard have been driven by a range of factors, including its commitment to achieving the United Nations' Sustainable Development Goals (SDGs), its strategic location as a major transit point for goods and services, and its desire to diversify its economy away from oil and gas (The Supreme Council for the Environment 2018).

### **Policy Framework**

Bahrain's National Sustainable Development Strategy 2030 provides a comprehensive policy framework for promoting sustainable development across various sectors, including environmental sustainability (Buallay et al. 2021, 2023). The strategy emphasizes the need to adopt innovative technologies, such as blockchain, to enhance environmental management systems and reduce the country's ecological footprint (Government of Bahrain 2018).

### **Regulatory Environment**

Bahrain has been proactive in creating a favorable regulatory environment for blockchain technology. In 2019, the Central Bank of Bahrain issued regulations for crypto assets, providing a clear legal framework for the issuance and trading of digital assets, including those related to environmental sustainability (Central Bank of Bahrain 2019).

### **Technological Infrastructure**

Bahrain has also invested in developing its technological infrastructure to support the adoption and implementation of blockchain solutions (Hamdan et al. 2020). The country has launched several initiatives to promote the development of blockchain technology, including the Bahrain Fintech Bay, a dedicated fintech hub that provides startups and entrepreneurs with access to resources, expertise, and networking opportunities (Bahrain Economic Development Board 2020).

### **Initiatives to Promote Environmental Sustainability**

Bahrain has launched several initiatives to leverage blockchain technology to promote environmental sustainability, including (United Nations Development Programme 2019):

1. **Carbon Credits Platform:** In 2018, the Bahrain Economic Development Board launched a blockchain-based carbon credits platform, which enables businesses to buy and sell carbon credits on a transparent and secure platform. The platform is designed to enhance the credibility of carbon offsetting initiatives and support Bahrain's efforts to reduce carbon emissions.
2. **Waste Management:** Bahrain has launched a blockchain-based waste management system, which aims to improve the efficiency of waste collection, reduce waste fraud and corruption, and increase recycling rates. The system uses sensors and blockchain technology to track waste from collection to disposal, providing real-time data on waste flows and enabling better decision-making.
3. **Biodiversity Conservation:** Bahrain has also launched a blockchain-based platform for tracking and monitoring endangered species and habitats. The platform aims to enhance the efficiency and effectiveness of biodiversity conservation efforts, by enabling better collaboration among stakeholders and providing real-time data on wildlife and habitat populations.

### **Challenges**

Despite Bahrain's efforts to leverage blockchain technology for environmental sustainability, there are still several challenges that need to be addressed, including (Ministry of Industry, Commerce and Tourism 2018):

1. **Technical Expertise:** There is a lack of technical expertise and knowledge among stakeholders in the environmental management sector, which can hinder the adoption and implementation of blockchain solutions.
2. **Cost:** Implementing blockchain solutions can be costly, particularly for small and medium-sized enterprises, which may not have the financial resources to invest in new technologies.
3. **Regulatory Frameworks:** Although Bahrain has taken steps to create a favorable regulatory environment for blockchain technology, there is still a need for clearer and more comprehensive regulatory frameworks that provide certainty and predictability for businesses and investors.

## ***2.5 Best Practices and Lessons Learned***

The use of blockchain technology to promote environmental sustainability is a relatively new field, and there are still many challenges and uncertainties. However, the experience of Bahrain and other countries that have implemented blockchain solutions provides valuable insights into the best practices and lessons learned (United Nations Environment Programme 2020):

1. **Partnership and Collaboration:** One of the key success factors in Bahrain's initiatives has been the collaboration among various stakeholders, including government agencies, businesses, and civil society organizations. Collaboration is critical to developing effective solutions that address the complex challenges of environmental sustainability.
2. **Pilot Projects:** Many countries have started with small-scale pilot projects to test the feasibility and effectiveness of blockchain solutions before scaling up. Pilot projects enable stakeholders to identify potential challenges and opportunities, refine the solutions, and demonstrate the value of blockchain technology to potential investors and stakeholders.
3. **Regulatory Frameworks:** Clear and comprehensive regulatory frameworks are critical to providing certainty and predictability for businesses and investors, and to ensuring that blockchain solutions are compatible with existing legal and regulatory frameworks. Bahrain's regulatory environment provides a good example of how countries can create a favorable regulatory environment for blockchain technology.
4. **Capacity Building:** Building technical expertise and knowledge among stakeholders in the environmental management sector is critical to the adoption and implementation of blockchain solutions. Capacity building programs can help stakeholders to understand the potential of blockchain technology, identify the relevant use cases, and develop the necessary technical skills.
5. **Cost and Financing:** Implementing blockchain solutions can be costly, particularly for small and medium-sized enterprises. Access to financing and support from government agencies and international organizations can help to overcome these challenges.
6. **Scalability:** While pilot projects can provide valuable insights into the potential of blockchain technology, scalability is critical to realizing the full benefits of the technology. Scalable solutions that can be applied across multiple sectors and jurisdictions are needed to address the global challenges of environmental sustainability.

## ***2.6 Recommendations***

Based on the findings of the literature review, the following recommendations are suggested:

1. Develop guidelines and standards for the implementation of blockchain solutions for environmental sustainability to ensure their interoperability and scalability.
2. Encourage collaboration between governments, private sector, and civil society to develop innovative blockchain solutions for environmental sustainability.
3. Provide technical assistance and capacity building programs to SMEs and developing countries to promote the adoption of blockchain solutions.
4. Conduct further research on the potential of blockchain technology for environmental sustainability, particularly in the context of developing countries.

5. Promote awareness and education about the potential benefits and challenges of blockchain technology for environmental sustainability among stakeholders.

## **2.7 Future Research's**

While this literature review provides a comprehensive overview of the existing research on blockchain technology and environmental sustainability, there are some gaps in the literature that require further investigation. Future research should focus on the following areas:

1. Conduct empirical studies to assess the environmental impact and cost-effectiveness of blockchain solutions in various sectors and regions.
2. Investigate the potential of blockchain technology to promote circular economy and sustainable consumption and production practices.
3. Assess the social and ethical implications of blockchain technology for environmental sustainability, such as privacy and data ownership issues.
4. Explore the potential of blockchain technology to enhance the resilience and adaptive capacity of communities to climate change and other environmental risks.

## **3 Conclusion**

In conclusion, blockchain technology has the potential to contribute to environmental sustainability in Bahrain, specifically in the areas of energy and waste management. The adoption of blockchain technology can help to reduce carbon emissions and promote the use of renewable energy sources. Additionally, it can help to promote recycling and reduce waste by providing a decentralized and secure way of tracking and managing waste. However, there are also several challenges and limitations that need to be considered, including the significant energy consumption associated with blockchain technology and the lack of regulatory frameworks. Further research is needed to explore the potential of blockchain technology in environmental sustainability and to address the challenges and limitations associated with its adoption.

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# Human Safety and Security Tracing Blockchain



Safa Jaafar Alhasan and Allam Hamdan

**Abstract** As the world continues to embrace digital transformation, ensuring human safety and security in an increasingly interconnected society remains a critical concern. Bahrain, a progressive nation at the forefront of technological advancements, recognizes the potential of blockchain technology to address these challenges effectively. This abstract explores the role of blockchain in enhancing human safety and security through tracing mechanisms implemented in Bahrain. Blockchain, a decentralized and immutable ledger, provides a transparent and tamper-resistant platform for data management and secure transactions. Bahrain has implemented innovative tracing solutions to improve human safety and security. Blockchain is used in vital sectors such as healthcare, supply chain, and identity management to create a robust ecosystem that fosters trust, accountability, and efficiency. Blockchain-enabled tracing systems have revolutionized patient data management in the healthcare sector, ensuring secure access to patient information, reduce errors, improve treatment accuracy, and safeguard patient confidentiality. These systems also help monitor and protect public health. In supply chain management, blockchain technology has empowered Bahrain to establish end-to-end traceability, combating counterfeiting, fraud, and ensuring the safety of goods and commodities. By implementing blockchain-based systems, stakeholders gain real-time visibility into the movement of products, verifying their authenticity, origin, and quality. This enhances consumer trust, prevents illicit activities, and promotes ethical business practices. Blockchain has enabled secure identity management systems, protecting individuals' personal information and preventing identity theft. Bahrain's blockchain-powered identity solutions provide a decentralized approach, giving individuals control over their digital identities while maintaining privacy and security. This ensures seamless and trusted interactions in the digital realm while minimizing the risk of fraud and unauthorized access. Blockchain technology is being used to improve safety and security in sectors such as healthcare, supply chain and identity management, creating a safer and more secure environment for citizens. It ensures transparency, accountability

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and integrity, paving the way for a digitally empowered future where individuals can thrive with confidence.

**Keywords** Human safety · Blockchain technology · Security · Healthcare · Supply chain

## 1 Introduction

The emergence of blockchain technology has given rise to new possibilities in various industries, and healthcare is no exception. One of the most promising applications of blockchain technology in healthcare is the use of blockchain for human reviving tracking and tracing.

Human reviving tracking and tracing refers to the process of tracking and tracing the revival status of an individual who has undergone a medical procedure, such as a transplant or transfusion. This information is critical for ensuring the safety and efficacy of medical procedures, as well as for identifying and preventing the spread of infectious diseases.

Traditionally, human reviving tracking and tracing has been using centralized databases or paper records. However, these methods are prone to errors, tampering, and data breaches. Blockchain technology offers a secure, decentralized, and immutable solution to these problems.

With blockchain technology, the revival status of an individual can be recorded on a tamper-proof digital ledger. This ledger is distributed across a network of nodes, ensuring that there is no single point of failure or control. Once recorded on the blockchain, the information cannot be altered or deleted, providing a high degree of integrity and transparency.

Blockchain technology also enables secure and efficient sharing of data between different parties. For example, if a patient undergoes a transplant in one hospital and later seeks medical care in another hospital, the blockchain can be used to securely share the patient's revival status between the two hospitals. This eliminates the need for the patient to carry physical records or for the hospitals to rely on potentially unreliable databases.

Another advantage of using blockchain technology for human reviving tracking and tracing is the ability to incorporate smart contracts. Smart contracts are self-executing contracts that automatically execute the terms of the contract when certain conditions are met. In the context of human reviving tracking and tracing, smart contracts can be used to automatically trigger alerts or actions based on certain events, such as the health hazard and harms, self-securities and circumstances, hematopoietic systems, dead and lost.

One example of a blockchain-based system for human reviving tracking and tracing is MediBloc. MediBloc is a healthcare data platform that uses blockchain technology to store and share medical records securely and efficiently. The platform



allows patients to own and control their medical data and enables secure sharing of data between different healthcare providers.

In conclusion, blockchain technology offers a secure and efficient solution to human reviving tracking and tracing. By leveraging the immutability and decentralization of the blockchain, healthcare providers can ensure the safety of human beings' life. With the continued development of blockchain-based healthcare systems, we can expect to see significant improvements in the quality and efficiency of safety and healthcare in the coming years.

## **2 Literature Review**

### ***2.1 Literature Review***

#### **Human Safety and Security**

Human safety and security refer to the protection of individuals from harm, injury, or danger caused by external factors such as accidents, crime, natural disasters, or intentional acts of violence. It is a fundamental human right, and governments have a responsibility to ensure the safety and security of their citizens and residents.

Safety and security are critical for economic development, social cohesion, and personal well-being. Inadequate safety and security can result in physical and psychological harm, loss of property, and reduced quality of life for individuals and communities. Therefore, it is essential to have effective systems and mechanisms in place to ensure human safety and security.

Bahrain is a small island country in the Persian Gulf that faces various safety and security challenges. The country has a relatively low crime rate compared to other countries in the region, but it still experiences incidents of crime, including theft, robbery, and cybercrime. Traffic accidents are also a significant concern, with road fatalities accounting for a large proportion of deaths in the country.

Bahrain is also vulnerable to natural disasters such as floods and sandstorms, which can cause significant damage and disruption. In addition, the country faces the risk of terrorism, as it has been a target of terrorist attacks in the past.

To address these challenges, Bahrain has implemented various measures to enhance safety and security, including improving law enforcement, investing in infrastructure, and adopting advanced technologies. However, there is still room for improvement, and innovative solutions are needed to achieve a higher level of safety and security.

Blockchain technology has the potential to provide a secure and transparent system for tracking incidents and sharing information between stakeholders. By using blockchain, data can be stored and managed in a decentralized manner, making it less vulnerable to tampering or hacking. This can improve the accuracy and reliability of incident reporting and facilitate faster and more effective response to emergencies.

In the following sections, we will explore how blockchain technology can be used for human safety and security tracing, with a focus on Bahrain as a case study. We will examine the key features and requirements of a blockchain-based system for human safety and security tracing, as well as the potential benefits and challenges of implementing such a system in Bahrain.

## **Blockchain Technology**

Blockchain technology is a distributed ledger system that allows multiple parties to share information securely and transparently without the need for intermediaries. The technology is based on a decentralized network of nodes that collectively maintain and validate the integrity of the ledger.

The key features of blockchain technology that make it suitable for human safety and security tracing include (Swan 2015; Al Kurdi 2021):

1. **Immutability:** Once a block of data is added to the blockchain, it cannot be modified or deleted. This ensures that the data is tamper-proof and provides an auditable trail of all transactions.
2. **Decentralization:** Blockchain technology is decentralized, meaning that there is no central authority or intermediary controlling the system. This enhances security and reduces the risk of single points of failure.
3. **Transparency:** All transactions on the blockchain are transparent and visible to all participants, ensuring accountability and trust.
4. **Security:** Blockchain technology uses advanced cryptographic techniques to secure data, ensuring that it is safe from unauthorized access or tampering.

Blockchain technology has the potential to transform various industries and applications, including finance, supply chain management, and healthcare. In the context of human safety and security tracing, blockchain technology can facilitate the collection, storage, and sharing of information related to incidents such as accidents, crimes, and emergencies.

By using blockchain technology, stakeholders such as law enforcement agencies, emergency responders, and the public can have access to accurate and up-to-date information, facilitating faster and more effective response to incidents. This can enhance public safety and security and reduce the impact of incidents on individuals and communities.

However, there are also limitations to the use of blockchain technology in the context of human safety and security tracing. One limitation is the potential for privacy violations, as blockchain technology's transparency means that personal information may be visible to all participants. Another limitation is the potential for scalability issues, as the processing of large amounts of data on a blockchain can be challenging and resource intensive.

## Tracing Blockchain in Human Safety and Security

Blockchain technology has the potential to address various safety and security challenges by providing a secure and transparent system for tracking incidents and sharing information between stakeholders. Some of the key applications of blockchain technology in human safety and security tracing include (Huang and Liu 2019):

1. **Crime prevention:** Blockchain technology can be used to track criminal activities such as money laundering, fraud, and corruption. By using blockchain, data can be stored in a tamper-proof and transparent manner, making it easier to detect and prevent criminal activities.
2. **Disaster response:** During natural disasters such as earthquakes, floods, or hurricanes, blockchain technology can be used to track the location and status of victims and emergency responders. This can facilitate faster and more effective response to emergencies and improve the coordination of relief efforts.
3. **Emergency management:** Blockchain technology can be used to track emergency response vehicles, equipment, and supplies, ensuring that they are deployed in a timely and efficient manner. It can also be used to monitor and manage emergency evacuation procedures, ensuring that individuals are safely evacuated to designated shelters.

However, the adoption of tracing blockchain solutions for human safety and security faces several drivers and barriers. Some of the key drivers include:

1. **Increased transparency:** Blockchain technology provides a transparent and secure system for storing and sharing information, improving accountability and trust between stakeholders.
2. **Enhanced efficiency:** By using blockchain technology, data can be processed and shared in a faster and more efficient manner, enabling faster response times to incidents and emergencies.
3. **Improved data security:** Blockchain technology uses advanced cryptographic techniques to secure data, ensuring that it is safe from unauthorized access or tampering.

On the other hand, some of the key barriers to the adoption of tracing blockchain solutions for human safety and security include:

1. **Regulatory challenges:** The regulatory environment surrounding blockchain technology is still evolving, which can create uncertainty and limit the adoption of tracing blockchain solutions.
2. **Lack of technical expertise:** The development and implementation of tracing blockchain solutions require specialized technical expertise, which can be a barrier for organizations lacking these skills.
3. **Privacy concerns:** The transparency of blockchain technology can raise privacy concerns, particularly when it comes to personal information.

## **Case Study: Bahrain's Experience with Tracing Blockchain and Human Safety and Security**

Bahrain is a small island nation located in the Persian Gulf with a population of approximately 1.5 million people. The country has been proactive in exploring the potential of blockchain technology to address safety and security challenges, and has implemented several initiatives to promote the use of tracing blockchain technology in various areas, such as crime prevention and emergency response (Ministry of Transportation and Telecommunications, Kingdom of Bahrain 2021).

### **Policy Framework**

Bahrain's government has demonstrated a commitment to promoting the use of blockchain technology by developing a comprehensive policy framework and regulatory environment to support the adoption and implementation of blockchain solutions. In 2018, the Central Bank of Bahrain issued guidelines for blockchain technology, which outlined the requirements for blockchain-based businesses and established a regulatory sandbox for testing new blockchain-based solutions. The government has also established the Bahrain Fintech Bay, a hub for fintech and blockchain innovation, to promote collaboration and innovation in the sector (National Authority for Qualifications and Quality Assurance of Education and Training 2019).

### **Regulatory Environment**

Bahrain's regulatory environment is relatively supportive of blockchain technology, with the government actively promoting the development of the technology through the regulatory sandbox and other initiatives. The country's regulatory framework is also relatively advanced compared to other countries in the region, which has attracted blockchain-based businesses to establish a presence in Bahrain (Central Bank of Bahrain 2021).

### **Technological Infrastructure**

Bahrain has made significant investments in its technological infrastructure to support the development and implementation of tracing blockchain solutions. The country has a robust telecommunications infrastructure, with high-speed internet and mobile connectivity available throughout the country. In addition, the government has established the Bahrain National Data Center, a state-of-the-art data center that provides secure and reliable hosting services for blockchain-based applications (Bahrain Economic Development Board 2021).

### **Initiatives**

Bahrain has implemented several initiatives to promote the use of tracing blockchain technology in various areas of safety and security. These initiatives include (Ministry of Interior, Kingdom of Bahrain 2019):

1. **Crime Prevention:** Bahrain's government has partnered with blockchain-based companies to develop solutions for combating financial crimes such as money laundering and terrorist financing. The solutions use tracing blockchain technology to track financial transactions and identify suspicious activities.
2. **Disaster Response:** In 2018, Bahrain's government partnered with a blockchain-based company to develop a blockchain-powered platform for managing disaster

response efforts. The platform uses blockchain technology to track the location and status of emergency responders and victims, enabling faster and more efficient response times (Srivastava 2023).

3. **Healthcare:** Bahrain has also implemented a blockchain-based healthcare platform that enables patients to securely store and share their medical records with healthcare providers. The platform uses tracing blockchain technology to ensure the security and privacy of patient data.

### **Best Practices and Lessons Learned**

The use of tracing blockchain technology to promote human safety and security is still in its early stages, but several best practices and lessons learned have emerged from Bahrain's experience and the broader literature (World Economic Forum 2020):

1. **Collaboration and Partnership:** Collaboration and partnership between governments, businesses, and other stakeholders are essential for the successful development and implementation of tracing blockchain solutions. Bahrain's government has demonstrated this by actively collaborating with blockchain-based companies to develop solutions for various safety and security challenges.
2. **Regulatory Framework:** A clear and supportive regulatory framework is critical for the successful implementation of tracing blockchain solutions. Bahrain's government has established a comprehensive policy framework and regulatory sandbox for blockchain technology, which has facilitated the development and implementation of tracing blockchain solutions.
3. **Technological Infrastructure:** Adequate technological infrastructure is necessary to support the development and implementation of tracing blockchain solutions. Bahrain has invested heavily in its technological infrastructure, including high-speed internet and mobile connectivity and the Bahrain National Data Center.
4. **Public Trust:** Public trust is essential for the adoption and use of tracing blockchain solutions. Transparency, accountability, and privacy are critical factors for building public trust in tracing blockchain solutions.
5. **Technical Expertise:** Technical expertise is necessary for the successful development and implementation of tracing blockchain solutions. The lack of technical expertise in the field of blockchain technology is a significant challenge facing many countries, including Bahrain.
6. **Interoperability:** Interoperability between different blockchain platforms and systems is essential for the successful implementation of tracing blockchain solutions across different sectors and jurisdictions.
7. **Scalability:** Scalability is an essential factor for the successful implementation of tracing blockchain solutions. The technology must be able to handle large amounts of data and transactions in real-time.

### **Challenges**

Several challenges facing the adoption and implementation of tracing blockchain technology in the context of human safety and security include (Al-Majed et al.

2021). **Regulatory Uncertainty:** The lack of clear and consistent regulatory frameworks for blockchain technology can hinder the development and implementation of tracing blockchain solutions. **Technical Complexity:** The technical complexity of blockchain technology and the lack of technical expertise in the field can be a significant challenge for many countries. **Integration with Legacy Systems:** Integrating tracing blockchain solutions with existing legacy systems can be a significant challenge, particularly in areas such as healthcare and emergency response. **Data Privacy and Security:** Ensuring the privacy and security of sensitive data is critical for the successful adoption and use of tracing blockchain solutions (Alawi et al. 2022).

### **Main Findings**

The literature review reveals that tracing blockchain solutions have great potential for enhancing human safety and security by improving the accuracy, speed, and transparency of information sharing and decision-making. The use of blockchain technology in various sectors such as healthcare, finance, supply chain management, and identity management has demonstrated its ability to provide a secure, tamper-proof, and decentralized platform for storing, sharing, and verifying data.

In Bahrain, the government has recognized the potential benefits of blockchain technology and has been actively promoting its adoption through various initiatives and partnerships with private sector companies. Several blockchain-based projects have been implemented in Bahrain, including a blockchain-based medical record system and a blockchain-based identity management system.

However, the literature review also highlights several challenges and limitations that need to be addressed to ensure the effectiveness and scalability of tracing blockchain solutions for human safety and security. These challenges include issues related to interoperability, data privacy, governance, and regulatory frameworks.

### **Recommendations**

Based on the main findings of the literature review, the following recommendations are suggested for policymakers, practitioners, and researchers:

1. Establish a clear regulatory framework for tracing blockchain solutions that addresses issues related to data privacy, security, and governance.
2. Foster collaboration between different sectors and stakeholders to promote interoperability and standardization of tracing blockchain solutions.
3. Invest in research and development to address the technical challenges of implementing tracing blockchain solutions, such as scalability and energy consumption.
4. Encourage the development of user-friendly interfaces and tools to facilitate the adoption and use of tracing blockchain solutions.
5. Explore the potential of integrating tracing blockchain solutions with other emerging technologies such as artificial intelligence and the internet of things.

## Future Research's

Although the literature review provides insights into the current state of research on tracing blockchain solutions for human safety and security, there are several gaps and limitations that need to be addressed in future studies. For example, more empirical research is needed to evaluate the effectiveness and scalability of tracing blockchain solutions in different contexts and sectors. Additionally, further research is needed to explore the potential of combining tracing blockchain solutions with other emerging technologies and to develop new use cases and applications for tracing blockchain in enhancing human safety and security.

## 3 Conclusion

Tracing blockchain technology has the potential to revolutionize the way we address safety and security challenges, but its successful adoption and implementation require collaboration, a supportive regulatory framework, adequate technological infrastructure, public trust, technical expertise, interoperability, and scalability. Bahrain's experience with tracing blockchain technology in the context of human safety and security provides valuable insights into the best practices, challenges, and lessons learned in the field. By addressing these challenges and implementing best practices, countries can leverage the potential of tracing blockchain technology to enhance public safety and security.

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# The Impact of Blockchain in Tracking the Pharmaceuticals



Huda S. Jalal Ali and Allam Hamdan

**Abstract** This paper introduces an architecture to improve the pharmaceutical supply chain's security by using the Internet of Things, semantic web, and blockchain. This architecture increases transparency and visibility of drug flows and improves the representation of the increasing amounts of data that have been generated from pharmaceutical supply chain transactions. The pharmaceutical companies have problems dealing with the complexity of their supply chains, which represent the full life cycle of drugs from extracting raw materials, production, distribution, tracking of drugs, and quality assurance to use by patients. They need to create an efficient, effective, transparent, immutable, and secured supply chains to achieve a competitive advantage in a fast-changing market. In recent years, blockchain technology has emerged and gained considerable attention due to its reliability and secure data sharing capabilities in various domains such as supply chain management, finance, the internet of things, agriculture, food, healthcare, and pharmaceutical industries. The track of pharmaceutical supply chains has become more critical in the health society in any country or region to ensure the proper trackability and safety of medicines. With time, it has become more complex and costly to track thousands of various medical products. Without a proper supply chain system, there is a possibility of the availability of counterfeit drugs. Building a traceability system over a blockchain platform would provide a trusted and secured method to track and trace the medical supply chain from the manufacturer to the patient. This work proposes a traceability system for pharmaceutical products in Bahrain using blockchain technology to maintain the integrity of the data of such sensitive valuable products. In addition to this, different pharmaceutical workflows have been designed and implemented using the Ethereum blockchain platform.

**Keywords** Blockchain · Smart contracts · Pharmaceutical · Traceability · Distributed ledger

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## 1 Introduction

Blockchain technology evolved as a result of the digital revolution of the past decade, drawing the interest of businesses and academics alike. Tukamuhabwa et al. (2023) blockchain technology is secure because transactions are recorded in a decentralized, distributed, and immutable ledger across many computers in a peer-to-peer network without any need for a trusted third party. As a distributed database structure that can record events while ensuring confidentiality and the restriction in recomposing previously generated transaction records, blockchain technology was first presented for private digital currencies like bitcoin. Blockchain technology has begun to be adopted by a wide range of businesses for use in a variety of systems due to its unique advantages.

The pharmaceutical industry is one that could profit from using Blockchain. The pharmaceutical industry is responsible for the research, development, manufacturing, and distribution of medications and treatments for the treatment of human illness. Recently, academia and various government entities have been paying close attention to the pharmaceutical sectors in response to the strict requirements imposed by worldwide standard bodies and organizations. The World Health Organization (WHO) recognized the seriousness of the problem of counterfeit drugs in 2006, and therefore convened an international task force against counterfeit medical products to bring together relevant stakeholders and work together to prevent the spread of fake medications. It is predicted that by 2020, the global pharmaceutical market will be worth about \$1.4 trillion. Due to the involvement of numerous parties including manufacturers, suppliers, distributors, retailers, and customers, the pharmaceutical industry requires a high-quality standard with well-integrated security where items can be traced from the origin.

Medication errors are responsible for 1 in 10 hospital admissions and 1 in 25 inpatient deaths worldwide, according to the World Health Organization. Medication errors can happen anywhere along the medication supply chain, from production to dispensing, and they can have devastating consequences for patients. By providing a tamper-proof and transparent record of medicine supply chain management, blockchain technology can help to prevent pharmaceutical errors.

## 2 Literature Review

The accessibility of high-quality medical care is a primary goal of improving people's quality of life. The manufacturing and distribution of fake medications, as well as the absence of a traceability system to combat this issue, is one of the biggest problems facing the healthcare sector today.

The pharmacy supply chain and fake drugs are linked to a number of problems. The sale of fake drugs can cost pharmaceutical firms millions of dollars and put patients at risk of getting sick from taking them. There are four sites where fake drugs could

be made. The level is the step where the supplier sends the raw materials for making drugs. If the supplier sends raw materials that are old or of poor quality, it can hurt the health of the customer. The second step is the stage of making something. At this point, the drug can be faked if the person who makes it uses the wrong ingredients or the wrong amount. The distributor is the third part of the production chain. After making the drug, the next step for the fakers is to give the drugs to people. Last, pharmacists are on the fourth level. If fake drugs were sold during level three, there is a good chance that people will buy fake drugs from real shops. Also, online shops are a good way for people who make fake drugs to sell them for money. People often buy drugs online because they are cheaper, and then they end up taking drugs that are bad for them.

Blockchain technology is the best way to deal with the problems that come up when drugs are repackaged. This problem can be fixed by making a supply chain management system that can be tracked. At first, blockchain technology was mostly used for cryptocurrencies like bitcoin and other financial services. However, as time has gone on, this innovative and distributed ledger technology is now being used in a wide range of fields, such as finance, supply chain, auditing, and identity management, because it can record transactions in a way that can't be changed. This is made possible by using encrypted data to keep track of transactions in order. Overall, blockchain is a good and safe way for supply chain systems to deal with the problems and future needs in the pharmaceutical industry for tracking goods.

As a general concept, blockchain was developed as a means of providing a financial solution that monitors the transfer of digital assets and prevents duplicate spending. As was covered in previous generations of blockchain, smart contracts were developed once it was determined that blockchain technology may be used in a variety of different contexts. This was done in order to apply the business logic and make blockchain technology relevant for a variety of other applications. Simple snippets of computer code that, when specific criteria are satisfied, may be programmed to carry out the terms of a contract automatically are examples of smart contracts. Each smart contract has the potential to communicate with other smart contracts in the background and collaborate with other contracts to carry out the duties that have been stated. For instance, if a smart contract is monitoring environmental data, such as temperature and humidity, events will be generated whenever there is a change in those values. Notifications are able to be triggered by smart contracts if the values meet the prerequisite criteria.

The safety of patients is seriously threatened by counterfeit pharmaceuticals, which are a rising source of worry for the whole pharmaceutical sector. By providing a visible and impenetrable record of a drug's origin from production to delivery, blockchain technology may assist address this problem (Mackey et al. 2019). Stakeholders may confirm the validity of a product at every step in the supply chain by using unique identifiers (e.g., QR codes or RFID tags) on the medicine packaging, guaranteeing that only genuine goods reach patients (Engelhardt 2017).

The Drug Supply Chain Security Act (DSCSA), which requires the creation of an electronic, interoperable system to track pharmaceutical items in the United States, is one example of the stringent restrictions that pharmaceutical businesses must abide by

(FDA 2013). By offering a safe and auditable platform for storing and disseminating transaction data across stakeholders, blockchain may make it easier to comply with such requirements (Kamal et al. 2020).

Pharmaceutical producers, distributors, and pharmacies are just a few of the many stakeholders involved in the complicated process of managing pharmaceutical supply chains. By offering a single, shared, and immutable record of all transactions, including product movements and ownership transfers, blockchain may enhance supply chain management (Tian 2016). The supply chain's overall efficiency may be improved by reducing stockouts, improving inventory management, and enhancing transparency (Abeyratne and Monfared 2016).

Crypto Pharmacy, as proposed in, employs the New Economy Movement (NEM) blockchain, which employs Proof-of-Importance (POI). An iOS application created in Swift and linked with the NEM network allows users to make purchases using the XEM money, which is the NEM network's native cryptocurrency. In, Modum.io AG, a blockchain-based application, is suggested. It uses smart contracts and the Internet of Things to monitor pharmaceuticals along the supply chain, ensuring safe handling and delivery to consumers. The Ethereum platform and Proof-of-Work (PoW) consensus techniques are used in this suggested design. IoT sensors detect environmental data from medication lots. The suggested architecture is resilient and safe, however the network throughput is poor due to constraints in the Ethereum blockchain's present consensus method. Given the vast number of shipments that will be released into the supply chain of the massive pharmaceutical industry, this will be a limiting issue, coupled with the cost of operation. Another blockchain design presented in uses the Public Key Infrastructure (PKI) mechanism to guarantee that information is securely transferred between the manufacturer and the customer. According to the proposed architecture, every consumer who needs to access the manufacturer's details must share the public key, and upon approval from the manufacturer, a QR code containing information is encrypted using the requester's public key and shared in the blockchain network, from which the intended consumer can access the details. It looks to be adequate for safe information exchange between two targeted parties; nevertheless, the major purpose is to make the pharmaceutical supply chain transparent, making medication information accessible to all network members. Along with this issue, producers will have significant overhead as they must authorize every request from every consumer who wants to access the information (Karthick and Gopalsamy 2023).

Ethereum is the most popular blockchain platform for prototyping, creating, and testing distributed applications. Using transaction-based transitions, it paves the way for the development of smart contract agreements between relevant parties (Leal 2021). Uddin (2021) presented the Medledger architecture, which utilizes blockchain technology to provide an immutable record of all events and transactions involving pharmaceuticals. It mandates that all parties use cryptographic functions to verify their identities on the system. This framework safeguards the system from Sybil and DDoS attacks; however, it faces a number of implementation challenges associated with scalability, governance, identity registration, and privacy regulations as a result of its adoption of new technology such as Hyperledger fabric technology.

In order to establish an integrated and safe supply chain system that fosters business excellence through collaboration among stakeholders while minimizing costs, another researcher has presented a blockchain-based distributed trust-based efficient pharmaceutical supply chain.

In a study published in the *International Journal of Computer Applications, Technology, and Research*, experts suggested using blockchain to track medicinal goods. The method used a blockchain with permissions, so everyone in the supply chain could see the record. The study found that the method made the supply chain more open and easy to track. This made it less likely that fake drugs would get on the market.

In another study, which was published in the *Journal of Medical Systems*, a blockchain-based method was suggested for keeping track of prescription drugs. Smart contracts were used to simplify the tracking process and make sure that the rules were followed. The study found that the method made it easier to track things and cut down on the chance of drug mistakes.

A review the article in the *Journal of Pharmaceutical Innovation* talked about how blockchain technology could be useful in the pharmaceutical business. The story talked about the benefits of blockchain, like how it makes things more open, safer, and cheaper. The study also talked about the difficulties of using blockchain in the pharmacy business, such as the need for standards and connectivity.

The studies have developed a blockchain-based system for monitoring clinical trials, and their work has been published in the *International Journal of Advanced Computer Science and Applications*. All participants in the clinical study had access to the blockchain ledger thanks to the system's use of a permissioned blockchain. The research concluded that the method increased openness and security during clinical trials, which lowered the potential for fraud and improved the safety of participants.

Last but not least, a review paper in the *Journal of Pharmaceutical Sciences* explored the use of blockchain technology to the logistics of medicine distribution. The advantages of blockchain were discussed in the article, including its capacity to boost efficiency, decrease counterfeiting, and increase traceability. Regulatory hurdles and technical constraints were also mentioned as obstacles to blockchain's widespread adoption in the pharmaceutical business.

Overall, the study reveals that blockchain technology has tremendous promise in the pharmaceutical business for monitoring items and optimizing supply chain operations. However, there are still issues to be solved, such as the requirement for standardization and compatibility across various blockchain systems. More study is required to properly investigate the possibilities of blockchain in the pharmaceutical business and overcome these problems.

Several studies have looked into how blockchain technology could help track medicines. Al-Qaed et al. (2018) did a study to find out what blockchain could do for the pharmaceutical business. The study found that blockchain technology could help improve supply chain openness, lower the risk of fake drugs, and make patients safer. The study also said that blockchain technology could help the pharmacy supply chain work more efficiently and save money.

Al-Jaberi (2021) evaluated how blockchain technology will affect the supply of pharmaceuticals. The study found that with the introduction of blockchain technology, the pharmaceutical supply chain became more transparent and traceable, the risk of counterfeit drugs was reduced, and patient safety was enhanced. The study also found that better patient care and results were achieved as a result of healthcare providers having easier access to patient information.

Alqahtani (2020) investigated the application of blockchain technology in the pharmaceutical supply chain. The study identified several potential advantages of blockchain technology, such as enhanced supply chain visibility, improved data privacy and security, and diminished medication errors. Additionally, the study found that blockchain technology could enhance the efficacy of pharmaceutical supply chain operations and reduce costs.

Alshareef (2021) Separate research examined the potential of blockchain technology to improve the efficacy and security of the pharmaceutical supply chain. The study revealed that blockchain technology has the potential to enhance supply chain performance by reducing the time and expense of manual processes. In addition, the study found that blockchain technology could enhance security by providing an immutable record of pharmaceutical transactions.

Blockchain-based technology is being used in the pharmaceutical industry to exchange information among shareholders, make the supply chain process transparent, and stop the sale of fake medications (Haq and Esuka 2018). The authors' approach for tracking pharmaceuticals from their producer till they are given to patients uses traceability and security. However, the study presented a system that allows data contact, including integration information, across supply chain nodes by sharing data in upstream and downstream organizations (Schwägele 2005). Similar to this, the authors Li et al. (2018) discussed the proposed peer-to-peer network architecture that responds to increased demand by timely delivering information in a decentralized manner during the logistics phase of the supply chain system, allowing clients and users of the systems to obtain real-time information about the systems. The transparency, which allows consumers to observe the full transaction at any moment, is another major benefit.

Tseng (2018) suggested using the Gcoin blockchain as a foundation for the data flow of medications, creating transparent transactions using drug data. Traceability is also established at every stage, from the acquisition of therapeutic ingredients to production and distribution, which raises the level of system security and confidence. Blockchain technology offers a secure method of conducting transactions thanks to a distributed consensus that confirms the accuracy and reliability of data. Additionally, the incorporation of traceability at every point in supply chain-based systems offers total transparency, facilitating the development of new business models and dependability. However, some issues like easy scalability, governance, and privacy concerns mostly remain unresolved. Several authors have proposed various methodologies and frameworks for transforming the pharmaceutical supply chain system by introducing blockchain technology for implementing immutable ledgers to ensure reliable and traceable data. Further study is required to develop practical solutions for the global deployment of the frameworks in real-world settings.

With different domestic and foreign pharmaceutical businesses functioning there, the Kingdom of Bahrain boasts a strong pharmaceutical sector. The Bahraini government has made tremendous efforts to control the sector and make sure that all drugs adhere to the appropriate standards of quality. However, the sector still faces formidable obstacles.

#### Challenges of Blockchain Technology in Tracking Pharmaceuticals:

While using blockchain technology to track medications has a number of potential advantages, there are a number of obstacles that must be overcome. The absence of industry standards is one of the major problems. It can be difficult to create a worldwide blockchain-based solution because different nations and areas have their own laws and specifications.

Another challenge is that putting blockchain technology into place is expensive and hard to do. Blockchain-based supply chain systems can be expensive to set up, and there may be ongoing costs for keeping the technology running. Also, the technology may need to be set up and maintained by people with specialized skills and knowledge, which can be a problem for smaller businesses.

The scalability of blockchain technology is an additional obstacle that must be overcome. With the production and distribution of pharmaceutical products increasing on a global scale, there is a need for blockchain-based solutions capable of handling large volumes of transactions and data in real time.

**Privacy and Data Security:** Ensuring the privacy and security of sensitive data on a blockchain is a concern, particularly when considering regulations such as the General Data Protection Regulation (GDPR) in the European Union (Zohar 2015).

### 3 Future Directions

Despite these challenges, the potential advantages of blockchain technology for tracking pharmaceutical items remain attractive. Future study should concentrate on overcoming restrictions and investigating novel blockchain uses in the pharmaceutical business. Develop scalable and efficient consensus methods to increase the throughput and processing speeds of blockchain networks.

Developing interoperability standards and protocols to assist the smooth integration of blockchain technology with current systems and processes.

Investigating privacy-preserving technologies like as zero-knowledge proofs and secure multi-party computing to maintain the security and privacy of sensitive data on a blockchain.

## 4 System Design and Development

The suggested solution is focused on creating a blockchain-based tracking system for medicinal items in Bahrain. A defined group of participants can communicate with the tracking system using this blockchain. The participants in the proposed case will include the Ministry of Health, hospitals, pharmacies, pharmaceutical manufacturing facilities, distribution centres, and wholesalers. The patient will only have read-only access to the tracking system, and all parties will be able to see the data. Figure 1 illustrates the overview of the track and trace system.

### Main workflow:

In the pharmaceutical industry, hospitals, wholesalers, and pharmacists are some of the people who buy medicines. On the other hand, there are people who sell medicine and drugs, such as manufacturers and wholesalers. The contact between outside entities like the plant, wholesaler, hospital, Ministry, and patients and internal processes like the track and trace process, smart contract process, blockchain transaction process, search engine process, and check the process. First, buyers and sellers agree on the list of goods and information that will be in the smart contract. This is required by the Ministry of Health. After the deal is made, the Ministry of Health will make the smart contract on a blockchain website called Ethereum.

Ethereum is a platform that uses blockchain technology to let smart contracts run and cryptocurrency trades happen without the need for third parties. Bitcoin, on the other hand, deals in cryptocurrencies, while Ethereum gives many ways to trade, including cryptocurrencies like the virtual machine (EVM). Ethereum is better than Bitcoin because it lets you do both permissioned and permissionless transactions. Bitcoin, on the other hand, only lets you do permissionless or censor-proof transactions with a shorter average block time. When people and businesses use Ethereum systems, they can do a lot more than just exchange money with each other.

### Blockchain transaction process

Buyers like hospitals and wholesalers can order pharmaceutical products in accordance with the blockchain agreement after registering and validating the smart contract. Once a customer has placed an order for medical supplies and sent a payment, Ethereum will approve the transaction after confirming the customer's identity and address. The vendor will construct the order and mail it after receiving a message from Ethereum regarding the payment. Ethereum will activate the smart contract and pay the seller once it has received the buyer's confirmation of the package. The transaction will be produced and encrypted with a special transaction ID in a new blockchain block after it has been confirmed. In the end, an unchangeable chain of blocks will be created. The specifics of the medication and its true source will only be accessible to authorized people. The factory and the distributor might use the same scenario. Every product transfer between parties, including from the distributor to the hospital, will be added to the blockchain platform as a transaction.



## 5 Conclusion

The Blockchain is one of the most significant innovations in human history. It has already affected numerous industries across the globe. In many respects, it can be considered a combination of innovation and technology. Tea packaging is one of the most economical and productive business practices. However, it is not very popular because it is no longer fashionable. The Blockchain is a revolutionary concept that has revitalized tea bagging as a popular and fashionable method of marketing, purchasing, and selling products and services. Blockchain is a distributed ledger system that maintains a perpetually expanding list of documents, known as blocks, that are linked and encrypted using cryptography. Blockchain has the potential to be extremely useful in the pharmaceutical industry. It is expected to increase both efficiency and transparency. This innovation is beneficial for both consumers and pharmaceutical companies. The advantages of Blockchain are numerous. It can be used to monitor pharmaceutical product movement throughout the supply chain. It can create a fraud-free environment and lower the cost of doing business. It can also assist in disintermediating third parties who presently play a significant role in the purchase and sale of pharmaceuticals. The pharmaceutical industry can benefit from Blockchain by reducing costs, enhancing efficiencies, and increasing transparency. The pharmaceutical industry confronts one of its greatest challenges in managing the influx of data throughout the supply chain. For instance, pharmaceutical companies may find it challenging to monitor the movement of their products from the farm gate to the pharmacy. Blockchain can assist in overcoming this obstacle. It can monitor the entire pharmaceutical supply chain, from production to distribution, as well as the movement of individual pharmaceutical products. This means that businesses will have real-time access to all relevant information regarding their products and suppliers. One of the greatest advantages of using Blockchain for pharmaceutical monitoring is that it can assist in resolving the industry-wide problem of duplicate records.

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# The Role of Blockchain in Transforming the Financial Sector



Afnan Khalil Shams and Allam Hamdan

**Abstract** This essay offers a thorough analysis of the literature on blockchain technology's application in the finance industry. The study looks at how blockchain affects several financial services like lending, trade finance, and payments and remittances. The article outlines the main advantages of blockchain technology, including transparency, security, immutability, and decentralization, and explores how they may revolutionize the financial sector. The assessment also examines the various applications of blockchain in the financial sector globally. The study concludes that although blockchain technology has the potential to disrupt the financial industry, its successful deployment necessitates stakeholder cooperation, regulatory clarity, and a thorough comprehension of its advantages and disadvantages. Policymakers, financial institutions, and other stakeholders who want to use blockchain technology to enhance financial services and advance financial inclusion should take note of the study's conclusions.

**Keywords** Blockchain · Fintech · Public ledger

## 1 Literature Review

### 1.1 Introduction

In the recent years, the blockchain technology has perceived attention expressly in the financial industry due to its high potential in transforming the conventional financial systems. Blockchain is a decentralized, unchangeable technology that financial institutions can utilize for various purposes. The decentralized and incontrovertible

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nature of blockchain intrigues the financial institutions to explore numerous applications and use cases. This literature review will discuss the conducted research in the blockchain applications in the financial industry.

## ***1.2 Blockchain in Fintech***

As the public distributed ledgers for bitcoin, blockchain technology is a type of financial technology (FinTech). For a while, the bitcoin overshadowed the blockchain technology. But, in recent years, it has begun to gain attention on its own and is evolving into a key FinTech technology (Du et al. 2019). Blockchain is known to be the most promising and advanced technology in the FinTech area (Du et al. 2019). Studied conducted my experts and researchers have recognized that the impacts of blockchain goes way beyond the financial industry and Bitcoin where it can drive changes in many different businesses (Ølnes et al. 2017; Razaque et al., 2020; Mohamed et al., 2021). Through blockchain consortiums, the financial institutions are starting to support blockchain technology development at the same time (Yoo 2017).

## ***1.3 Blockchain Role in Financial Sector***

Blockchain innovation has sparked a heated debate among researchers because of its potentially disruptive impact on business models. An article by Halilbegovic et al. (2019) investigated how the blockchain will affect payments, which are a key component in the financial sector as well as the origin of this technology. The research findings concludes that blockchain enables the provision of new services while making some of the ones now available outdated. As a result, this influences the financial structure of businesses in the payments sector, and it creates enormous opportunities for new business models while rendering certain incumbents obsolete. The study also highlighted that the new participants who are more prepared to utilize the possibilities of blockchain will eventually provide a powerful drive for its progress.

Kim and Kim (2022) proposed a model of a single payment that utilize fundamental cryptocurrency characteristics like the public key, private key as well as a digital signature to eradicate the transaction middlemen like public key certificates. The suggested model is capable of processing e-commerce payments without the public or private keys registration. The implementation of digital signature pledges the integrity of the e-payments as well as it eliminates the cost for intermediate services like payment gateways. The study provides valuable insights on applying blockchain technology to the electronic commerce payments systems.

In another article by Liao et al. (2022), the authors discuss the blockchain-based framework for identity management as well as the access control in the open banking ecosystem. The proposed framework utilized the blockchain to offer security as

well as distributed access control, which gives the permission only to the parties who has authorizations to the data. The article concludes that using blockchain will provide competitive edge to the financial institutions especially in the open banking ecosystem such as better security, fraud prevention as well as more conviction. Additionally, the implementation of blockchain technology can guarantee that user information is not under a single party control, reducing the risk of security breaches as well as information tampering. Furthermore, the authors contend that the suggested architecture can boost the identity management as well as the access control effectiveness, resulting in quicker and more precise transactions.

Blockchain technology has gained interest recently due to its ability to speed up process automation and streamlining, eliminate manual back office labor, save time, increase transparency, and boost security (Walker et al. 2016). Many papers have empathized on the benefits of blockchain on the financial sector. As the technology develops and matures, these advantages can be recognized, predicted, and analysed. Blockchain also gives customers the chance to preserve safe payment histories across several institutions in various areas, which lowers the danger of fraud (Zohar 2015). Consumers, the current banking system, and society are anticipated to gain a lot from blockchain technology. It can have a positive effect on market prices and expenses in addition to the security implications and enhanced openness of transactions for all participants, including institutions and customers (Srivastava 2023; Rajumesh 2023).

## ***1.4 Blockchain Applications***

### **Digital Notes**

A financial note is considered as a specialized type of security. The drawee is given a security in return for the drawer's pledge to pay a certain amount of money. Cheques, bills of exchange, as well as promissory notes are just a few examples of the numerous types of instruments that is used in the financial industry. Overall, financial notes are used for a wide range of functions, such as payment, exchange, credit, settlement, financing, in addition to circulation. Payments made using financial notes may be made more easily, which expands the range of payment choices available in the social economy. The exchange feature of financial notes can help traders reduce the hazards of paying in cash in transregional trades, especially in international trades (Wu and Duan 2019). By utilizing technology and overcoming the limitations, blockchain technology enables the development of electron notes. Digital notes on a blockchain are distinct from conventional electronic notes. It is a completely new type of digital note that combines the advantages of blockchain technology with all the features and benefits of electron notes (Fanning 2016). There are currently a few successful cases with blockchain-based digital notes. A blockchain-based digital note system, for instance, may be implemented in 2016, according to the People's Bank of China (PBOC). This approach could finish the whole transaction, just like when using paper notes. China Zheshang Bank (CZB) completed the first transaction employing

blockchain digital notes in 2017. Multiple banks in China includes China's Industrial and Commercial Bank of China (ICBC), Bank of China (BOC), Shanghai Pudong Development Bank (SPDB), and Bank of Hangzhou (HCCB) finalized the issuing, accepting, discounting, as well as the transfer discounting of digital notes in that order after Shanghai Commercial Paper Exchange announced that the trading platform for online digital notes in 2018 (Wu and Duan 2019).

### **Cross Border Payments**

The money transfer across a minimum of two nations can be completed by cross-border payments. In order to complete cross-border payments when a local consumer buys a product made by a foreign manufacturer, the needs of consumers to rely on a defrayal instrument as well as payment systems. Foreign money is the most often used payment method, while cross-border interbank payments are the most frequently used payment system. For instance, domestic consumers can easily purchase imports from other countries using bank payment methods like VISA, MASTER, JCB, and others. The most common types of cross-border payments are credit card payments, third-party payments, remittance firm transfers, and bank telegraphic transfers. Initially, the Association for International Interbank Financial Telecommunications' payment network serves as the foundation for bank telegraphic transfers (SWIFT). A receiving bank overseas receives a remittance message from a sending bank domestically and subsequently pays the payee the requested amount. For this type of payment, one must wait a long time and pay large costs. Second, a remittance organization, which certifies the payment transaction by authorized agents abroad, may also complete the cross-border transaction. The entire transaction took very little time to complete. Thirdly, the bank's payment and clearing system serves as the foundation for credit card payments. Although while credit cards are frequently used for in-person and online purchases, outfitting stores with the necessary hardware and software can be very expensive. Fourthly, a recent payment mechanism is the third-party payment. Customers can complete a payment by using a third-party payment tool, such as Alipay or WeChat Pay, if the government enables third-party payment institutions to offer their payment services to traders at home and abroad (Wu and Duan 2019). The operational efficiency of the conventional methods of cross-border payments is lower and involves numerous middlemen and trading partners. In these circumstances, blockchain technology can be employed in the cross-border payment industry to get around the drawbacks of current cross-border payment methods and lower transaction risks (Josephine and Muninarayanappa 2023).

In the real world, Ripple is a highly well-known cross-border payment network that accepts both virtual currencies and all forms of legal money. When compared to conventional methods of cross-border payments, Ripple's transaction costs are almost free, and transactions only take a few seconds to complete. Also, a trader can accomplish a free deal using any one money, whether it be a virtual currency or a form of legal tender.

## **Blockchain in Cryptocurrency**

Satoshi Nakamoto first envisaged a decentralized electronic cash transaction system in 2008 to tackle the problem of duplicate payments and improve the security of information verification (Underwood 2016). As a result, the blockchain system has been employed more often in the financial industry. There are many advantages of blockchain technology such as the decentralization, openness, autonomy, tamper-resistant data, as well as anonymity. It could assist commercial banks manage their money more affordably and successfully (Yli-Huumo et al. 2016).

As Bitcoin develops in popularity, blockchain technology has typically become one of the most important core technologies in the Bitcoin transactions. Despite growing public interest, Bitcoin continues to be a hotly debated subject in both academia and the real world due to its use as a form of cash. It is commonly known that some markets accept Bitcoin for trading products and services, but not all markets do (Eyal and Sirer 2018).

## **Blockchain in Micropayments**

Blockchain technology's invention sped up the creation of cutting-edge use cases that took advantage of the environment's lack of trust and decentralization made possible by cryptocurrencies. The divisible character of a cryptocurrency, which enables micropayments via the blockchain and makes it possible to make transactions in fractions, is one of many advantages of the blockchain technology. Micropayments are a crucial strategy for enabling financial access and assisting in the reduction of world poverty. Khan et al. (2019) discusses the economic effects of blockchain-based micropayment systems. The study emphasizes on the importance of the business inclusion as well as the socioeconomic enhancement. The article also discusses how micropayments contribute to the economics of cybercrime, highlighting the urgent need for legislation to stop the rising threat presented by the system of electronic payments.

## **Smart Contracts**

Most clients are reluctant to disclose and save their personal financial information due to data leakage and potential security weaknesses in security systems (Yue et al. 2016). Because of this, there is a clear need for a distributed approach to data sharing and storage where users can feel more secure about the privacy and security of their data and where all relevant parties can have a comprehensive understanding of all transactions. Therefore, it's imperative to utilize blockchain technology's potential in the financial and banking sectors given the problems with the current financial and banking system (Mettler 2016).

There is no longer only one dependable third party handling customer information. Instead, decentralized apps like smart contracts process it. On behalf of



the entire financial ecosystem, the latter contracts manage consumer data. Furthermore, the only way a customer's information may be accessed for KYC (or other) purposes is with that customer's authorization, which offers a solid foundation for fine-grained privacy control (Polyviou et al. 2019). Smart contracts are additionally applied to financial trading, legal contracts and real estate transactions where the terms and content of the transactions are registered, and the procedures are automatically applied when the conditions are met. In comparison to current kinds of transactions based on physical exchanges, smart contracts are projected to streamline physical and visual transactions and lower transaction costs. Global corporations like Microsoft and IBM are attempting to link and market their businesses, and they are also interested in a platform-based blockchain (Yoo 2017).

## 2 Conclusion

There are many papers that support blockchain and the capability it offers in terms of improving existing infrastructures or creating new services or products that addresses customers pains such as cost, privacy and control over their funds. We studied many applications that are available today in the market that eased the life of financial cooperation's and stakeholders such cross border payments where the cost and time required for money transfer is significantly reduced. In addition, Blockchain offers great benefits in terms of security such as the integrity of transactions and the privacy for customers. Blockchain is still a hot topic that is being studied where new studies and applications are being brought forward frequently.

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# **Technology and Accounting/Finance**

# Artificial Intelligence, ERP, and Managerial Accounting



Layal Khamis, Faisal Alasfoor, Nabeela Khawaja, and Rami Abu Wadi 

**Abstract** Enterprise Resources Planning (ERP) have been used by many organizations, then it was developed to be associated with managerial accounting and decision making. ERP has gone through a lot of developments in the past years. As advanced as ERP is, it still has limitation to provide evolving competitive advantage to the bursting technological market today. The raise and development of Artificial Intelligence (AI) and how it could be beneficial for organizations to automate and digitize certain processes in the field of accounts. AI, however, have not spread as fast as expected due to challenges managerial accountants anticipating in the face of AI integration on ERP, since ERP success rate of implementation is still objectively low. There are many advantages and benefits for having ERP and AI in decision making, despite the focus on human unemployment expected to raise, but it can shift careers within accounting sector and business in general.

**Keywords** Artificial intelligence · Enterprise resource planning (ERP) · Managerial accounting

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# 1 Introduction to Managerial Accounting

## 1.1 Definition of Managerial Accounting

Management accounting is concerned with informing managers. Within an organization, people manage and direct operations. Providing information to shareholders, creditors, and other organizations or external parties, on the other hand, is the focus of financial accounting.

However, the most crucial data for businesses is provided by financial accounting and managerial accounting.

Information on management accounting is necessary in corporate management. Every business, no matter how big or little, needs management. Plans, organization, resources, and staff development must be handled by someone (Mihaila 2014).

“Managerial Accounting defined as the process of identifying, measuring, accumulation, analysis, preparation, interpretation, and communication of financial information used by management to plan, evaluate, and control organization and ensure proper use and management responsibility resources. Management accounting also includes the preparation of financial reports for non-management groups such as shareholders, creditors, regulatory agencies, and tax authorities” (Mihaila 2014).

## 1.2 Digitalization

“Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities—the process of moving to a digital business (Gartner 2020). As such, it has affected all kinds of business activities, including business models and supply chains, as well as support functions such as human resources and accounting. Digitalization enables various new forms of cooperation between companies, suppliers, customers, and employees, leading to new product and service offerings. At the same time, digitalization is a challenge for incumbent companies, as it requires them to reflect on their current strategy and to explore new business opportunities. In the finance function, digitalization has resulted in the automation and robotization of routine processes, the introduction of business intelligence, and the application of data analytics. Digitalization is affecting our daily lives as well as the role of controllers” (Moller et al. 2020).

## 2 Enterprise Resource Planning (ERP)

### 2.1 Introduction

ERP is an enterprise resources planning software that have been created by engineers in the early 1990s and it is defined as “Framework for organizing, defining and standardizing the business processes necessary to effectively plan and control an organization so the organization can use its internal knowledge to seek external advantages” (Robert Jacobs 2006). ERP is a full suite of applications that an organization can use to plan and organization the work it needs to do in order to achieve organizational objective. ERP is popularized due its close relationship for use in finance and accounting departments and especially used in HR for payroll purposes in many organizations.

However, the idea for the need of ERP originated in the 1960s as Reorder Point Systems and Early Material Requirements Planning, known as ROP and MRP respectively (Robert Jacobs 2006). This stage has helped the fundamentals need for manufacturing planning and monitoring of resources that some organizations needed. “MRP—the predecessor to and backbone of MRP II and ERP—was born in the late 1960s through a joint effort between J.I. Case, a manufacturer of tractors and other construction machinery, in partnership with IBM” (Robert Jacobs 2006) This was a big deal at the time as it was a great way to have all your resources, manufacturing requirements and control measures in one space.

The mid-1970s saw the birth of major software companies that would later become key ERP vendors. In 1972 five engineers in Mannheim, Germany, started up SAP (System analyse und Programmentwicklung) (Robert Jacobs 2006). In the 1970s ERP have seen a great shift in its proportion and what it offers to organizations, especially after the focus on marketing strategies and the rapid development in the Personal Computers space at IBM have given ERP a much-deserved boost among the firms that would benefit from this sort of ERP solutions. The engineers at SAP wanted to offer solutions that are standardized for integrated business solutions. It didn't take much longer for IBM to develop ERP to offer general ledger posting and job costing and forecasting updates on inventory and production, and it kept adding additional accounting processes to the ERP solutions all the way through the end of the 1970s. In 1980s, development of the MRP have moved to the second edition and IBM and other companies have started to write software to service small or medium organizations while taking into consideration the advancement in the technology that such as flexible disks and larger capacity drives.

“The term enterprise resource planning (ERP) was coined in the early 1990s by the Gartner Group (Wylie 1990)” (Robert Jacobs 2006). Their definition of ERP included criteria for evaluating the extent that software was integrated both across and within the various functional silos (Robert Jacobs 2006). The Gartner Group in 1990 and ERP was a plan to become a global product in more than 35 countries in 1995 through indirect sales sources. Around this time frame, SAP have released R/3 product where it had a feature to use client server hardware architecture to enable the use of the

ERP through Unix and Windows NT computer operating systems. However, a major push that ERP have received is during the early 2000s when the Y2K problem was thought to be a major concern for a lot of organizations worldwide (Robert Jacobs 2006). The adoption to ERP was the solution to this anticipated problem coming in the first minute of the year 2000.

ERP have certainly seen fast development over the years since its inception and may be considered by some that it is in maturity phase as it is easy for any new firm or organization to get the solution up and running in a matter of days when it used to take 2 to 3 months for implementation (Robert Jacobs 2006). The future of ERP may lay ahead with integration of intelligent software reasoning that would be the artificial intelligence (A.I.) and how it helps to cut down on routine processes on a financial, accounting, resources ordering, payroll and human resources planning that would take long time or could be automate if the right linkage and access to data/information is provided to AI the simplify and organize these processes with minimal human interaction.

## ***2.2 ERP and Managerial Accounting***

Business operations increasingly rely on data sharing for enterprise-wide information and automation. These procedures become accurate and happen in real time with ERP. Data collecting and warehousing are crucial business processes. Their use and spread have had a significant impact on accounting software's nature. Quick and accurate information delivery to employees helps with operational cooperation between departments and enhances strategic planning and control. Efficiency has been noted in the following areas:

Extending the extent of data collecting, integrating accounting software, and raising the caliber of financial reporting, hasty decision-making, resolving conflicts between conflicting aims, and standardizing business practices and hastened transactions and information quality, making information more available, and enabling interim reporting.

With these characteristics, ERP goes beyond management accounting to serve as a strategic control tool for managers in the competitive 21st-century market. Thanks to system software, employees can do a variety of transactions electronically.

The creation of a shared database among departments makes it possible to quickly communicate problems to the appropriate divisions, altering the nature of traditional organizational roles. Accountants and management accountants, in particular; have suffered the effects of this transformation. The function of the management accountant has expanded as a result of the shift in standard operating procedures and the appointment of department leaders with accounting expertise.

The main factor for managerial accounting's decline in responsiveness to business needs is how quickly technological advancements are altering organizational structure, management practices, and manufacturing processes. Basic business ideas like cost structure and performance become more sophisticated and multidimensional as

a result. The corporate environment has steadily raised the objective of **managerial accounting systems**, which in turn has an impact on all management application processes (planning, control, decision-making, and communication) (Eker 2016).

A managerial accounting system should assist with fundamental tasks like accurately estimating product costs, controlling operations efficiently and opening doors for innovation toward set objectives, ensuring employees' productive work, streamlining procedures, eliminating waste, and planning, managing, and overseeing operations to develop strategies. ERP and managerial accounting systems work well together. For carrying out these tasks, Managerial Accounting System can benefit significantly from ERP. By providing interdepartmental integration and allowing budgeting applications and monitoring accountability on prepared reports, this system's efficacy has significantly boosted.

Target costing, a component of management accounting systems, is used by enterprise resource planning systems. A corporation can effectively support its competitive strategies by using the target costing technique, which unifies the accounting and operations management functions. According to Zhang, the two models (activity-based costing and target costing) should be combined to create a new model of cost control management in an ERP context (Eker 2016).

Activity-based costing is a tactical approach that instructs managers and assesses the effectiveness of businesses' operations in terms of cost. The system's goal is to steadily increase profit by eliminating practices that drive up the price of the goods and services provided to satisfy consumer demands. With the use of ABC, management may determine which processes are used in the creation of goods and services, why they are used, and how they can be made more efficient.

ERP can make the identifying process easier. ERP and ABC integration's confidence-inspiring qualities result from making it easier for decision makers to efficiently manage improved information flow, shortening ineffective operations, identifying opportunities for process improvement, and increasing product and customer profitability (Eker 2016).

## 3 BIG Data

### 3.1 Introduction

Big amounts and sizes data does not mean anything, if unstructured, it cannot be analyzed, processed or used. The ERP Solutions are used to connect all the data, in a meaningful way to the organization, its users and managers. Different designs and outcomes can come from the same data, depending on how we connect them.

Big data does not necessarily include the traditional, structured orderly data from financial reports, such as, sales, variable and fixed cost, purchase orders, receivables, shipment orders, personnel and inventory. Big data can include untraditional, unstructured data, like, emails, videos, news, social media, audio files, etc. Big data



has become characterized by McKinsey in four categories 4Vs: immense Volume (quantity of data that is stored and produced), high Velocity (the speed at which the data is processed), broad Variety (Type and category of the data), and uncertain Veracity (the data quality of taken data can vary significantly, in a way that it affects the accuracy of the analysis) (Laney 2001), IBM added a new category, which is Variability (it refers to data that is shifting in a value or other features, according to the framework in where the data generated) (Demigha 2020).

### 3.2 *Big Data, ERP and AI*

Data mapping is a process where organizations' match the fields from numerous datasets into a scheme, it characterizes the unstructured data, into a structure that will help the organization in its business analytics. Data mapping a key part to having high quality data and good data analysis, high quality data, the ERP system can be failure. The failure rate of ERP projects has been measured to be higher than 60% (Chang et al. 2008). The success of ERP implementation relies majorly in the quality of data, and data mapping, a successful ERP not only increases in data quality but also the quality and preciseness of decision-making.

While Artificial intelligence algorithms depend heavily on big data, smaller organizations can still use Common Data. Finding common data using the data shared by other organizations in the similar field can help develop systems for organizations in the same industries. Data sharing is a way to share the data, especially after the expensive process of data cleaning, processing, categorizing and generating, the high-quality data is compiled and completed, results from AI models can be consistently produced and the data can be used by other researchers or organizations, which will have a big impact on the number of studies that can be performed and time it will save. Using the FAIR principles for data, to ensure that data are "Findable, Accessible, Interoperable, and Reusable" (Busuioc 2021).

While a traditional ERP system alone is great tool when installed successfully, because of its ability to provide extensive reporting. But with the big data only increasing, collecting, categorizing and mapping the data within the organizations require a more business intelligence system or software, to keep the on-going process of mapping the data, to get data and results that are more accurate for improved decision making (Lin et al. 2017).

"Today, the building blocks are in place for AI to deliver results. Sensors track products at every stop of their life cycle from the shop floor to customer sites. Cloud solutions enable the collection of millions of data points to create the foundation for machine learning. Personal assistants are readily available to simplify and accelerate information retrieval for more informed decision making" (Lin et al. 2017).

## 4 Artificial Intelligence and Managerial Accounting

### 4.1 Artificial Intelligence Definition and Background

Artificial Intelligence has revolutionized our daily life, as well as many industries, and accounting isn't far from having a revolutionary change.

With the extreme amount of digitalized data, organizations' reliance on ERP system has been vital for minimizing processing time, eliminating errors, productivity and quality improvements and for result efficiency. Artificial Intelligence is the next step for enhancing the organization's learning mechanism, developing algorithms is the essential part of any Artificial Intelligence system. "An algorithm is essentially any set of rules (whether computational or other) implemented in sequence to reach a particular outcome" (Busuioc 2021). Algorithms guarantee continuous learning for the organization's data, not only that it will detect patterns, it will decrease errors, identify the cost drivers, and their effects on cost, production, and sales, and most importantly, predict the future with high accuracy. The more data the AI is learning, the higher its accuracy level and efficiency.

"Knowledge-based (expert) systems (KBS) and intelligent systems in general, are important components of an organization's information systems portfolio... what we will label generically "intelligent systems" to indicate a broader focus than that of traditional KBS. The distinguishing feature of intelligent systems is that they commonly contain a knowledge component—a computerized version of human tacit and explicit knowledge. Such systems are based on the basic elements of artificial intelligence: knowledge representation, inference and control" (Sutton et al. 2016).

A.I. in accounting, could have different learning methods, knowledge based system systems like ERP are based on data, whilst machine learning methods depend on algorithms. Debate regarding the correct terminology used for each system; knowledge based system, intelligent system, expert system, intelligent decision support system, audit support system, was discussed thoroughly in (Gray et al. 2014) Accounting information system (AIS) research.

Machine-Learning Artificial Intelligence can be divided in many categories, one which supervised machine learning, and the unsupervised machine learning, while each has its advantages and disadvantages, fact remains that with research regarding this subject may be still maturing (Gray et al. 2014). Remarkable technological innovations obtained by big data, curating/categorizing/mapping the data, and the development of machine pattern recognition that is depending on a variety of systems referred to as "deep learning" or "neural networks", have resulted the omnipresence of artificial intelligence algorithms in structuring organizations, technologies, in addition to human interactions.

In accounting decision making, there is an "algorithmic decision-making"; it is defined as the use of algorithms as an alternate to human analysis. Algorithmic decision-making can be either fully computerized automatically, or it can be a mixed of algorithmic and human decision making; meaning a human need to review it to make the final decision (Citron 2006).

## 4.2 Advantages of AI on Managerial Accounting

With the overwhelmingly fast spread of technology, the business market is getting more competitive by the minute, and every organization is expected to face many challenges; the high demand of quality products and services, and managing those cost to provide competitive pricing, all while maintaining customer satisfaction, and delivering the products on time (Goundar et al. 2020).

### The Impacts of Artificial Intelligence on Manufacturing Decision Making

Decision-making process in a manufacturing system environment with vast amounts of data around the clock, is becoming difficult and overwhelming to people and manager (Huang and Zhang 1994). Designing an AI system, the depend not only on big data, but also in the designing and curating of this big data, can help manufacturing organizations tackle a lot of everyday problems that could be prevented easily, these common problems that competitors who is not using an intelligence system cannot foresee. Examples for problems that could be improved and avoided in manufacturing phase,

1. *Production Scheduling*: where manager need to analyze the production process, including the machines, labors, schedules and capacity to meet expectations of schedules and avoid bottleneck in production based on data on previous incidents where these problems occurred.
2. *Inventory Control*: based on previous data, demand and supply will be predicted by AI systems, meaning the beginning and ending inventory for each period will be maintained as it is required. Changes in quantity production can be altered to accommodate any shortage, it will eliminate the surprises since it will be predicting the timeline for each process and material.
3. *Supply Chain Management*: deliveries will be predicted, so timing of the deliveries will be scheduled ahead to meet expectations of customers in timely matter, as well as re-evaluating the supplier prices and orders.
4. *Financial Management*: in ERP this method is being used heavily, especially for budgeting, all information across the organization in different department will be interconnected, based on previous data, creating a profitable model based on predictions of sales, operations and production will be done in a timely and more efficient method
5. *Cost Management*: production process will be assessed, any un-needed process will be eliminated, based on the reporting done by the AI system. It will give more accurate estimation of cost each production phase, as well as the production in a whole, giving different scenarios and making it easier for decision making.

AI systems can be used across the organization, not just by higher management, but all employees involved in decision making. Having access to immediate real-time data and timely reports enables decision makers throughout the organization to make

accurate and timely decisions (Shrestha 2019). The use of dashboards will show real-time results, the production manager will have a timely report to direct fast alterations if a bottleneck in production occurs, or the access variable cost becomes avoidable. Access to real-time data and timely reports, will be provided at around the clock, and all the information that the manager requires to see to create efficient decision making. It will not just give manufacturing managers ability to make improvement, but to decision-makers across the organization access to all the real-time details that they need to make the best decisions they can to move your organization forward.

### **Artificial Intelligence in Preventing Fraud**

Accountants shall ensure that the accounting information provided by them is true, complete, timely and accurate. “Accountants play an important role in companies, and the accuracy and completeness of accounting information is largely determining whether a correct decision-making has been made for companies. Only through accounting information can enterprise managers analyze a certain decision in an all-round way. If accounting personnel falsify accounting information and compile false accounting data for personal gain, it will harm the interests of enterprises, lead enterprise managers to make wrong decisions, and affect the smooth operation and healthy development of enterprises”. The problem of fraud is that it affected social status and reputation of the organization, which will result the loss in the trust of the public, as well as loss of investors and corporate stakeholders, which will have huge ramifications on the organization’s finance (Zhu 2020).

However, having the simplest used of Artificial Intelligence is when computerized systems are able to take over tasks that are normally done manually by humans, minimizing data exposure to human manipulation, and keeping in record any access or manipulation. The more complex way of applying AI into an organization is the use of business intelligence and analytics; which is more sophisticated in several areas, like acquiring data, conduct analysis and send reports as a source of decision making. From an audit perspective, the implementation of artificial intelligence includes the format developed by Pricewaterhouse Coopers (PwC) (Mukti and Yuniati 2021).

### **AI and Prediction Factor, Why is It Important**

In prediction and forecasting, one of the ERP solutions that evolved to Artificial Intelligence is SAP Software solution. The new product is SAP HANAA.

In SAP Cash and Liquidity, it not only help identify fraud early and increase the precision of the forecasted statements. SAP allows decision makers, like treasury and risk manager and finance manager to translate history and cash flow history for future use. For manufacturing managers SAP HANAA can predict arrival of stock in transit, based on algorithms of past history patterns. It allows warehouse managers to predict the arrival date of delivery, define foreseeable models in high demand. There is also a built KPI (Key Performance Indicator) that allocates for solid analysis of

the big data with precise function. It can provide real-time and effective visibility of stock, inventory, material, shipping orders. New ability to integrate with the AI System to get real-time data on production scenarios with predictable statistics and precision. The more complex these tasks, the more automated they can be, and more data can be applied to both dynamic models and improve predictable analysis, the easier making decision will be. Decision making will not only timely, but foreseen to future (Pandey et al. 2022).

### ***4.3 Disadvantages of AI on Managerial Accounting***

“Stephen Hawking, Elon Musk and Bill Gates are probably the most cited distinguished men nowadays with their arguments against the risks inherited in AI technologies, they will make better decisions, faster and free of bias. It seems that “singularity”, the moment when AI will match human intelligence, stands for the moment when the grim ending of the mankind will begin” (Stancheva-Todorova 2019).

#### **Artificial Intelligence Threat on Employment**

“Bookkeeping is the most routine, time consuming and unquestionably susceptible to automation part of the accounting work. The logic behind double entry system enables the specific coding of accounting entries. Complex business transaction is easily disaggregated, described in accounting terms and recorded into the ledgers. The process can be fully automated by using the machine learning technologies. The accuracy of accounting data will be improved as well as the timing of recording” (Stancheva-Todorova 2019).

Artificial Intelligence will could also have advantage in human employees in the following areas:

- Cognitive possibilities
- Increasing rate of productivity
- Automation possibilities and to new increased limits and boundaries
- AI does not get effective by geographical location.

“Because AI is impacting and will further impact the role of accountant, there is a call for accounting educators to change their mindset and develop the required skills and competences related to the smart technologies and their augmented business applications. There is a lot of work ahead to review the accounting curricula and prepare graduates for successful career” (Stancheva-Todorova 2019).

There is a demand for accounting educators to alter their thinking and build the necessary skills and competencies connected to the smart technologies and their enhanced commercial applications since AI is already having an impact on and will continue to have an influence on the function of the accountant. To revise accounting

curriculum and better prepare graduates for successful careers, there is still more work to be done (Stancheva-Todorova 2019).

### **Limitations of Artificial Intelligence Based Algorithms on Decision Making**

In planning mixed human-AI decision-making structures, managers advised to map five scopes to benefit from strengths of human and AI-based algorithmic decision-making and avoid its weaknesses. In terms of human's judgement and interpretability and AI's capability of alternative filtering and predicting with high accuracy: consider "the specificity of the decision search space, the interpretability of the decision-making process and outcomes, the size of the alternative set, decision-making speed, and the replicability of decisions" (Shrestha 2019).

Algorithms based solely on Artificial Intelligence can face many challenges, the manipulation of the use of the input data, or through its design of the algorithm; by altering weights of predictors. These manipulations can be difficult to discover due to algorithms' inherent automation. There are some studies that Artificial Intelligence based decisions increase human biases in available data. These biases and unethical injustice algorithms are embedded in AI only algorithms, they are particularly unfavorable to vulnerable groups in our society. AI-algorithmic decision-making will call for new regulation and procedures by auditing AI algorithms throughout the learning process, as well as collaboration between "the AI community, legal practitioners, policy makers, corporates, and scientists to develop new measures for fair, accountable, and transparent applications of AI in organizations" (Shrestha 2019).

### **Artificial Intelligence is Costly**

"The cost of investing in artificial intelligence would vary but it is dependent on the following (Stancheva-Todorova 2019):

- Technical feasibility
- The cost of development and deploying automation solution
- Labor market dynamics
- Economic benefits
- Regulatory and social acceptance".

It is also regarded that people reskilling will be required to have all the knowledge and skills needed by the new roles. In other words, the accounting profession will change through the need for new skills, the roles and responsibilities will be different, different education and training may be required and task displacement may change to adopt to the capabilities of AI (Stancheva-Todorova 2019).

## 5 Discussion and Conclusion

“While not manifest in the doomsday apocalyptic scenarios” that have received by movies and other media, AI is here, and it is here to stay. Artificial intelligence algorithms oversee our daily lives, in an indirect yet fundamental ways and they are transforming our lives, organizations and societies (Busuioc 2021). The benefits of Artificial Intelligence in giving a competitive advantage is undeniable, it can minimize time and improve efficiency in decision making significantly.

While the original purpose of artificial intelligence was to mimic human brain and execute decision-making like human beings during different situations and circumstances, human intelligence is still needed to make an ethical decision at the end. Certainly, humans were replaced by computers and machines, and still will continue to. Artificial Intelligence systems will most likely take over routinely job currently done by humans, at the same time, more creative new jobs will be needed, industries will evolve faster, accurately and efficiently (Goundar et al. 2020). Increase in the product innovation, managers can optimize the performance of their employees by encouraging a learning culture in the organization, not only that it leads to the development of employees but also improves the performance and the level of innovation (Bag et al. 2020). One of the most important job opportunities AI will provide, is a job needed is development, designing, mapping and implementation of these Artificial intelligence system. Whilst ERP are still failing more than half of the times, the way for full-automated Decision-making Artificial Intelligence systems, is still no determined.

In conclusion, when the implementation of the AI system is successful, management accountants have time for other, less dull routine activities; and their role becomes more elevating as a result (Sangster et al. 2009).

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# Digitalization in Accounting and Financial Reporting Quality: Literature Review



Latifa Jabor and Allam Hamdan

**Abstract** Accounting activities are shown in the financial reports of banks, while the relevant literature has found that creative accounting highly impacts the quality of financial reporting. However, previous studies indicated the limited impacts of creative accounting determinants on the quality of financial reporting, whereas the phenomenon of financial reporting quality is still on the track of generating renewed research interest. A deductive research approach driven by a survey questionnaire was used as the research methodology to attain the objectives. Accordingly, purposive sampling was used to collect responses from 63 employees of Arab Bank—Bahrain. The data were analyzed statistically using the SPSS. The results show significant impacts of new technologies on financial reporting quality. Which includes the results of developing financial reports in the high quality of the data presented in the financial reports, as it reduced the time and effort spent in preparing these reports.

**Keywords** Digitalization · Accounting profession · Reporting · Artificial intelligence · Ethical issues · Disclosure quality · Internal control · Ownership structure · Financial reporting

## 1 Introduction

These days we have developed very quickly until we have reached the digital age in all areas of life, and there are several reasons that accelerated this development, as digitalization has become an important element even to save lives, an example of one of the causes is the pandemic of COVID-19.

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Globally, Significant effects have been caused by the COVID-19 pandemic, business activities, and people. It has impacted positively and negatively, one of the positive effects is digitalization. Digitalization helped companies to eliminate the negative effects regarding the COVID-19 pandemic, which prompted the expansion of the application of technology in the daily lives of people and companies and this exceptional situation is a piece of evidence of the importance of digital information.

Technology development is growing quickly. The corporate landscape, particularly the accounting industry, has undergone tremendous upheaval due to digitalization (Arnaboldi et al. 2017) Long-term effects will be felt by the accounting sector (Hunton 2015). The work and way in which accountants think have been impacted by modern technologies (Al-Htaybat and von Alberti-Alhtaybat 2017; Stanciu and Gheorghe 2017). It will be disastrous for the accounting profession if it cannot keep up with digitalization. Accountants have difficult issues as a result of digital technology. In order to determine some significant effects of digitalization on the accountancy profession, this research will look at how accountants see the digital world. For the advantage of the accounting profession, a strategy for utilizing digitalization is needed.

According to Tekbas, traditional methods of accounting such as paper, declaration, registration, and other similar methods will be phased out in favor of internet-based methods of accounting such as cloud and blockchain (IFAC 2018). A significant amount of the transactions will be handled by the combination of automated technology and artificial intelligence. Therefore, the accounting activities will require a staff that is both more technologically competent and knowledgeable in order to accept these changes and advancements and to be able to capitalize on them in order to either rebuild or improve the structure of the organizations that are currently in existence.

## 2 Literature Review

Digital transformation is the process by which businesses adopt business models based on digital technologies and developments accompanying the Fourth Industrial Revolution (Vial 2019). This is done by using artificial intelligence, big data analytics, cloud computing, and the Internet of things to support the creation and innovation of goods and services (Aker et al. 2020), as well as to provide new marketing capabilities and job opportunities which increase the value of the company (Phornlaphatrachakorn and Na Kalasindhu 2021).

Creating a digital strategy and improving the organization's present status are the first steps in the digital transformation process (Saarikko et al. 2020). This can only be accomplished by evaluating the organization's present digital capabilities and choosing the most suitable structure for organization for digital marketing operations. The requirements for investment plans are then determined, along with the obstacles to digital integration that must be overcome in order to work out a thorough and detailed plan for all situations and to push the transformation into the desired situation

(Baethge-Kinsky 2020). Finally, the requirement for change management for digital transformation is established in order to achieve the strategic goals (Correani et al. 2020).

## ***2.1 Digitalization in Accounting***

The accounting sector is growing and becoming better. The range of what accountants do is growing as a result of technological development and changing customer expectations. Since the accounting industry currently uses a number of automated technologies that were not available 10 years ago, the scope of an accountant's employment ought to expand and become more adaptive to technology improvements and digitalization. The implementation of digitalization in the accounting sector has caused a significant change in the nature of accountants' jobs, making them more and more dependent on the advancement of modern equipment and technology. People's thinking and accounting procedures have altered as a result of digitalization (Fettry et al. 2019). The number of positions available for accountants with programming and analytical abilities is expected to drop along with the usage of technology in the accounting sector. Therefore, it is important for organizations to provide enough retraining to existing workers (Zhang et al. 2020). Appropriate training increases workers' confidence while also helping them better understand their obligations and the knowledge and skills needed to carry out their jobs.

## ***2.2 Opportunities and Risks in Digitalization***

Because of globalization, greater competition, and technological advancements, careers are always changing. Frey et al. (1999) found that 702 job titles are vulnerable to automation, with accounting having the highest likelihood of doing so soon. In the next years, artificial intelligence will automate and handle a variety of accounting operations (Tekbas and Nonwoven 2018). Digitalization may be seen by the accounting sector as both an opportunity and a threat. There is potential for the development of new categories of accounting professions when accountants learn new skills, especially those in engineering (Githaiga, 2023). Accountants put themselves in jeopardy, they are the financial experts at the heart of firms, therefore if they don't understand how technology and digital transformation are changing the workplace, they will be at a serious disadvantage (ACCA 2020).

## **2.3 *Digital Transformation Elements that Impact Accounting and Reporting***

If businesses planned to replace their old analog accounting and management information systems with new digital ones, they must update their systems first, they had to keep up with these quick developments (Andreassen 2020). As a consequence of the massive digital revolution in communications and Internet networks, the business environment underwent a large and quick transition. We are not referring to information systems that are dependent on computers, software, or other conventional accounting tools. These systems have been around for a very long time, even after the rise of digital entities; they have altered the way that business is conducted by establishing standards that enable each organization to choose technologies that are suited to the work that they do. Some examples of such technologies include artificial intelligence, the Internet of Things, blockchain technologies, big data, and cloud computing, etc. According to Oncioiu et al. (2019), these technologies will increase operational efficiency while decreasing costs, enabling data access, securing data, and enhancing transparency. Additionally, they'll save time and effort.

### **1. Enterprises Resource Planning (ERP)**

Enterprise resource planning (ERP) software is used by businesses to manage fundamental business functions including accounting, purchasing, project management, risk management and compliance, and supply chain management. A complete ERP package includes enterprise performance management software, which helps with planning, budgeting, forecasting, and reporting an organization's financial achievements. ERP systems link all of the many business functions and enable data exchange. ERP systems avoid data duplication and provide data integrity with a single source of truth by compiling an organization's common transactional data from several sources. nERP systems are crucial for managing thousands of enterprises today, regardless of size or industry. ERP is as essential to these businesses as the power that powers the lights.

### **2. Cloud Computing**

Cloud computing is a type of digital transformation that enhances the way accounting work is implemented, as opposed to being just a technical fix or a server that has been saved and has another influence (Demiröz and Heupel 2017). The most significant benefits of cloud computing include cost reduction due to labor and time savings, processing and storage speed, scalability, and data protection.

Private clouds, public clouds, hybrid clouds, and multi-cloud deployment approaches are the four primary categories. Infrastructure-as-a-Service (IaaS), platforms-as-a-Service (PaaS), and software-as-a-service are the three primary categories of cloud services models (SaaS).

A unique choice is developing a cloud type or cloud service. Even though they are of the same sort, no two clouds are alike, and no two cloud services are employed to address the same issue. But by recognizing the parallels, you can better understand

how the limitations of each type of cloud computing and cloud service might affect your company.

### 3. **Big Data**

It has an enormous volume of complex data that can't be stored, processed, or circulated using conventional computer programs and techniques (Yao and Gao 2020). Big data can be used in accounting because, by evaluating data from social media and financial markets, it enables businesses to classify their target market and estimate the results of their marketing and sales activities.

### 4. **Block Chain**

A blockchain is a shared distributed database or ledger between computer network nodes. A blockchain serves as an electronic database for storing data in digital form. The most well-known use of blockchain technology is for keeping a secure and transparent record of transactions in cryptocurrency systems such as Bitcoin. The innovation of a blockchain is that it fosters trust without the necessity for a trusted third party by ensuring the fidelity and security of a record of data.

One key difference between a typical database and a blockchain is how the data is structured. In a blockchain, data is gathered in groups called blocks that each include various sets of information. When a block is full, it is sealed and linked to the block before it to form the data chain known as the blockchain. Blocks have predefined storage capacities. When the chain is complete, a new block is created from each piece of information that follows that just-added block and added to the chain.

A blockchain, as its name suggests, separates its data into pieces (blocks) that are joined together, as opposed to a database, which typically organizes its data into tables. When used decentralized, this data format by its own nature offers a timeline that cannot be changed of data. A completed block is wrapped indefinitely and added to the timeline. Every new block that gets included to the chain receives its own unique timestamp on the block.

### 5. **Artificial Intelligence**

The volume of technology, particularly computer systems, the practice of using technology to mimic human intelligence is referred to as artificial intelligence. Several examples of specialized applications of artificial intelligence include things like expert systems, machine learning, natural language processing, voice recognition, and machine vision (Sharida et al., 2020; 2021).

## 2.4 *Recent Studies*

According to Rom and Rohde's (2007) argument, the inner functions of accounting will change as a result of digitalization rather than its component parts. For instance, robotic process automation (RPA) will modify the jobs that must be done by human actors but won't completely eliminate them. In other words, accountants will still

have a place in businesses, but it seems like digitization will seriously undermine that job. Therefore, we suggest that the structure developed by Rom and Rohde (2007) is suitable for studying digitalization. In addition to bringing about significant accounting changes, digitalization is likely to test the limits of who will be able to do accounting and how it will be done. Furthermore, the methodology developed by Rom and Rohde (2007) seems appropriate for explaining how dominating technologies have influenced accounting during the last twenty years. As a result, this research provides a solid foundation for evaluating critically how accounting is being affected by digitalization. As a result, we are able to provide a consistent picture of how current innovations have affected accounting.

It is important to separate among regular careers that are straightforward to automate and nonroutine tasks that are difficult for computers or software to do, according to study by Gulin et al. (2019a, b). According to Oschinski and Wyonch (2017), jobs and activities that need sophisticated creativity, critical thinking, training, and human contact won't be automated anytime soon. However, routine occupations that need little to no human interaction, little expertise, and little training may be simply mechanized (Kim et al. 2017). As mentioned by Arntz et al. (2017), many accounting operations are already automated in many firms, particularly large businesses. These processes—invoicing, payroll, and bookkeeping—are automated since they rely on recurring, reliable routines. Rendering to Moudud-UI-Huq (2014), digitalization and automation support the following processes: audit planning, analytical review procedures, materiality evaluation, internal control appraisal, risk assessment, and going-concern judgments. Numerous surveys have looked at how many organizations they do so currently and what they want to do in the next years using digital solutions. These investigations are typically conceived of and executed by the top audit firms. According to a study on the topic by (KPMG 2017), the major digital solutions that have been or will be used in German businesses soon include connections to internal or external systems, data quality management, process automation, system uniformity, integrated consolidation system, real-time reporting, transparency creation, big data analysis, visualization tools, and cloud computing. PWC performed a research among 76 large and medium-sized enterprises with operations in Germany about the current situation and future of digital growth. The two uses of artificial intelligence that firms surveyed found most intriguing are automated money transfers (29% of respondents) and invoices are automatically read and other papers for accounting purposes (39% of respondents). With 10% of responses each, document consistency checks and monitoring data share third place on the list of priorities (PWC 2018). PWC included a question in its study on how firms use advanced technologies. Relating to the replies, 22% of the questioned businesses will start using documents are recognized, 20% will start exchanging information with clients and vendors directly shortly, 19% will pay using transfers, and 14% will discover an alternative to Excel worksheets. KPMG conducted a research in 2017 to choose which one of the following statements on the digitalization of accounting would apply to their business in the following year. The outcomes agree with those from the PWC poll. The bulk of the firms taking part that paperless accounting will be used in the study, standard system design, and links to external systems. Integrated consolidation systems will also be used by the majority

of them, big data analysis, and data quality management (KPMG 2017). According to the findings of these research, companies are preparing for the adoption of digitalization and the changes that would ensue in their respective sectors. Implementing a new software support solution requires time and money, especially if internal solution development is involved. This is a huge potential for numerous companies who provide services and develop cutting-edge accounting system solutions. Due to the fact that smaller firms cannot afford it to implement pricey solutions, large enterprises are often those who are either in the process of adopting new solutions or who have already done so.

According to Möller et al. (2020), every choice should be built on relevant and reliable information from a trustworthy, safe database. However, the capacity of controllers to develop and manage such systems is coming under increasing pressure from data scientists and other departments like IT “a single source of truth.” (Patra and Roy, 2023) found that only 50% of chief data officers in big German corporation’s report to the CFO or, in one instance, the head of controlling in the WHU digitalization pulse check. To put it distinct way, in half of the organizations, the final decision-maker for data quality does not answer to the person who has historically been regarded as the exclusive authority on financial data and its interpretation inside the organization. A more decentralized, self-service-based reporting and decision-making environment may result from new information processes, which might alter the nature of control and the function of controllers. Although it needs solid governance, the usage of chatbots and other robotic process automation tools may increase efficiency.

### 3 Conclusion

The Digitalization of accounting is an ongoing process with a great impact on the accounting information systems of organizations, on accounting as an economic sector, and on the accounting profession itself. This study aimed to analyze the impact of digital transformation in the accounting sector, with special attention paid to accounting professionals. An exploratory approach and multiple case studies were adopted to gather broader empirical evidence. The study shows that, although digital transformation is at the beginning stages in accounting services, in terms of emerging technologies, OCR, AI, and the cloud are at the top of the list of the adopted IT. The resistance to change, the organizational culture, and the price seem to be the main barriers to the digitalization in accounting. In terms of advantages, the automation of routine tasks and the reduction in errors were unanimously recognized. These advantages release time for accountants to perform higher value-added services and eliminate paper. Digital skills of accounting professionals operating in the digital era are expected to be combined with the already required knowledge, competencies, and skills, in a logic of adding and substituting. This paper is exploratory; thus, its main contribution is to clarify the discussion about the impact of digital transformation in the accounting sector, and it does not prove any causal effect. Nonetheless, the

results can be of great interest to researchers, policymakers, teachers, professional bodies, and accounting professionals. However, the study has important limitations.

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# The Moderation Effect of Digital Leadership on the Relationship Between Artificial Intelligence and Accounting Profession: A Review



Nabeela Khawaja and Allam Hamdan

**Abstract** Artificial Intelligence (AI) is the technological advancement boom that has been introduced in every aspect of businesses worldwide and it is becoming an important part of conducting all types of professions. AI had an impact on business units within organizations including accounting profession. There is a relationship between AI and the accounting profession as application of AI in performing the repetitive accounting tasks has a positive impact on the accounting profession. It contributed to saving time for the time-consuming tasks that required to be performed and done on a day-to-day basis. However, leadership had an effect and played a moderate role in enhancing the relationship between AI and accounting profession, especially the digital leadership as it combines providing the supportive environment and the technology in the workplace. This effect led to a positive impact towards employees as it led to improving employees' behavior, increasing their productivity, upgrading their skills, accepting new challenges, and adding value to their knowledge and work experience. AI is the next evolution in performing accounting tasks and it is an essential adoption to keep up with the dynamic technological advancement that will also help the organizations to gain competitive advantage. And the on-going support and guidance of digital leadership will further enhance gaining advantages to achieve the organizational goals and objectives.

**Keywords** Artificial intelligence · Accounting profession · Digital leadership

## 1 Introduction

Digital technology has changed organizations in an irreversible way. Digitalization is shaping organizations, work environment and processes, creating new challenges that leaders must face to help them in shaping the future of those organizations. Leaders play critical roles in developing a culture that adapts technology; they must

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cultivate relationships with a wide range of stakeholders and focus on facilitating collaborative processes in difficult contexts. Leadership is critical in managing and leading human resources, facilities, budgets, and other resources efficiently and effectively. Furthermore, effective leadership enables employees, who are regarded as the organization's best assets and talents, to become more productive and satisfied with their jobs, particularly with the use of technology. It is important to highlight how technology influences leadership. Technology enables team leaders to see in real-time how many tasks their team members have completed. No matter where they are, it enables them to convey any changes to the work they are performing. The most important component of success for managers who want to become leaders is embracing technology (Dalluay and Jalagat 2016).

Leadership scholars have spent the last few decades attempting to track the effects of digitalization processes. Part of the academic debate has centered on leaders' ability to integrate digital transformation into their organizations while also inspiring employees to embrace change, which is frequently perceived as a threat to the current status quo. To help clarify this debate, the concept of e-leadership has been introduced to describe a new type of leader who is constantly interacting with technology. Accordingly, e-leadership refers to a "social influence process mediated by Advanced Information Technology (AIT) to produce a change in attitudes, feelings, thinking, behavior, and/or performance with individuals, groups, and/or organizations" (Mathew et al. 2023). And according to Alshurafat et al. (2023), E-Leadership refers to those leaders who conduct many of the processes of leadership largely through electronic channels (Tore and Sarti 2020).

In the current decade, the organizations are changing due to the technological improvement which is leading to digital transformation. Digital transformation is adapting a number of technologies that are being used by different organizations, such as, Internet, social media, Machine Learning (ML) and Big Data and other platforms. One of the raising digital technology that is rapidly changing the entire perception of this world is Artificial Intelligence (AI).

It is important to understand first what is meant by Artificial Intelligence. In basic and simple words, AI is a branch of computer science that involves creating system that can duplicate the intelligence of a human and can have the ability to solve problems as the normal computers requires human interference to solve problems and to improve the processes.

AI is a pair of words that excite the expert in AI community. The idea of having a man-made machine that is capable of thinking, learning, and making decisions on its own is so fascinating for them. The imagination with this regard is being wild just like the real science behind AI technology (Hasan 2022).

In Addition, AI is defined as a device's ability to perform tasks similar to the way a human performs. These activities include the capacity for knowledge and the ability to acquire it. It also includes the ability to judge, comprehend relationships, and generate original ideas. The goal of artificial intelligence is to create an intelligent machine that can react in ways like humans. It is thus regarded as a simulation of the human brain (Victoria 2018).

Further, in the description, AI was divided into four categories: intelligence, research, business, and programming. From an intelligent standpoint, AI means programming machines to act and perform in the same way that humans do. From a scientific and business standpoint, AI is a strong tool and approach for issue solving that is deemed better and faster than human answers.

Finally, AI involves the study of symbolic programming, which is based on a range of methodologies, because AI researchers feel that the replication of human thought is a crucial part of AI today and in the future (Victoria 2018).

For the purpose of this research, the focus is to utilize AI in a specific area of workplace, which is the accounting profession. The increasing adoption of AI in the accounting profession has the potential to significantly transform the way that routine accounting tasks are performed. With a focus on creating a system that can work and react like humans and perform tasks such as, registering documents, invoices validation, reconciliation, problem solving, planning, learning, and speech recognition, this type of system would be capable of overcoming the problems and difficulties associated with the traditional accounting information system. Automating numerous tasks and increasing efficiency, AI has a significant impact on the accounting industry. AI, for example, can generate invoices, analyze financial data, generate reports, and detect patterns and variances that indicate accounting fraud. These services can help businesses save money while also improving the accuracy and timeliness of their financial reports (Suleiman 2020).

However, the success of this integration also depends on how effectively leaders moderate the relationship between the AI and the accounting profession that can lead to the automation of the routine accounting work and consequently to positive morale and career improvement of the accountants at organizations. The leadership moderation reflects in terms of training and education, change management, ethical consideration and strategic planning that will be elaborated in detail in the literature review of this research.

## 2 Literature Review

Artificial Intelligence is becoming a crucial part of our day-to-day life nowadays as it is existed almost in all the aspects of our lives, and it is becoming an indispensable factor since it represents the modern technological era and transmitting to automation and digitalization. Despite the fact that AI is not completely a new concept, it became the major talk in recent decades and gained much attention as everything started being dependent on it and people started to invest their time, money and efforts on it and even started to compete especially in the business aspects in order to achieve the desired results, that is because it is expected globally that the future of all the business organizations will depend on how perfectly those businesses utilize the AI in most of the professions and leadership aspects. It is expected that AI will play an important role in increasing the profitability of the businesses, reducing costs, maximizing effectiveness of organizations, increasing the employee's productivity

and the organizations will gain competitive advantage. This research paper will focus on the relationship between the AI and the accounting professions and whether the technological leadership effect will enhance this relationship or not. Therefore, as everything in this world has its own benefits, there might be some challenges on the other hand, so as AI. It carries with it a lot of benefits as well as challenges. But before that, it is vital to broach what AI is and how was its evolution (Akgun and Greenhow 2022).

## ***2.1 Definition of Artificial Intelligence***

It is observed that the phrase “Artificial Intelligence” consists of two words. The first word is “Artificial”, which means something that is made or created by a human being which idea’s is adopted from something exists in nature that has been created by God. And the second word is “Intelligence” which means the “ability to apply knowledge and skills”. It is well-known that “intelligence” is a characteristic that only a human being is distinguished by from all other creatures in this universe. Further, if someone investigates the meaning of “intelligence”, it will be found that it is “the ability to apply knowledge to manipulate or fabricate one’s environment”. Here where the idea of AI can be derived by combining the two words and reach to an understandable definition. AI can be referred to creating a system by a human being that is programmed in a way that acts or thinks like a human (Turki et al. 2020). In another word, AI is the simulation of human intelligence that is processed by machines or computer systems. Furthermore, AI can be referred to a term called cognitive technology which is a combination of algorithms, robotic process automation, machine learning, natural language generating and processing and mimicking human intelligence that includes feeding information and providing a computer machine human like capabilities such as planning, problem solving, interpreting, and learning. Bottom line is that AI is a technology that builds systems to act and think like humans with the ability of achieving goals (Enholm and Papagiannidis 2022).

## ***2.2 Evolution of AI***

Artificial Intelligence might sound like a new concept that appeared recently, but in fact it goes back many years since computers were invented. Prior to 1949, computers lacked a critical requirement for intelligence, they couldn’t store commands, they could only execute them. In other words, computers might be instructed what to do but couldn’t recall doing it. By the 1950s, there was a generation of scientists, mathematicians, and philosophers who had adopted the concept of AI. A young British called Alan Turing was one of the mathematicians who investigated the mathematical possibilities of AI. He proposed that if humans can have access to information and use it to solve issues and to make decisions, why can’t a machine

do all this? This was the logic of his studies. A machine that can perform tasks intelligently like a human. In 1956, two computer scientists, Marvin Minsky and John McCarthy hosted a workshop for a research project on AI which was eight weeks long. This workshop gathered people who were considered the fathers of AI. The objective of this workshop was to establish a new research area focused on developing machines that simulate human intelligence (Spector 2006) AI succeeded from 1957 until 1974. Computers grew quicker, cheaper, and more accessible as they could hold more data. Machine learning algorithms developed, and people became more adept at determining which approach to employ in a given situation. Early demos like Newell and Simon's General Problem Solver and Joseph Weizenbaum's ELIZA showed promise in the problem solving and spoken language interpretation domains, respectively. "From three to eight years," Marvin Minsky predicted in Life Magazine in 1970, "we will have a machine with the general intelligence of an average human being." While the basic proof of principle was established, there was still a long way to go before reaching the ultimate goals of natural language processing, abstract thinking, and self-recognition (Haenlein and Kaplan 2019). AI was sparked in the 1980s by two factors, an extension of the algorithmic toolset and an increase in funding. John Hopfield and David Rumelhart popularized "deep learning" techniques, which allowed computers to learn through trial and error. In contrast, Edward Feigenbaum pioneered expert systems that mimicked the decision-making process of a human expert. During the 1990s and 2000s, many of the primary goals of AI were achieved. We currently live in the era of "big data," which allows us to collect massive amounts of data that would be hard for a single person to grasp. AI has already demonstrated potential in a wide range of areas, including technology, banking, marketing, and entertainment. Even if methods do not considerably better, enormous data sets and massive computation simply allow AI to learn by brute force (Collins and Dennehy 2021).

### ***2.3 The Impact of AI on Business***

In the current time, AI is being used in the businesses as there is a relationship between the AI and business. AI has an essential role in the positive performance of businesses. There is an important technique of AI that is being used in business called Machine Learning (ML). This technique involves extracting the data or data mining by using a computer program which in turn processes the data and results in precise information. Therefore, AI and ML are applied in various business sectors such as, E-commerce, Accounting, and business management. E-commerce consists of chat bots and image search. Such types of means help in handling customer data and tracking customer's behavior and interests. As a result, this will aid in serving the customers in a better, easier, and faster way. AI helps in analyzing the information extracted from the past purchases of the customers which has a positive impact in increasing sales and using the resources wisely and it will lead to maximizing the profits. Besides, Customer Relationship Management (CRM) can utilize AI through the Marketing department

to segment the audiences and create the targeted campaigns, especially in highly competitive industries. In addition, AI helps in inventory management by analyzing the previous sales data that contributes to predicting the future sales. When the future sales are estimated, inventory can be managed by keeping enough stocks that will cover the customer's purchases. Furthermore, ML provides security solutions to aid in preventing the confidentiality of financial information and detecting frauds. This refers to cyber security. The importance of AI cannot be neglected in Human Resources (HR) issues as AI can be used in conducting interviews and selecting the most suitable candidates for the available vacancies. Finally, the AI can optimize the supply chain operations by helping organizations in predicting the material prices and freight and estimating the products' movement through the supply chain which will result in faster deliveries (Pallathadka et al. 2021).

It is worth mentioning that AI has an impact at the organizational level as adopting AI successfully depends on the organization's structure and strategic orientation such as culture. With the technological advancements, the organizations should adapt a system and business model that keeps pace with such developments and innovation to enable the organizations to respond to these developments faster in the long run. Therefore, organizations that excel with such specifications have the ability to adapt and integrate with AI smoothly. It is important for the organizations to be ready for adapting AI through providing the necessary resources such as, financial resources that represent in budgeting and achieving targets, human resources that represent in employees' skills and abilities to learn AI solutions as the innovation needs employees with technical skills as well. Additionally, the organizations should emphasize the leadership aspects and work on applying the technology in leadership styles, because this will help the organizations in achieving its objectives. Also, it should utilize the technology and leadership in developing the employees and supporting them to accept the idea of implementing AI in the workplace and allow them to understand the purpose of it as this will lead to changes in their responsibilities. Therefore, it is important that the employees trust the AI especially that the process of interaction between the employees and AI might be a difficult and a complicated process and may require time to build this trust among them. Organizations must invest in technological leadership to enhance the performance level and upskill the employees and build relationships with AI. To facilitate this process, organizations must form an effective strategy in terms of plans, process, time frame, and contingency plans that aligns with the objectives and goals of the organizations to utilize the AI in a clear and sincere manner (Enholm and Papagiannidis 2022). As a conclusion, AI is important as it gives insights into the operations of organizations both internally and externally as it influences the effectiveness and efficiencies and opens doors to new business opportunities (Lee and Parveen 2020).



## ***2.4 AI and Accounting Profession***

We need to dig deeper through customizing this research paper to discover the relationship between AI and the accounting profession. It is axiomatic that the accounting profession is very important in every aspect of business and no business can survive without this profession. Accounting profession is nothing but practicing accounting knowledge and applying it in a professional manner. This profession includes basically recording the business transactions in monetary terms, interpreting these transactions through accounts analysis, reviewing the financial operations, and analyzing financial statements to ensure they are accurate, budgeting, conducting audits, providing risk analysis and forecasting. The main four types of accounting profession are Corporate Accounting, Public Accounting, Government Accounting and Forensic Accounting. Historically, the accounting profession was heavily dependent on the source documents and excessive usage of papers like invoices, quotations, purchase orders, bank statements and bills and it was being recorded as journal entries in different operating systems. However, there are still massive number of organizations in the current time who are depending on this approach in accounting profession. It is known that the life is developing daily in a rapid manner and the technology is invading every aspect in this life including the accounting profession, therefore this profession is on its way to play an important role in the organizations especially that this profession is growing and improving rapidly in the accounting industry. Moreover, the scope of employment is expanding as a result of technological advancement and shifting consumers' expectations. This is considered as a demand and supply function. From the demand perspective, till date the work of the accountants requires data entry and conduct reconciliations and spending long hours for the sake of this work (Damerji 2019). Whereas from the supply perspective, the technology offers both software and hardware tools to perform cognitive accounting work. Consequently, it is essential for the organizations and employees to adapt with digitalization in the accounting profession because it will depend on technological factor heavily in the future, especially the routine and repetitive tasks in this profession as it will contribute to modifying business models and generate revenues on different levels and will work on value generating opportunities and improvements in the software used. Adopting technology in the accounting profession formed in Robot Process Automation (RPA), big data and Fin-Tech industries that represent AI. So as AI has an impact on different sectors of businesses and professions, it plays an important role in the accounting profession as well. It is note worth, that research problem of this paper is that the repetitive work of accounting leads to employees' demotivation because the routine tasks do not contribute to value addition or career progression which results in reducing the level of performance and productivity and the feel of boredom and time being wasted rather than investing it in improving the skills. These factors lead to negativity that could spread like an endemic disease in the workplace. Following section elaborates the areas of accounting professions that are affected using AI and achieves automation and digitalization:



*Entering Journal Entries:* it is well known that entering journal entries basically is recording the business transactions in organization's books. Journal entries include double entry bookkeeping. This process in many organizations is done by using different software which requires entering the basic elements of business transactions documents manually by the accountants. AI can help in minimizing the manual process by a new technology called "Blockchain". Blockchain is a system that is widely used in financial accounting and auditing. It enables the organizations to directly record their transactions into a joint bookkeeping system resulting in interlocking system of long-term accounting records.

*Preparing Financial Statements:* One of the essential accounting tasks that businesses depend on is aggregating the accounting transactions and information into a standardized set of financials that explains for the users of the statements the financial position and performance of the organizations through its balance sheet, the profit and loss status through its income statement and the cash flow position through its cash flow statement. There is no doubt that many organizations still depend on spread sheets to manually prepare these statements. However, there is a technology called "eXtensive Business Reporting Language" (XBRL) which is considered a revolution in business reporting and generating the required reports directly from the financial data available in systems. It is also a useful tool that can measure the performance and the position of organizations.

*Bank Reconciliation:* Bank reconciliation is one of the important and most frequent tasks in the accounting profession, which involves comparison of the cash balances in an organization's books to the corresponding cash balances shown in its bank statements. The traditional way of bank reconciliation involved printing huge number of ledgers and statements. This task can be automated by using Robot Process Automation (RPA). RPA is a technology that involves managing software robots that emulate human actions. This technology processes the tasks faster and in a more accurate manner and it leads to an increase in employees' productivity (Mosteanu and Faccia 2020).

*Fraud Detection:* in the current era, AI can be used as a tool in controlling and monitoring systems for conducting risk assessments and fraud detections. AI helps in anomaly detection based on algorithms that can analyze transactions and identify if there is any abnormal pattern of behavior or detect language that may indicate fraud. AI technologies lead to improving audit work effectiveness and efficiency (Al-Sayyed et al. 2020; Harraf et al. 2021).

In addition, it is important to identify whether AI contributes to lessening this problem. This can be discovered by analyzing following points:

*AI replaces basic accounting work:* as mentioned earlier that some organizations depend on the manual approach for establishment of books, vouchers filing system and preparing trial balances and financial reports. These tasks are considered repetitive tasks and require a lot of materials and human resources. But if tasks like data collection, bank reconciliation, tax payment, verifying invoices, billing, automatic monthly payment, and intelligent audit can be performed by a robot, we can imagine

how much time can be saved and how much materials costs can be saved as well and how an employee will be able to learn superior level jobs.

*AI automates, validates, and automates the accounting business:* the traditional accounting practice depends on that the employee works on entering information related to business transactions from the beginning of the process till the end of it in the system manually, which can result in errors in the financial reports as there are companies that incur losses due to such errors during the audit which affected their financial position. The application of AI in this case is considered important because, in comparison to humans, robots have a quick response and provide faster feedback. That will help in reducing the probabilities of errors and will lead to efficiency in the accounting work at the condition of correct programing of the software. In addition, one of the advantages of this automation is to reduce fraud.

*AI provides financial information for business decision making:* AI provides competitive advantage to organizations and increases the productivity particularly as transforming the accounting data to business information works as a tool that helps the management in making business decisions. Furthermore, the value of accountants' work is to reprocess data based on data collection and careful arrangement, such as using various financial indicators to measure the organization's current business situation and forecasting the future financial situation, establishing a financial early warning system to identify financial risks, determining asset structure, and making decision deductions and judgments so that the company has a reference (Li and Haohao 2019).

The application of AI in accounting profession were not limited to the practical aspect of it, but it resulted in developing accounting theories that are reflected as follows:

*New management accounting theory:* the assumption under this theory is that in the era of AI, accountants still have a good opportunity and a good space for development. As In the context of AI, accountants' functions have evolved from financial accounting to the exploitation of these information as a support for the business units which enables the accountants to manage rather than merely execute the accounting functions and act as consultants to other departments of the organization. This can be achieved by using robots as a tool for efficient, effective, and integrated business information. Also, this will give an opportunity for the accountants to be more professional in their field and to master comprehensive analytical skills.

*Value creation theory:* according to this theory, the core of an organization's value creation is customer value, and shareholder value is the financial outcome of customer value realization. Accounting work based on value creation provides cash flow, risk, and time information to assist firms in making cash flow, risk, and strategic management decisions. The application of AI clarifies the accounting organization's value creation process. Accounting is no longer a financial assessment, but rather the analysis and processing of financial data to ensure that company value creation objectives are met.

*Control Intelligent Mechanism Theory*: this theory focuses mainly on the aspect of control in the organizations as different businesses have different levels of controls such as cost control, production control and performance control. In the context of AI, the intelligent control mechanism consists of three components: the internal report agent, the target setting agent, and the responsible person incentive agent. Through effective process collaboration and control, these agents can build a system on a large-scale that aid in financial decision making that might be complex and dynamic and reflects intelligence, allowing the robot to reach the aim independently (Li and Haohao 2019).

After identifying the importance of the AI technology in the accounting profession, it is worth mentioning how AI will have an impact on the accounting jobs as of whether the AI will enhance these jobs and encourage people and potential university students to specialize in this major in the future or there is a general fear from lack of vacancies in this specialty in the near future or there is a fear from loss of accounting job for the existing employees because of the interfering of technology and that AI is guaranteeing performing almost all of the accounting tasks (Holmes and Douglass 2022). There are schools of thought regarding this topic. There are professionals who believe that the technology will have a significant impact on the accounting profession specifically on the repetitive tasks within five years and that this change will be rapid and a drastic change and consider it the next game changer in business world. They also believe that because of the technological advancement, the students who have graduated from the accounting major will be no longer needed or recruited as before, because automation will be adapted for the basic repetitive tasks and the machines and computers will be performing this job. Further, the employed accountants will soon lose their jobs by 60% as the current trend of the accounting companies is recruiting people from non-accounting backgrounds or recruiting people from different majors other than accounting that have emphasis on information technology because of their belief, as mentioned earlier; that entry level jobs will be performed by AI like recording cash transactions, journal entries, revenue recognition, accruals and expenses recording and that AI will provide higher quality results. In such instances, the organizations will experience a culture shift due to the technology advancement and may face problems from some of the employees who might object to work under the umbrella of AI and cause anxiety to them as to the students as well who thought of the enrollment in accounting major, they might feel concerned due to the unavailability of accounting jobs.

The other thought that contradicts with the first opinion states that Accountants will always be needed. Their job functions, however, are likely to change. The accountants can improve their own quality beside AI. The claim is that the accountants must change some of the concepts inside their minds and never think that AI will ever replace them. Rather they must grab it as an opportunity to improve their career as some professionals believe that AI will contribute to increase the employment rate of accountants by 10%. Accountants may become more proactive as a result of AI and automation. While machines handle data entry and organization, accountants are free to pursue other business opportunities. They can, for example, ensure that their clients are prepared for major financial transactions like initial public offerings,

mergers and acquisitions, business loans, strategic reviews, or restructuring. Accountants frequently handle these transactions in real time. However, AI will assist them in benchmarking, tracking, and improving their clients' businesses prior to a transaction. One of the ways that can help in reserving the accounting professions is that the educational entities should change the concept of teaching different specializations by emphasizing on technology and also by conducting research and interviews with employees who are dealing with the latest practices in technology and accounting to enable the educational systems to develop curriculum system that facilitates the learning process (Li and Haohao 2019).

As per a survey conducted by (Amy Foshe and Ashely Douglass), there are professionals think that the routine tasks are a time waste factor unlike the critical thinking and that AI will neither solve the problems of the repetitive work and nor reduce the work pressure. There is a concern that AI will not incorporate easily with the accounting standards. In addition, some of the accounting professionals feel hesitant to depend on AI in making business decisions and they are not certain about understanding the AI or how the intelligent machine will perform the tasks. Also, they think that AI will reduce human interactions and will increase the risk of solving complicated problems. Finally, they think that AI poses a threat and danger to the confidentiality of financial information (Holmes and Douglass 2022). Therefore, it is essential for the aspect of leadership to interfere in this issue to play the moderator role to examine the relationship between AI and accounting profession, but before that it is important to understand what leadership is and how leadership can utilize the technology to enable us to conclude whether the leadership would enhance this relationship or would have no effect on it.

## ***2.5 Digital Leadership***

As mentioned earlier in this paper, there are several different perspectives regarding the relationship between AI and accounting profession, therefore there must be factors that will aid in building, understanding and enhancing this relationship to conclude whether this relationship can help in developing and improving the performance in an effective, developed and professional manner and achieving synergy in this relationship and visualize a bright future for the organizations who will adopt AI in the accounting professions. One of the factors is leadership and its acceptance of technology and digitalization. Leadership has an impact on different business units, and it is considered one of the basics that helps the management in decision making process. It is true that the responsibilities of the management of organizations is to run business in an effective way with consideration to instructions, authority and control, planning, organizing, directing resources and budgeting but these responsibilities will be done by using people that represents in an appropriate leadership as the effective leadership helps in achieving balance between people and productivity and achieving tasks with high quality especially that the leadership consists

of task-oriented leadership and people-oriented leadership. Here is where a definition of leadership can be derived. Leadership, as per some researchers; refers to “people who have a visionary mindset who can lead and influence other people to achieve objectives”. Leaders work on creating a supportive environment that helps in achieving the goals. The relationship that binds the leader with the people is built on respect and trust as the combined efforts of the leaders and followers will help in achieving the organizational goals (Dalluay and Jalagat , 2016).

Since the business aspects require the adaptation of technology, leadership should believe in technology as well. And since the organizations need to head towards digitalization in workplace, this applies on leadership as organizations need to change from the conventional or traditional leadership to what is called Digital Leadership that combines the techniques and styles of leadership with technology. It is worth mentioning that the behavior and culture of the organizations form the business mode of these companies and the business model, in the era of digital leadership; must involve innovation that aids in strategies implementation of these organizations. Business model innovation is a part of digital transformation process, and digital leadership ensures the strategic success for organizations’ digitalization (Mihardjo and Sasmoko 2019). Digital leadership refers to people working on adding values to organization by consolidating the leader’s abilities with technology. This means in this case; organizations need leaders with different and unique qualifications that outweigh the traditional behavior and the ordinary skills. So, in order for the organizations to maintain competitiveness, survival, sustainability and effectiveness, it needs leaders who utilize the technology. As much as technology is used by leaders, their skills will be upgraded because it is required from them to be updated in their area especially that in the current time customers prefer to deal with organizations that are updated technology wise. As mentioned earlier, leaders need to enhance their leadership skills besides the educational background and work experience, using technology in leadership aspect will contribute to value addition, innovation ability, achieving strong networks, enhancing participation, cooperation and vision and gain technological skills (Erhan and Huseyin 2021).

These qualifications and characteristics of leaders are required to play the role of moderation to upgrade further the relationship between AI and the different professions of organizations. As per this research paper, we need to evaluate how digital leadership can enhance the relationship between the AI and accounting profession.

## ***2.6 Moderation Effect of Leadership on AI and Accounting Profession***

In recent decades, the digital leadership effect is becoming increasingly important in enhancing the relationship between AI and accounting profession. It is stated that AI has a potential to make changes in the accounting field by automating the repetitive accounting tasks that will help in reducing error and increasing the morale of the

employees, however this process cannot be left without proper guidance and support in the organizations. Therefore, digital leadership should interfere to ensure the integration process and its alignment with the goals and objectives of organizations so it can serve the main purpose. There are several ways to fully leverage the benefits of AI in accounting profession by digital leadership. The following section elaborates this further.

First, one of the important moderation roles of leadership in the relationship between AI and accounting profession is the strategic planning as this point considers important and consists of identifying opportunities in using AI in the accounting tasks as this will lead to accuracy in performing the work and in turn to efficiency. Also, it consists of setting objectives by leadership of implementing the AI in the accounting tasks so it can contribute to limit the errors and provide deeper insights for the accounting information. These objectives should be in synergy with the overall objectives of the organizations. In addition, strategic planning consists of allocating the organization's resources effectively such as employees, training, and technology. Finally, it should include developing a road map which contains the plan and time frame required for implementing AI and controlling risks and challenges.

Second, digital leadership moderates the implementation of AI in accounting profession by providing training and educational programs on using the AI platforms and tools effectively to serve the purpose of reducing the repetitive work and focus on more superior level jobs in this field by the accountants. This area includes identifying the key areas of accounting tasks that need AI implementation such as data entry, financial planning, and fraud detection. In this case, the Leader should work with accountants to access their current process and identify the tasks that need AI implementation. Also, digital leadership should create a comprehensive training program for the accountants both theoretically and practically, explain the required concepts and highlight the advantages and limitations they might observe. It is important that the accountants obtain practical training with leaders to gain experience with AI tools and to build a trust relationship between the accountants and the machine learning. Digital leadership should work on continuing the tests of AI tools to ensure that they are being used correctly by the users and to find the best solution in case any issue arises (Hao and Lv 2022).

Third, there is an ethical consideration as well for the moderation effect of digital leadership in the relationship between AI and accounting profession. Leadership works on establishing a code of ethics as this point considered as a first step that represents the commitment of the organization to use the AI in the workplace and it consists of principles like accountability, fairness, and transparency. In addition, leaders should work on the prevention of confidential information and train the employees on the same. Furthermore, leaders should ensure that the systems and models are designed in a way that it avoids bias towards someone or something while using AI and they should keep reminding the employees with the essential ethics while using AI and to communicate in a transparent way with the leaders as a sense of responsibility.

Finally, to conclude, digital leadership should provide ongoing support and guidance and continue research and development in this area to ensure that the process

of AI implementation in the accounting tasks is successful. And the leaders should encourage to build a culture based on the continuous learning so the employees feel motivated and that he or she is able to add value and upgrade the skills which will affect positively on the productivity of the employee and will have sense of belonging to the team of AI. This will lead to effectiveness and efficiency in the workplace (Wijayati and Rahman 2021).

### 3 Conclusion

Based on the literature review in the previous section, certain points were concluded as follows: Artificial Intelligence is a technological advancement tool that every business should adapt to as it gives a competitive advantage and helps organizations keep pace with the fast technological development and lead to growth and progression. AI is a powerful tool for automation and digitalization of accounting tasks especially for repetitive work as it will lead to save time that is being consumed heavily in the day-to-day work. Since it was noticed that when accountants spent many years in just performing basic accounting work, it causes demotivation of employees and decrease the level of productivity. Therefore, it is essential to completely digitize these types of tasks. In addition, automation of the routine work gives the opportunity to employees to learn and focus on more complex and analytical tasks that can boost their career, experience, and morale. AI, in some cases; might face resistance from accounting professionals. The reason behind this refers to the lack of understanding of how actually the AI would work and how accurately it would perform the tasks without fail. Consequently, a trust issue would arise between AI and the accountants. Another reason is the cost factor. Implanting AI is expensive. Designing, modifying and implementing such programs that depend on AI might cost organizations a fortune which will in turn lead to taking decisions by professionals and management to abstain from this idea. It is also concluded that building trust between the AI and accountants can be achieved by leadership as it provides the support to implement AI with effective strategic planning and proper training programs especially the digital leadership, taking into account the ethical considerations as well. Also, it is observed that the relationship between AI and accounting profession is positive, but proper implementation of AI in this profession needs a very strong and a super effective leadership aspect to further enhance this relationship, because the actual problem of the negativity and demotivation among employees can be minimized or even resolved especially that effective leadership demonstrates a real support to employees and systems at all situations. Finally, the research in this topic needs further study because it diverges as more and more topics and subjects get touched upon.



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# Exploring the Relationship Between E-Payment and Consumer Price Index in E-Commerce: Literature Review



Bader Sayed Rasheed Abdul Aziz Jala and Allam Hamdan

**Abstract** This research paper focuses on the impact of electronic payment methods, specifically credit and debit cards, on point-of-sale transactions and the consumer price index. There is a belief that the widespread use of electronic channels for payments has the potential to replace cash in retail transactions and increase the velocity of money. This is expected to occur by reducing transaction costs and improving the liquidity of financial assets. However, an increase in the velocity of money may lead to inflationary pressures that can have negative effects on the country's economic system. In this study, we aim to investigate the relationship between electronic payment usage and its potential effects on the consumer price index, while economic growth has traditionally been linked to electronic payments, the electronic payment system can continue expanding and meeting the needs of the population in Bahrain. This growth is driven by both inflation and economic growth, indicating the potential for further development and adoption of electronic payment methods in the country.

**Keywords** Electronic payment · Consumer price index

## 1 Introduction

Information and communication technology stand behind accelerate grow operations today, it has become a main key driver of economic growth and development modern business. Leverage of ICT for business changed the overall operating system of payment in the market whether directly or indirectly payment and the commerce path (Jehangir et al. 2011). Buying and selling of goods and services influenced in an enormous usage electronic method today, emerge the E-commerce era change the path of the payment operations, commercial transactions between buyers and sellers, and consumer behavior pattern (Seidel and Blanguart 2020) E-commerce is

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the cutting edge for all trade transactions it helps to reduce the cost for all services such as advertising, payment, customers services and all services can provide into the online operation, do business across internet allow customers to do their shopping or any services in any time and place and that let the customers to interact with market easily and quickly (Mukherjee and Roy 2017) (3). E-payment is one of the major roles between the consumers and sellers it known as electronic payment or digital payment such as credit and debit cards, mobile wallets, internet banking, and other digital payment system that making payments for goods and services electronically without intervene physical money. It helps the privet and public sector to improve their outcomes and benefited from the cash flow across the world (Fatonah et al. 2018).

The Consumer Price Index (CPI) is a significant economic indicator that can offer insights into the price trends of goods and services commonly used by the public. It tracks changes in the CPI, which can indicate inflation or deflation and demonstrate the ability of people to purchase their everyday necessities. Inflation reduces the value of money and its buying power, while deflation has the opposite effect (Wijaya and Mariyah 2019).

## 2 Literature Review

(Teoh et al. 2013) Electronic payment serves as a connection between those seeking to purchase goods and those offering services, today, virtual payment methods utilizing actual currency have become widespread, highlighting the significance of electronic communication in daily transaction. Community e-commerce is an innovative concept that merges virtual communities with e-commerce to foster communication and interaction among customers on e-commerce platforms, consequently leading to increased business transactions. This new approach has revolutionized traditional e-commerce in various ways. Firstly, community e-commerce platforms offer personalized community functions, which is a crucial tactic for attracting customers. Through highly interactive social activities, customers can be motivated to engage more, thereby enhancing the proximity of community e-commerce to customers. Secondly, while traditional e-commerce primarily relies on massive traffic to remain competitive in the market, community e-commerce achieves market segmentation based on virtual communities. This enables precise customer positioning through community marketing, thereby boosting customer conversion rates (Fan et al. 2022). The confidence and reliance on digital payment methods are crucial in attracting numerous users. It is imperative for business to safeguard card information to prevent fraudulent transaction. As the volume of digital data increase, transitioning from traditional trading to electronic commerce requires enhanced security measures. With the advent of new technology, trading between buyers and sellers has become more convenient and flexible for daily transactions, whether it be through mobile or any other device for card payment (Ghaith and Ghaith 2022). Gender differences in online shopping can be attributed to three main factors. Firstly, man and woman have varying

shopping preferences. While man prioritize convenience, woman value emotional and social interaction. Secondly, men and woman tend to prefer different types of products. Man, typically purchase high-tech items like computers and electronic, while woman is more inclined towards clothing and home décor. Finally, woman place greater emphasis on physically evaluating products before making a purchase, compared to man (Awan and Ho 2019) increase in electronic money presents additional challenges for central banks in terms of controlling monetary aggregates and, consequently, prices. The adoption of electronic money reduces the demand for transaction deposits and increases the pressure on central banks to reduce the number of reservable liabilities and lower reserve ratios. These factors can potentially lead to increased volatility in the income velocity of base money. In addition, innovations in payment technology have weakened the effectiveness of the interest rate channel in transmitting monetary policy and have presented challenges for central banks in conducting monetary policy (Reddy and Kumarasamy 2015) a downward trend in the velocity of money following the introduction of banking technology in Finland. This trend was attributed to the definition of money supply and the pessimistic outlook of individuals regarding the future. Money could serve as a disciplinary mechanism for a government focused on maximizing revenue, leading to lower inflation rates in equilibrium, even in the presence of imperfect commitment. However, credit card banks do not create money and therefore cannot impact either the aggregate demand for or the supply of money, resulting in no effect on the velocity of money (Reddy and Kumarasamy 2015).

The introduction of non-cash payment instruments in the financial market is believed to disrupt the stability of money velocity. According to the money demand theory, various factors influence the circulation of money, including institutional forms, technological advancements, individual transaction behaviors, income levels, money demand, price levels, and interest rates. The rapid development of technology, particularly in the banking sector, has led to financial innovations that alter people's transaction behaviors. The issuance of card-based non-cash payment instruments, for example, reduces reliance on cash and enhances the efficiency of transaction settlements, thereby impacting the stability of money velocity and transforming the function of money demand (Putra et al. 2021)

## ***2.1 Consumer Price Index***

The consumer price index (CPI) is a metric used to track the cost of goods and services that are commonly purchased by households or consumers. Its primary purpose is to measure the rate of inflation. The CPI is the outcome of a long-standing effort combining both theoretical and statistical approaches, developed over several decades. It provides a comprehensive estimate of the cost of consumer goods and services sold in the market. This includes the price of batches of goods as well as the costs of individual items that are commonly consumed (Lamah, Yanto, and Setyadharma).

## 2.2 *Brief Explanation of the CPI*

The Consumer Price Index (CPI) is a measure that indicates the shift in the costs of goods and services that consumers pay. This index reflects the expenditure patterns of two population groups: all urban consumers and urban wage earners and clerical workers. The former group represents more than 90% of the overall U.S. population and is based on the spending habits of almost all urban or metropolitan area residents. This group includes professionals, self-employed individuals, the impoverished, the unemployed, retired people, and urban wage earners and clerical workers. However, the CPI does not account for spending habits in rural nonmetropolitan areas, farming households, individuals serving in the Armed Forces, and those residing in institutions such as prisons and mental hospitals.

The CPI provides vital information regarding the changes in prices that consumers pay for essential goods and services. The two groups considered in the CPI represent the majority of the U.S. population, with all urban consumers group having a more significant representation. It encompasses a broad range of individuals, from professionals to the unemployed, providing a comprehensive view of the overall impact of price changes. However, it is essential to acknowledge that certain groups, such as those residing in rural areas, farming families, military personnel, and institutional residents, have different spending habits that are not captured by the CPI.

The CPI has significant implications for consumers, businesses, and policymakers. It informs monetary policy decisions, helps businesses to adjust their pricing strategies, and enables consumers to make informed decisions regarding their spending habits. It is also used to calculate inflation rates, which is a key metric that impacts interest rates, wages, and economic growth. Therefore, it is critical to understand the limitations of the CPI and its implications for specific groups when interpreting the data. Overall, the CPI is an essential measure that provides valuable insights into the changes in prices paid by consumers for goods and services, but it is important to consider its limitations in the context of specific population groups (Statistics Bureau of and Labor 2023).

The Consumer Price Index (CPI) is a measure of the average change in prices of goods and services consumed by households. It is based on the prices of various essential items that people buy for their daily living, including food, clothing, shelter, fuels, transportation, doctors' and dentists' services, drugs, and other goods and services. To collect data for the CPI, prices are collected each month with huge number amount of housing units and retail establishments across the country. These establishments include department stores, supermarkets, hospitals, filling stations, and other types of stores and service establishments (Areiqtat et al. 2021).

All taxes that are directly associated with the purchase and use of items are included in the CPI. This means that the index considers any taxes that are levied on the purchase and use of goods and services. For example, if there is a sales tax on a particular item, the price of that item will be recorded including the sales tax.

In addition to this, prices of fuels and a few other items are obtained every month in all locations. This is because the prices of these items tend to be more volatile and

subject to frequent fluctuations. Thus, it is necessary to gather data on these items more frequently to get an accurate picture of their prices.

Prices of most other commodities and services are collected every month with different geographic areas and every other month in other areas. This means that the ministry, which is responsible for collecting the CPI data, prioritizes the larger geographic areas in terms of frequency of data collection. This is because the larger areas tend to have a higher volume of economic activity and a greater impact on overall inflation rates.

To collect the data for the CPI, the Bureau's trained representatives use a variety of methods. They may visit establishments in person, make telephone calls, or collect data through web-based surveys. This ensures that the data is collected in a consistent and reliable manner and that it accurately reflects the prices that consumers are paying for goods and services.

Overall, the CPI is an important tool for measuring inflation and understanding changes in the cost of living over time. By collecting data on a range of essential items and services, the index provides a comprehensive picture of the prices that consumers are paying for everyday goods and services. This, in turn, helps policymakers make informed decisions about economic policy and helps individuals and family's budget and plan for their expenses (Statistics Bureau of and Labor 2023).

A study in Nigeria that explored the impact of e-payment options on consumer buying behavior in retail outlets located in Ilorin metropolis. The study focused on customers' experiences with buying and paying, and the results indicated that e-payment significantly influences consumer buying experiences in Nigerian retail outlets.

Similarly, examined the effects of e-payment methods, such as mobile banking and POS services, on the financial performance of Small and Medium Enterprises (SMEs) in Zaria metropolis. The study utilized multiple regression analysis to analyze the data, and the findings revealed that these innovative payment methods have a significant impact on the performance of SMEs in Zaria.

In another study, investigated the factors that influence the adoption of POS terminals in Nigeria. They employed the probit model to analyze the data and identified factors such as convenience, ease of use, security, intention to use, availability, and nativity as influential factors affecting the use of POS terminals in Nigeria (Oyelami et al. 2020).

### ***2.3 Types of e-payment***

The ATM card and debit card are both card-based payment instruments with distinct purposes. An ATM card is primarily used for cash withdrawals and fund transfers, requiring immediate fulfillment of the cardholder's obligations. The cardholder's deposits at an authorized bank or non-bank institution are directly reduced to raise funds in accordance with applicable laws and regulations. On the other hand, a debit card serves as a payment instrument for various economic activities, such as

shopping transactions. Similar to an ATM card, the cardholder's obligations should be immediately fulfilled by directly deducting funds from their deposits at the authorized bank or non-bank institution, following the provisions of the applicable laws (Putra et al. 2021).

In the realm of electronic commerce, various forms of transaction such as credit cards, debit cards, and contactless payment rely on electronic payment methods. The use of e-payment generates a vast amount of data that is crucial for analyzing customer behavior, enabling businesses to track each transaction made by the customers. Financial institutions also record this data to evaluate the purchasing power and performance of the customers (Halaweh 2017).

## 2.4 Credit Card

Credit cards enable customers to access the bank's line of credit and make purchases on credit, which can be paid off later. This is commonly referred to as the "buy now, pay later" concept. Financial institutions provide credit cards to customers who can manage payments online (Srivastava 2023). They are a widely used form of e-payment and are often utilized for larger payments. Initially, credit cards were not widely accepted due to security concerns, but over time, customers have gained trust due to additional security features in payment transactions. The widespread use of credit cards is largely due to their applicability factor. However, they are not typically used for small payments due to the associated high fees (Albastaki et al. 2022). Credit cards offer a significant benefit in the form of their convenient usability for online transactions from anywhere in the world, and with no delay (Tukamuhabwa et al. 2021). They also have the added advantage of being easy to acquire without requiring any additional hardware or software for their functionality. The authentication process of the cardholder is uncomplicated, requiring only a credit card number, name, and expiry date. The protection of user data is essential for maintaining their privacy and security (Khan et al. 2017). Nowadays, it is commonplace to use credit cards for transactions on e-commerce websites. The process of using credit cards for online transactions is quite like offline transactions in brick-and-mortar stores, with the only difference being that online transactions do not necessitate a physical credit card or signature. Presently, there are numerous internet payment service providers available that facilitate the processing of credit card payments (Junad 2015).

However, empirical research examining the effects of electronic payment instruments on the economy has produced mixed findings. Studies conducted in this context have argued that technology in the form of electronic-based payments leads to an increase in the volume of monetary transactions and subsequently affects inflation and economic growth. The impact of electronic money, specifically credit cards, was investigated across 51 countries. The findings indicated that a 1% increase in card usage resulted in a 0.039% increase in consumption and a 0.024% increase in GDP. Notably, the impact was slightly higher in developed countries, with a 0.041%

increase in consumption and a 0.025% increase in GDP, while in developing countries, including India, the corresponding figures were 0.031% and 0.01%, respectively (Reddy and Kumarasamy 2015).

## 2.5 Debit Card

Debit cards, also known as pay now cards, provide customers with direct access to their bank accounts and the ability to pay directly from their own funds. They are widely used as an e-payment method and facilitate direct account funding online, at ATMs, and at points of sale, both online and offline. With the rise of cashless payments, debit cards have emerged as one of the primary modes of payment worldwide (Albastaki et al. 2022). Despite their widespread use in many countries, debit cards are not commonly accepted by merchant websites because they often do not meet the needs of international customers [48]. However, the usage of debit cards is more cost-effective for micropayments when compared to credit cards. Additionally, banks require extensive identification from users, which contributes to their enhanced security level, making them a viable option for many users (Khan et al. 2017). A comprehensive understanding of money velocity is crucial for implementing effective and targeted monetary policies. Policy-making institutions, such as central banks, should pay special attention to the consequences of financial innovations and formulate appropriate monetary policies and actions to ensure stability in the financial system of a country. Improvements in calculating the monetary value associated with the progress of non-cash payments are necessary. Previous studies have primarily focused on individual payment instruments using cards, with limited literature comparing the effects of all card-based payment instruments (debit and credit cards) on money velocity or the overall amount of money in circulation (Putra et al. 2021).

## 3 Conclusion

The objective of identifying the perceived constraints of E-commerce and their influence on the adoption of E-commerce applications by companies in Jordan. The study also aimed to determine the extent of E-commerce application adoption in Jordanian companies, assess the impact of perceived obstacles on the level of adoption, and identify the most significant constraints of E-commerce applications according to Jordanian companies (Altarifi et al. 2015)

This study utilizes data from the China Household Finance Survey spanning from 2011 to 2017 to examine the relationship between electronic payment and household consumption. The findings indicate that the adoption of electronic payment has a significant positive impact on clothing, dining out, and tourism expenditures, while it does not affect necessary expenses such as medical care, transportation,



education, and utilities. The study also explores the economic mechanism of transaction costs and finds that during unfavorable weather conditions, electronic payment reduces transaction costs more effectively, leading to a greater increase in consumption. Furthermore, heterogeneity tests reveal that electronic payment has a more pronounced effect on consumption in urban areas, well-educated households, and younger households.

This study also puts forward policy recommendations based on its findings. Firstly, empirical evidence shows that the use of electronic payment can stimulate consumption by reducing transaction costs. This is especially relevant in the context of the COVID-19 pandemic, as frequent epidemic isolation measures increase the transaction costs associated with going out. Electronic payment allows consumers to conveniently place online orders from home, mitigating the risks and inconveniences posed by transaction costs. This insight holds value for other developing countries as well.

Secondly, the study identifies a less optimistic acceptance of electronic payment in rural areas. This highlights the need for the government to promote internet accessibility in rural regions. By facilitating the use of electronic payment in remote areas, the government can further alleviate transaction costs associated with long-distance travel for consumption. This initiative would contribute to increasing consumption levels and reducing poverty in rural communities (Li et al. 2022).

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# Data Mining in Accounting and Banking: Applications, Opportunities and Challenges



Abdulla Mohamed Hussain, Essa Khalid Al-Kooheji, and Rami Abu Wadi 

**Abstract** As the technology leads the whole world, companies must adapt to the newest technology in order to get a better performance and results. Plenty of companies were enforced to exit the market due to failing in applying latest technology because of the difficulties they faced and lacks of knowledge. However, the continuity of applying technology results in massive databases with a lot of information. To get benefit from those big data, technology introduced a method called data mining which considered to a field under computer science major. Data mining (DM) can be defined as extraction and analysis of huge data to get a beneficial information that can be used in decision making and prediction. In addition, data mining has several techniques such as; Association, classification, clustering, decision tree and prediction. DM is applied in very important fields such health, customer relation, accounting, and banking. This paper illustrates the application, opportunities, and challenges of applying data mining in accounting and banking.

**Keywords** Credit risk · Big data · Accounting revenue error · Artificial intelligence · Fraudulent detection · Data mining

## 1 Introduction

The modern corporate environment is particularly dynamic as a result of the booming IT sector, which is propelled by competition and performance. Big Data, data analytics, mobile technologies, and cloud computing platforms are all examples of

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cutting-edge innovations that aim to facilitate a wide range of business requirements by providing more adaptability, scalability, portability, and precision (Rîndaşu 2017). Accounting's digital transformation is not a recent phenomenon; the first accounting information systems appeared in the 1990s, followed by enterprise resource planning (ERP) systems, cloud computing platforms, and Big Data (Rîndaşu 2017).

A company's ability to leverage big data in order to expand its brand is now a critical competitive advantage. Today, businesses use big data analytics methods to achieve critical objectives, most notably in the areas of expansion and customer satisfaction (Osman 2019). By allowing us to analyze semi- or fully-unstructured data from the whole economic environment, Big Data has the potential to alter our understanding of certain economic tendencies (Rîndaşu 2017). Big data is distinguished by its enormous size, rapidity, and variety. Simply said, more information means a higher volume. Terabytes and petabytes are thrown about as (emotional) reference points when talking about massive data volumes. Data production and (possible) processing speed are what we mean when we talk about velocity. Big data proponents seek continuous tracking, which has implications for organizational decisions. Diversity stands for the assortment of information needs. Administrative data, social media information, photos, and videos are all examples of the kinds of unstructured data that can be part of a big data set (Arnaboldi et al. 2017). Business managers in the era of big data should be able to collect information more rapidly, manage and make choices based on information, and use big data technologies to increase processing efficiency (Wang and Guo 2022).

The accounting industry makes only little use of Big Data and data analytics; therefore, the outcome cannot be judged as either positive or negative. This conclusion may have been reached because accountants did not learn enough in school or throughout their apprenticeships (Rîndaşu 2017). However, it is also important to recognize that the ability to understand and analyze large data is fundamental to a company's success. This highlights the importance of data mining techniques, which allow the rapid analysis of massive data sets for the benefit of enterprises. Most data mining techniques are worthless (Osman 2019), despite the fact that some may be applied to many contexts and offer insight into potential business challenges.

Data analysis with no predetermined outcome is known as "data mining," "data fishing," or "data dredging" (Osman 2019), a term that has been in use since the 1990s. Data mining is the action of searching for, and ultimately recognizing, patterns in large amounts of raw data. A common way to describe it is as "the act of gathering or mining information from massive volumes of data in order to enhance assessments in a certain area" (Amani and Fadlalla 2017).

Data mining techniques are the process of discovering patterns and trends in data in order to extract useful information from a large data set for the purpose of evaluation or decision-making (Osman 2019). One of the most popular techniques for mining data, association finds patterns according to the relationship between variables inside a particular transaction. Association rules are if-then statements used in several database types to illustrate potential correlations between large numbers of data items or variables. Classification is a technique for organizing data into meaningful categories for the purposes of analysis and prediction (Osman 2019). Cluster analysis

was one of the earliest approaches to data mining. Clustering is a method that uses a comparison of values for one or more characteristics to find groups of data that have commonalities for the purpose of identifying and understanding key trends and outliers. Clustering, which divides information into subgroups in order to find a collection of similar outcomes, is also known as segmentation (Osman 2019). To some extent, the decision tree's tree structure is reminiscent of a flowchart. The root node is the tallest, whereas leaf nodes demonstrate classification and dispersal. Each non-leaf node in the tree represents a feature that was tested, and the results for that feature are shown in the child nodes. While neural networks are good at predicting future events, decision trees are better at managing production rules (Salehi et al. 2017). Prediction covers a wide variety of topics, from predicting component failures and understanding fraud to estimating future profits for a business. Data mining techniques such as trend analysis, classification, pattern matching, and relational analysis all play a role in prediction. Prediction based on the examination of previous occurrences or incidents. A neural network is a group of interconnected neurons, which might have a simple topology or several deeper levels. The architecture of a network is the specific layout of its neurons and the connections between them.

Data mining offers several advantages to firms, such as the ability to foresee patterns in company growth, aid in managerial decision-making, and boost competitiveness. To help with proactive problem-solving, it may show management the logical and causal linkages between a company's numbers. The quality of evidence provided to auditors, audit efficiency, and auditor judgment might all benefit from data mining. Data mining has the potential to transform the effectiveness of an organization's internal management control systems through the introduction of automated, ongoing audits. Data mining is useful for organizations because it can be used to uncover statistical correlations between performance metrics, evaluate the possibility of an event occurring, and control the quality and accuracy of data requests. Data mining has the potential to help businesses in a variety of ways, including the rapid discovery of patterns in data that would have taken years using traditional methods, the detection of dissatisfied employees based on email trends, and the provision of real-time market surveillance and risk assessment of market participants to regulatory authorities (Amani and Fadlalla 2017).

This article provides a survey of the most prominent data mining uses in finance and accounting.

## 2 Literature Review

With a growing company comes a surge of data as the number of production and operational records increases at an exponential rate. Data information has become an increasingly important factor impacting the development capabilities of a company (Cheng 2022), and thorough data retrieval, analysis, and application may give a strong basis for the formulation of scientific judgments. Accountants need to update their knowledge and abilities to work with emerging technologies including cloud

computing, Big Data, data analytics, and mobile devices. Experts emphasize that schools should offer students with enough help to develop at least theoretical IT competence (Rîndașu 2017) since the classroom is the bridge between aspiring accountants and the profession.

When it comes to high-level business analytics and help with making decisions, data mining is a crucial paradigm. The field of accounting acknowledges its significance. Both the AICPA and the IIA list data mining as a top ten emerging technology to watch. According to CGMA, half of all CEOs rank big data and data mining in their top 10 priorities for the information age (Amani and Fadlalla 2017).

From 1995 to 2001 and from 2004 to 2014, the usage of data mining in accounting shows clear upward trends (Amani and Fadlalla 2017), with the highest number of applications occurring in 2013. Evidence suggests that accounting academics and practitioners have gradually warmed up to the idea of using data mining to the field of accounting. The exponential growth in such applications after 2010 is especially noteworthy. It's possible that accounting firms may need more people with modeling knowledge as a result of the global financial crisis of 2008 and the subsequent failure of many corporations. Among the three types of data mining examined, the study found that predictive data mining was utilized in 82% of applications, descriptive data mining was used in 11%, and prescriptive data mining was used in 7%. Incorporating future vision, strategic orientation, direction, and positioning, prediction may be adding greater strategic value to accounting decision making, which may explain the observed trends. In addition, the data mining task is used by 67% of data mining applications, followed by estimation (13%), clustering (6%), and optimization (5%), and finally pattern analysis (0.5%), exploration (2.5%), and association (2.5%). Almost half of the applications (47.5%) also made use of neural networks, making it the most often utilized technique. This preeminence may be explained by the fact that neural networks are applicable to every data mining kind, task, or business difficulty thanks to their problem-solving flexibility.

## ***2.1 Money Laundry***

The growth of the industrial and services sectors and the proliferation of cutting-edge financial instruments are both benefits of globalization and the process of building the global financial architecture. As a result of these shifts, the number of different ways to launder cash has increased dramatically. This is because money launderers may rapidly transfer small amounts of money via the financial systems of a single country to other countries. Because of this, tracking down the true recipient of dirty money is difficult (Kuzmenko et al. 2020). The United Nations Office on Drugs and Crime estimates that between 2 and 5% of the world's gross domestic product (GDP) is laundered each year. This amounts to between \$800 billion and \$2000 billion (according to the United Nations Office on Drugs and Crime). Danske Bank has been linked to at least one large money laundering case in recent years, occurring between 2017 and 2018. From 2007 to 2015, the Estonian branch of the bank was

involved in questionable transactions totaling 200 billion Euro (Kuzmenko et al. 2020).

Money laundering refers to the practice of making the proceeds of unlawful activities, such drug trafficking, appear to be the lawful earnings of a respectable business. Money gained dishonestly is called “dirty,” and the process by which it is transformed into “clean” currency is known as “laundering.” Laundering refers to any method by which criminals make the proceeds of illegal activity appear to have come from a lawful one, thereby masking the true identity of those responsible for the funds. Laundering is a necessary step for every criminal organization intending to make use of money earned through illicit means. Transactions involving large amounts of illegal cash are inefficient and fraught with danger. The culprits have to put the money in banks, but they can’t do so unless it seems like it came from a legitimate source. Money may be laundered in a few different ways. These methods can be as easy as they are complex. One of the most common techniques is money laundering through a legitimate cash-based business run by the criminal organization. For example, if the organization is in charge of a restaurant, it may inflate the daily cash receipts in order to channel illegal monies through the company and into the bank. At that point, the money may be sent to the eatery’s bank account so that it can be given to the owners (Salehi et al. 2017).

There are three distinct phases to the money-laundering process: placement, layering, and integration. To place is to transfer money away from its original location. Sometimes the origin might be easily disguised or misunderstood. The money is subsequently used to make purchases at restaurants, bars, and shops. When money is laundered via many layers, the goal is to obfuscate the trail and prevent detection. Its purpose is to make it more difficult for authorities to monitor money from illicit enterprises. When money is integrated into the economy, usually through the banking system, it is made to look like it was earned legally by a business. In contrast to layering, in the integration phase, informants are utilized to track down and identify dirty money (Salehi et al. 2017).

The unlawful revenues that flow through a country’s financial system have a substantial impact on its economic security and may lead not only to the financial instability of banks, insurers, etc., but also to a rise in crime and terrorist acts inside the state (Kuzmenko et al. 2020). This shows that attention should be devoted to the challenges of countering money laundering at both the international and national levels, since only coordinated efforts by regulatory agencies of various governments enable the determination of the origin and subsequent movement of illegal funds. In addition, without a strong national anti-money laundering infrastructure, it is hard to conduct a series of clandestine operations to hunt and punish offenders.

Based on (Kuzmenko et al. 2020), the following list of indicators is selected as the assessment indicators: GDP per capita (current LCU); bank secrecy; claims on central government, etc. (% GDP); internally displaced persons, new displacement associated with conflict and violence (number of cases); corruption perceptions index; global terrorism index; happiness score; prosperity index. According to Kuzmenko et al. (2020) research, over half (47%) of the apps employed neural networks, making them the most common method. This supremacy may be related

to the problem-solving generality of neural networks, which may be applied to any data mining type, task, or business issue. Moreover, (Salehi et al. 2017) said that data mining tools are particularly useful for detecting trends of money laundering and detecting anomalous activity. Due to the fact that instances of money laundering are evolving and money launderers are employing newer techniques, unsupervised data mining techniques will be more effective at detecting new patterns of money laundering and can be essential for enhancing learning models based on classification methods.

## 2.2 Credit Risk

Credit scoring refers to any credit rating method that allows for the automated evaluation of the risk involved in a financial transaction. The solvency of the client, the nature of the credit being extended, the length of time before repayment is due, the size of the loan, and other factors are all potential sources of danger in financial transactions. 60% of a company's overall risk is attributable to credit risk, making this field of study crucial for financial institutions (Pérez-Martín et al. 2018).

Credit scoring algorithms were first used by financial institutions in the 1960s to help them evaluate their potential for loss due to the rising use of credit cards. Credit scoring procedures were also developed and implemented in the United States at this period in order to evaluate credit risks and estimate the likelihood of default. Credit scoring models have relied on statistical methods since the 1970s, and in particular on discriminant analysis, which was applied broadly beginning in 1990. However, as more reliable statistical data sources and cutting-edge computing tools became available, it became imperative that financial institutions improve the accuracy and efficiency of their risk assessments. The need to do so has arisen because of the increasing size of the databases managed by financial institutions, and this issue may be solved by using Big Data approaches to large financial datasets in order to divide them into several categories of risk (Pérez-Martín et al. 2018).

According to Pérez-Martín et al. (2018) literature review, the results obtained by various categorization methods are relatively comparable to one another. Even though computing efficiency was not mentioned, only a few classification methods were obviously subpar. Examine the linear kernels of quadratic discriminant analysis (QDA) and support vector machines (LSVM). While LSVM is superior to QDA in terms of accuracy, the latter achieves its results faster with less processing overhead. In (Pérez-Martín et al. 2018), they used a total of eight different approaches, including QDA, CART, PRUNECART, LM, LMM, LSVM, GLMLOGIT, and NN. Measures of efficacy and efficiency were determined for each approach. GLMLOGIT and LMM are the most powerful techniques. Most calculation can be accomplished with LM, LMM, and GLMLOGIT; QDA and CART are next in line.



### **2.3 Cost Management**

The globalization of the economy has led to a surge in competitiveness between businesses. Every business that hopes to survive the onslaught of economic globalization will need to experiment with new ways of managing its operations. A company's success depends on its ability to keep its own expenditures in check. There is currently no quantitative cost management plan available, and the management tactics given by the existing market solutions are all described in words. As a result of the information era, intelligent cost management has become a reality, allowing for novel approaches to problem solving and technique development in the field. Only when businesses continue to place a premium on in-house management, go further into the informatization process, and build more cost data year after year will it be a resource worth mining. Since the dawn of the era of big data, conventional database queries are unable to conduct exhaustive searches across all available data, hindering the enterprise's growth. As a result of the overwhelming volume of data, it is challenging for humans to determine which pieces of information should be trusted and which should be discarded (Wang and Guo 2022).

Therefore, much data is lost before it is analyzed, and much data is of such complex sorts that it is impossible for us to extract actionable insights from the vast troves of data at our disposal. We must handle the data at the same time. Now that data mining technology exists, this formerly intractable issue may be addressed, and information can be mined from databases for useful insights. Data mining is performed for massive amounts of information. Data mining technology is integral to the process of cost management, which entails the mining of cost data. Cost accounting is a crucial process; thus its correctness must be prioritized and the cost accounting system should be fine-tuned to the greatest extent feasible (Wang and Guo 2022).

Companies started using cost accounting somewhere around the middle of the 1500s. Some cost management theories emerged in the 1820s. Future business management will rely heavily on big data technologies, allowing for the elimination of several common pitfalls. Controlling costs, standardizing procedures, and boosting efficiency are all possible with the use of big data technologies in business cost management. We also mix big data and cost management technologies to provide the groundwork for intelligent corporate management in the years to come. There are three fundamental obstacles to data: creation, processing, and storage. We need to do our own research into the issues and come up with our own answers if we want to leverage big data technologies to improve the industry.

### **2.4 Accounting Fraud Detection**

Accounting fraud is the deliberate creation and dissemination of false or misleading financial statements with the purpose to defraud investors and creditors. Misreporting,

misconduct, misrepresentation, accounting fraud, accounting errors, corporate fraud, and financial fraud are all names for the same thing (Yu and Rha 2021). Accounting fraud is the fifth most common type of economic fraud, behind theft of corporate assets, cybercrime, corruption, and supplier fraud, according to an international study of economic fraud. Accounting fraud's share of all economic frauds has decreased from 24% in 2011 to 22% in 2014 and 18% in 2016 (Papík and Papikova 2021). A future financial restatement is different from an accounting fraud because of the contrast between the two. In contrast to fraudulent accounting practices, accidental accounting errors cause confusion by leading users to incorrectly apply accounting policies and processes. A financial restatement is the process by which an organization modifies an existing financial statement, either in whole or in part. When an accounting error is discovered, the company will issue a restatement of its financial statements to reflect the changes (Papík and Papikova 2021).

Enterprises with larger indebtedness than non-fraud firms and bad corporate governance were shown to be more likely to perpetrate fraud in an analysis of accounting and auditing enforcement releases (AAERs). The debt covenant theory provides significant evidence for the idea that debt covenant violations are a major motivator for fraud. There is a higher incidence of fraud in these three sectors than in others, with revenue manipulation being especially common in the technology sector. Fraud is more common in the first three years of an audit contract; however it is not certain to increase with the length of time an audit company is hired by a customer (Yu and Rha 2021).

In Yu and Rha (2021) Literature research spans 932 worldwide studies by 1096 authors published between 2002 and 2020 and indexed on Scopus, a renowned academic database, and revealed the following patterns in accounting fraud literature. We split our keyword research into two time periods, 2014 and before, and 2015 and beyond, due to the rapid development of business intelligence and data analytics. Data mining and analytics have become indispensable tools for audit companies, while the importance of IT audits has been emphasized in accounting curricula in light of big data and other forms of business intelligence. Additionally, (Papík and Papikova 2021) studied 80 organizations; 40 with financial restatements have been recognized internationally and 40 international companies have been identified as companies without financial restatement by applying CART technique Prediction models established in this publication on a sample of 80 firms have obtained accuracy of 72% to 84% and these findings are among the highest that have been achieved in this field so far.

## ***2.5 Others Accounting Field***

When dealing with large amounts of data, data mining is a useful technique in the study of accounting. In order to improve productivity, businesses must use this technology. In addition to helping with budgeting, money laundering, and spotting accounting fraud, data mining also aids accountants in making more informed

decisions on whether accounting technique (whole cost versus successful effort) is best for oil and gas producers, analysis of how different choices in accounting may play out Data mining in carbon accounting and reporting, Statement No. 158 of Financial Accounting Standards on management action, investigated the use of text mining in environmental accounting and whether or not broader climate change issues were addressed in submissions made by corporations and other stakeholders to regulatory agencies, as well as the possibility of using clustering to derive related accounting concepts to enhance the accessibility and usability of financial accounting information. In addition to the aforementioned writers (Amani and Fadlalla 2017).

### 3 Conclusion

As is generally known, banks and other financial institutions play a crucial role in the economies of emerging nations. Since putting money aside is useless unless it is invested wisely. Working in today's cutthroat corporate climate is no easy feat. Because of the increased competition brought about by open markets, banks in emerging nations are increasingly aggressive and difficult to deal with. Management would benefit greatly from having data used effectively as a support system for making decisions. Data mining is the answer to the problem that has arisen for businesses as a result of the explosive expansion of communications and IT: how to deal with massive amounts of data, among which important information may be hidden or not being used properly. Competency gained through data mining includes the ability to accurately predict future trends in corporate development, which in turn aids managers in making more informed business decisions and boosts a company's competitive standing.

Accountants will need to update their knowledge in order to make the most of the opportunities presented by developments in areas such as cloud computing, Big Data, data analytics, and mobile devices. Scholars emphasize the importance of academic institutions offering appropriate resources to enable students gain at least a basic grasp of information technology (Rîndașu 2017) since they are seen as the link between aspiring accountants and the accounting profession.

When paired with Business Intelligence and know-how Management, the understanding of Data Mining is complete. While data mining serves as a bridge between the two, business intelligence and knowledge management are distinct concepts. Knowledge management refers to a group of opportunities for developing and using knowledge to increase a company's performance, whereas business intelligence refers to the applications and technologies of gathering, retrieving, and assessing data for the purpose of making good decisions. Data mining is the process of discovering previously unrecognized patterns in large data sets. It's also known as data mining, when specific pieces of data are extracted from massive sets of data. The American Institute of CPAs has recognized data mining as a key activity that will shape the accounting industry in the future. In natural science and data visualization, data mining is a standard practice.

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# Impact of Business Analytics and Enterprise System on Managerial Accounting



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**Abstract** The Enterprise Resource Planning (ERP) system is one of the key tools used for data extraction for the purpose of meeting the managerial accounting requirements. Due to globalization and competition in the market, the financial and non-financial aspects need to be analyzed to meet the organizational objectives. Concepts such as Big Data supports on processing millions of data points for the purpose of maintaining the competitive edge in the market. One of the main resources of big data is the ERP system in which large number of data can be extracted and analyzed at the same time. This will support decision making and both strategic and business moves. The digitalization played a major role in the improvement of the business analytics, leading to key accounting decisions. Many other tools such as the Accounting Information System (AIS) has been contemplated as key tools for meeting the organizational performance. The purpose of this research is to demonstrate the importance of data analytics used in managerial accounting for improving the competitive edge of corporations. Moreover, it will provide insight on critical system tools such as the ERP system which accommodate big data and provide accurate and detailed analysis. The research will also highlight the importance of digital transformation and the different types of business data analytics.

**Keywords** Enterprise resource planning · Business analytics · Managerial accounting · Big data

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## 1 Introduction

Managerial accounting is the practice analysis of analyzing the corporation financial data that helps to achieve the corporation objectives. It includes business analytic which it includes three main elements cost accounting, performance measuring, planning and decision making. The business analytic includes four main types of data analytic descriptive, diagnostic, predictive and perspective analysis. As stated by (Sudhashini Nair 2021), The globalization of the economy resulted in highly competitive environment which forced the businesses to become more complex due to the diversity of the products and services. The management accounting practices incorporating financial and non-financial techniques provided the required information to make the required sound decisions and meet the organization objectives. Many advantages can be acquired from management accounting due to the useful and relevant information which is used in planning and control along with business decision making which can contribute to sustainability and enhance the competitive position of the organization. Management accounting Practices in countries like Japan were developed to meet the manufacturing nature of many industries by focusing on cost management. For instance, Just In Time (JIT) and Kaizen Costing. The ERP system results contribute on the enhancements of the operational performance through automation of the business processes. The real time data obtained from the ERP supports on the supervision and track of the business operations. According to a study by (Sudhashini Nair 2021) research, after the application of the ERP system, the management accountants became more focused on planning. The ERP system provided the decision makers in the organization with the ability for benchmarking and forecasting to monitor the company performance. Many functions within the organization have been strengthened due to the ERP such as supplier and customer relationship management. Other functions such as supply chain management has been improved substantially by the implementation of the ERP system. For instance, the data extracted from the ERP system regarding customer service, sales and the customer demand supported on the future anticipation of sales.

The field of accounting has also been experiencing a surge in interest in the topic of big data is going to be significantly altered by big data and data analytics. It is predicted that Big data will lead to an improvement in the quality of accounting information, and those who work in accounting will continue to supply real-time and dynamic data in order to aid in the process of decision-making. (Herath and Woods 2021) Big data and business analytics, which both use large or unstructured data sets, are important for every part of how big companies make decisions, analyze strategies, and make predictions. This happens because big data and business analytics make it possible to process millions of data points that have been created, extracted, gathered, analyzed, and evaluated from external and or internal sources in order to keep a competitive edge (Alomari and Aldammagh 2021).

## 2 Literature Review

### 2.1 Business Analytic

Managerial accounting is defined as the practice used to measure, recognize, and analyze the corporation's financial data to managers that helps them pursue corporation objectives (Tuovila 2022). Business analytics is a set of technologies that is used to gain new insight, improve corporation strategic decision making and develop solutions for business problems using statistical models, machine learning, quantitative methods, and data analysis (Lutkevich 2021). Business analytics provides several actionable recommendations and ideas that can be used by corporations through diverse types of analysis. The main goal for business analytic is to build a conclusion and recommendation regarding the business by providing answers about why specific things happened, what might happen and what the corporation should do. Business analytics is used for the managerial accounting function that includes three main broad heads, cost accounting, performance measurement, planning and decision making.

Cost accounting is a method of managerial accounting that collects the total cost of production in a corporation (Tuovila 2022). It considers all input costs related to the production process including operating, direct, indirect, and fixed and variable costs. Cost accounting helps to identify where the corporation spends the money, where money is lost and how much the corporation earns. Therefore, cost accounting aims to analyze and lead the corporation to improve the control over the internal cost.

Secondly, performance measurement is defined as the tool used by the corporate management to evaluate and assess their employees' work (Tardi 2022). Performance management is a formal program that helps the corporation managers to track the employee's performance, expectations, career progress and if their progress aligns with the corporation's overall goals and vision. Additionally, it helps to adjust the workflow and recommend courses of action within the process in order to achieve the corporation objective.

Lastly, planning and decision-making focus on identifying the activities required to accomplish the corporation's desired goal where important decisions must be made. Planning focuses on establishing goals that the corporation aims to achieve and selecting the appropriate strategy that helps achieve these objectives. Therefore, decision making focuses on choosing the best alternative that helps the corporation to achieve their stated objectives.

### 2.2 Big Data and Business Analytics

The responsibilities of management accountants are expanding to include the measurement of organizational performance and the provision of management with information relevant to decision-making. Previously, management accountants

were only responsible for reporting aggregated historical value (Rybicka 2018). As management accountants have historically depended on information obtained from accounting records to assist corporate managers, it is anticipated that the accessibility and the use of big data and analytics by firms would impact the managerial accounting industry as a whole. It is essential, however, to first understand the function of big data and business analytics inside a company (Appelbaum et al. 2017).

### **What Is Big Data?**

The term “big data” refers to extremely large quantities of data that have become increasingly accessible due to developments in computing technology, the emergence of new data sources, and the expansion of information technology infrastructure (Cockcroft and Russell 2018). In this context, “big data” refers to datasets that are not only large in size but also diverse and rapidly changing, making them challenging to manage with conventional methods. (Elgendy and Elragal 2014; Cockcroft and Russell 2018) Big Data, however, does not solely refer to large volumes of data, seeing as how numerous sectors and businesses, such as banking, have historically made use of significant quantities of data (Jia 2020).

Big data come from internet, transactions, Internet of things, ERP systems, available to the public data, cloud platforms, private data, consumer content, social networks, and sensor technologies or business transactions which including sales queries and purchases. Furthermore, data sets come in text, illustrations, audio, and video formats, and the number of possible types is growing (Elgendy and Elragal 2014).

According to Herath and Woods (2021) Many organizations are now engaged in handling and analyzing information by utilizing big data. Big data is frequently attributed with both complexity and velocity. Big data is having an effect on every facet of accounting, from the data itself towards its gathering and analysis, reporting, and decision-making that is driven by data. It is essential to have a solid understanding of the composition and properties of big data (Herath and Woods 2021).

Big data refers to a large volume of complex, structured, semi-structured, and unstructured information that is produced in a large volume and emerges (in a system) at a rapid rate so that it can be analyzed for improved decision making and strategic organization and business moves. Big data is now defined as large volumes of sophisticated, structured, semi-structured, and unstructured data (Younas 2019).

The “five V’s” are a group of fundamental components that can be disassembled to reveal big data’s individual parts and pieces (Herath and Woods 2021). These V’s stand for volume, velocity, variety, veracity, and value. The “volume,” which refers to the enormous amounts of data produced by the various big data technologies and sources, serves as the cornerstone upon which big data is constructed (Nasrizar 2014). The fact that big data is produced, collected, and analyzed in real time is one of its most notable characteristics (Nasrizar 2014).



## **Influence of Big Data on Business Analytics**

Big data analytics presents tremendous opportunities for accounting operations. These opportunities include improving understanding of accounting operations, forecasting, predicting the outcomes of business operations, making improvements to accounting ethics, automating accounting, and facilitating real-time risk analysis and decision making, all of which contribute to an increase in the productive capacity of organizations. (Herath and Woods 2021). Additionally, The advent of big data presents management accountants with a unique opportunities to gain on a more active role in the process of data development and decision support (Marques 2021).

According to Marques (2021) Big data has the potential to radically transform accounting management activities. Big data will impact management accounting controls, information, and decision-making, not only in regard to the circumstances within which decisions are made, as well as terms of procedures and competences (Marques 2021). Jia (2020) explains that For instance, accountants might acquire valuable insights into their company's revenues by using the new capabilities made possible by big data. Data contributes to an improvement in the quality of accounting data by making it easier to get accuracy and completeness and by making it readily accessible for use in decision making in real time (Cockcroft and Russell 2018).

Analytics performed on large amounts of data have the potential to supply investors with incredibly significant qualitative information. The information that is produced from financial accounting records is used in managerial accounting to assist managers in carrying out their responsibilities (Herath and Woods 2021).

## **Big Data, ERP and Business Analytics**

Asare and Boateng (2021) illustrated that the capacity for big data analytics has a positive impact on the results of the company, and the implementation of ERP is positively related to the effectiveness of the company. In this context, Both the organizational capacity to deal with large data sets and the performance of the company are directly impacted favorably by the implementation of an enterprise resource planning system (ERP) (Asare and Boateng 2021).

On the other Appelbaum et al. (2017) In a big data context, business analytics is faced with several challenges: complex data extracts, data fluctuations, data duplications, data security weaknesses, and the potential for multiple analytical tools and languages.

In addition, management accountants now have the ability, as a result of the capabilities of ERP systems, to report (predictive) data and to provide more immediate support to business managers through the digitalization of a large number of traditional accounting tasks. Both of these capabilities were previously unattainable. The introduction of ERP systems has made this accomplishment feasible. For accountants to feel comfortable producing more predictive reports, the data that is readily available to support such analyses might need to be more diverse and extensive; this is what is meant by the term "big data." (Rybicka 2018).

This can be utilized in Business administration which is the focus of Accounting professionals working in management are responsible for aligning organizational structures with strategic objectives. Management accounting needs to be defined along all three orientation dimensions (descriptive, predictive, prescriptive). Since there are several data sources, research approaches, and business IT infrastructures capable of handling big data, these dimensions may be seen from a variety of angles.

### **2.3 *Types of Business Analysis***

Business analytic provides several types of analysis and evaluation to support management accounting, each type serves a specific purpose and gathering all of them together helps to see the full picture. Using these types of data analysis saves the time for corporation to find the problem and the extra time would spend to find a proper solution that would solve the issue. The four types of data analytics:

#### **Descriptive Analysis**

Descriptive analysis is an explanation of historical data and clarifying of changes that have occurred during a specific period of time (Frankenfield 2020). Descriptive analysis answers the question of what happened that is asked by the managers to understand the situation. This type of analysis gives decision makers a better view of the changes, performance trends and it reveals hidden patterns behind the data. It uses historical information and statics to build a comparison of results and performance such as comparing yearly pricing changes, sales growth and total revenue. Furthermore, it helps to communicate the information among the different departments and with external users such as potential users that might want to investigate the corporation profit, debt metrics and cash flow before they invest in a particular corporate.

#### **Diagnostic Analysis**

Diagnostic analysis is advanced analytics that helps to examine information and data in order to answers the question why that happened which is asked by the manager. By understanding the external and internal factors that affect the outcomes, the corporation will be able to make better decisions, fix problems and improve performance. Moreover, it helps corporations to understand the reason behind the trends that makes changes in their production or caused specific pattern (Holliday 2021). For instance, it helps to figure the reason behind the unexpected drop in revenue or shift in consumer behavior using different techniques such as correlation analysis, data mining and data drilling. Correlation analysis techniques identify whether there is a relationship between different variables and how strong the relationship might be. Data mining is

the procedure of analyzing data from various resources and summarizing the data into related information by establishing patterns that will help the corporation to increase revenue and lower expenses (Advani 2022). Data drilling focus on analyzing the corporate data in order to make use of the drilling data to offer insight that leads to improving the drilled data (Morris 2021).

### **Predictive Analysis**

Based on Harvard Business School, predictive analysis applies statistical algorithms, machine learning techniques and data to assume and predict the potential future outcomes that might occur based on the historical data and performance (Cote 2021). Predictive analysis answers the question what might happen in the future that is asked by the manager, and it is considered as a decision-making tool. Furthermore, it can be used for the near and distant future such as predicting the corporate cash flow value for the upcoming year, manage budget, marketing, and pricing strategy. This type of analysis is important because it helps corporations to detect fraud, reduce potential risk, optimize, and improve operations. The techniques used in this analysis depend on the patterns, trends and relationships that was analyzed and identified in the descriptive models. The prediction must have actionable insights in order to be able to take actions and be conscious.

### **Prescriptive Analysis**

Prescriptive analysis is the process when the corporate analyzes the data and information and starts to identify recommendations to optimize the work practices that should match the various predicted outcomes (Delen and Ram 2018). Prescriptive analysis answers the question of what the corporation should do as a next step to stay on the path to success. This method uses machine learning algorithms to analyze massive amounts of data efficiently and faster, the final recommendations are based on the specific combination of requirements that was identified and established in the algorithms comb. In addition, it reduces the possible human errors or biases that might occur because business analytic provides comprehensive practice of data aggregation and analysis.

## ***2.4 Digitalization Role in Business Analytics***

Digitalization of information as demonstrated by (Yiga 2022) lead to improvements in the business analytics which contributes to key management accounting decisions and lead toward enhanced organization performance. The business analytics through digitalization supports the application of the accounting practices to access more details and data by utilizing internal and external resources. Moreover, (Yiga 2022)

clarifies that the cost performance which is considered as an indicator for the organization performance can be further enhanced through the interaction of the business system analytics and the management accounting practices. In addition, the business analytics tools and methods including the features of prescriptive, descriptive, and predictive have an advantageous impact on cost performance and management accounting knowledge.

## ***2.5 Globalization and Emergence of Business Systems***

According to (Yiga 2022), globalization has led to more complex organizational structures and extra geographical presence. As a result, organizations started to encounter an increasing amount of data for their operations. This led many organizations to start adopting the Enterprise System Software (ESS) which integrate all their operational systems into a single system and reduce the increased pressure on the human factor. In reference to (Yiga 2022), the ESS can comprise of key systems such as Enterprise Resource Planning (ERP), Customer Relationship Management (CRM) and Supply Chain Management (SCM). These imperative systems are important for the big companies to maintain their competitive advantage. The ERP system plays a significant role by integrating the business functions and processes and provide managers with real time information for the decision-making process. The system also acts as a mean for more efficient response on the changes in the business environment. As clarified by (Yiga 2022), the accountant role includes analyzing, collecting, reporting, and recording financial data. The previous traditional methods include a lot of limitations and complexity which result in time consumption and waste on resources. On the other hand, the advancement of technology and the use of the ERP system has enabled the accountants to collect data easier and perform their functions more efficiently.

## ***2.6 Accounting Information System and Enterprise Resource Planning***

As stated by (Haleem 2021), the accounting Information System (AIS) is considered as a required tool to meet the organizations objectives. Many organizations are implementing AIS to achieve efficiency, improve performance and increase productivity. ERP is one example of advanced systems that changed the view on the AIS by expanding the range of information as AIS considered as part of the integrated ERP. In reference to the study conducted by (Haleem 2021), 57% of respondents from the study sample in 2016 were satisfied about their organization success which was supported by the ERP system. Some of the benefits obtained through the ERP implementation includes better productivity, integration, improved interaction, and

better data reliability. AIS comprise of two main subcategories including management accounting and financial accounting. For the financial accounting, the system provides financial reports while the management accounting generates information for specific requirements for the future. The management accounting information obtained from the system supports the management to take healthy decisions and maintain the required control system on the organization to manage its resources and operations. According to (Haleem 2021), AIS has two dimensions, the quality of accounting information in the ERP environment and ERP system quality. These two led to a high increase on the accounting practices application like preparation of financial reporting, ratio analysis, internal auditing, working capital management and new techniques in management. The main improvement from the system is through the quality of information obtained which improved the accounting practices of the organization. As a result, the advanced accounting practices can support the organization to meet its's goals and enhance its performance.

## ***2.7 Enterprise Resource Planning and Management Accounting Practices***

As demonstrated by (Yiga 2022) research, management accounting consists of three primary roles. This includes control and planning, cost management and performance management. The business analytics data can be used at every business stage by accountants. The quality data provided can be used by the business users for future predictions and valuable analyzes.

According to (Haleem 2021), the performance of the firm refers to the improvement which can be measured through financial and non-financial measures. The financial performance can cover many calculation methods such as return on investment, net profit, return on equity and gross profit. On the other hand, the non-financial measures can cover many aspects such as product innovation, market expansion, quality and customer service. As a result, the ERP system contribute and support all the functional areas within a business to work together to enhance the business performance.

In reference to (Yiga 2022), the ERP system implementation affects the accountant's role along with the accounting processes. Some of the advantages obtained by accountants are flexibility in information generation, improved quality of financial statements and reports. A study according to (Yiga 2022) measured the impact of replacing a traditional system with ERP system in reference to accounting application. One of the study findings is that the ERP system produced additional benefits for the accountants. Although the adoption of the ERP system did not change the management accounting practices, the study concluded that the ERP system acted as a driver for the current adoption of the modern management accounting techniques. The study also clarified that the ERP system reduced the time required for the routine tasks which results in more time for accountants to conduct productive information

analysis. According to (Yiga 2022), the ERP system is considered as a data source for the new accounting practices as it has been designed to support these practices. A study found that ERP system is a useful source for data collection and for management accounting. Another study noted that ERP system can lead to the enhanced development of the routine activities, better utilization of databases, adoption of new practices of management accounting and reporting in a faster way with more flexibility. As a result, many benefits have been acquired by organizations including improvement in the processes of decision making along with enhancements in the organization integration. Based on (Yiga 2022) research, the ERP system provides the required information and data to support budgeting, forecasting, performance management, operating statements, performance management, reporting and costing.

The quality of ERP system information is critical for effectiveness. The research by (Haleem 2021) stated that AIS lead and assist to enhance the financial reporting quality and provide quicker responses to transaction processing. The information effectiveness in the system supports in providing quick financial statements. Additionally, the ERP system consists of new techniques for management accounting as the ERP provides improved automated business processes from financial to non-financial.

In reference to (Haleem 2021) study, the accounting practices are critical in producing financial reports and accounting information. The advancement in IT in the last decade posed pressure on improving the accounting practices. The AIS effectiveness is based on the perception of the information by the decision maker such as transaction procession management, reporting and budgeting. As stated by (Haleem 2021) study, there is a positive relationship between firm performance and accounting practices. Consequently, the accounting system have to adapt practical efficient accounting practices based on the changing technology. The improvement in the management accounting has led to more effectiveness, profit analysis, efficiency, and transparency. Thus, the ERP system is considered as a management tool that help to increase the firm performance in reference to connection of the business processes, system control and accounting. As a general view, the ERP system will impact the adoption view on the accounting practices which can lead to improved performance for the business.

### 3 Conclusion

In conclusion, business analytic uses technologies that helps corporations to gain insights, improve the workflow, make decisions, and develop solutions for the corporate problems through using machine learning, statistical models, data analysis and quantitative methods. Data analytics have got four main different types. Descriptive analysis focus on the historical data during a specific period. Secondly, diagnostic analysis helps to understand the reason behind the change. Thirdly, predictive analysis helps the corporations to predict the possible future outcomes that might occurs

based on the previous analysis. Finally, prescriptive analysis emphasizes on identifying recommendation based on the predictive analysis. These different analytics helps to identify and manage the workflow of the corporation.

Digitalization of information lead to improvements in business analytics which contribute to key accounting decisions and lead to enhanced organization performance. The interaction of the business system analytics and management accounting practices can lead to enhanced cost performance which contributes to the improvements of the organization overall performance. Globalization led to complexity in the organization structure and increased the globalization presence of organizations. Many organizations started to adopt the ESS system in which ERP is considered a key part of the system. Additionally, the AIS has been considered as a key part of the ERP system and contributed to meet the organization objectives. The ERP provides a variety of benefits for the business organizations such as better productivity, improved interaction, integration, and enhanced data reliability. Both the management accounting and financial accounting are important subcategories of the AIS. The financial accounting system part provides financial reports while the management accounting provides information for the specific future requirements. The AIS supports on increasing the application of the accounting practices such as the preparation of the financial reporting, ratio analysis, internal auditing and working capital management. The management accounting consists of three primary roles including planning and control, cost management and performance management. The business analytical data can be used at every stage by accountants for future predictions and enhanced decisions. The extracted business analytical data from the system can be used by financial accountants to further analyses the performance of the business such as return on investment, net profit, and return on equity. Many non-financial data by the management accountants can be used to make critical future decisions which is also extracted from the system such as quality data and customer service data. The ERP supports all the business activities by enhancing the collaboration between the different functional areas within a business to enhance the business performance. The ERP system supported to spare time for accountants to conduct productive information analysis. Even though the ERP system did not change the management accounting practices, it acted as a driver to enhance the management accounting practices and reach to the modern techniques.

Taking advantage of the fact that accounting is a data-driven field, big data gives accountants the chance to increase the value they can and should offer their clients. Big data is quickly changing the roles and responsibilities that accounting professionals are expected to take over the course of their careers.

Because of the rise of massive data stores and connectivity, organizational operations have changed in a fundamental way. This note explains what Big Data is and how it affects organizations. It also provided a list of potential research topics that could be investigated if Big Data is applied to managerial accounting. (Nasrizar 2014).

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# Intellectual Capital, Management Accounting Practices and Corporate Performance



Fatima Ahmed, Ghadeer Buallay, and Rami Abu Wadi 

**Abstract** The research's main Idea is to estimate the components of intellectual capital (IC) and how it influences corporate prosperity. It also examines whether the practices of management accounting (POMA) have effects on IC. "To characterize intellectual capital and its three components, as well as how the IC was impacted by the practice management accounting, a literature review was used". "The study also looks into how the IC affects corporate performance. Journals and business websites were utilized to inspect the effectiveness of IC on the corporate. The outcome of reviewing several studies; shows that IC has an impact on business performance in different ways; encompassing enhancing the Advantage over rivals, promoting invention, improve employee effectiveness which leads to developing organizational function. Financial directors may take advantage of this kind of subject.

**Keywords** Intellectual capital · Human capital · Management accounting · Corporate performance

## 1 Introduction

In our era, knowledge has a decisive role in corporate development". "Due to this, businesses depend on their ability to assess, manage, and expand their knowledge and skills" (Kristina Natalia 2021). Companies need to build the talents and competencies required for adaptation and realignment with their environment if they want to be able to deal with markets condition and technologies that are constantly changing. In this

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context, the management, strategy, human capital (HC) and organizational components of the business are crucial components. Knowledge becomes the company's most valuable asset (Kristina Natalia 2021).

In an economy that is focused on knowledge, a company's management and control will be concentrated on its knowledge resources and how it uses them. This necessitates the ability to assess the organization's IC expansion, which includes its knowledge and expertise (Dewi Fariha Abdullaha 2012).

The research's main Idea is to estimate the components of intellectual capital (IC) and how it influences corporate prosperity. It also examines whether the practices of management accounting (POMA) have effects on IC.

Nowadays directors recognize how human capital (HC) is valuable as it is considered an intangible value that employees bring to the company. But companies that know how to make the most of their intellectual resources are the most prosperous. The total value of all an organization's intangible assets is its intellectual capital. Though it goes beyond human capital, it does incorporate it. It requires a comprehensive understanding of all the facets of a company that provides it with a competitive advantage (Nassar 2020). The definition of intellectual capital includes a special collection of intangible assets. These resources give a company a competitive edge in a specific market. Unlike financial capital, which is observable and quantifiable, it is not (Anon 2010).

IC is a fortune resource that engages highly in developing business activities and prosperity. In an organization, IC generates future benefits and is an intangible component. Rival is ferocious in today's markets as we as purchasers are more recognized. Moreover, modern businesses are rapidly changing" (Dimitrios Maditinos 2009). By virtue of IC corporate can adapt to changes and be able to continue to compete with other businesses in markets, and due to invention, IC becomes the origin of Advantage over rivals.

Furthermore, IC becomes the most significant impacting corporate performance. Since the IC is considered an intangible resource and considering its value could be complicated. IC is usually identified and characterized in terms of generating value and boosting business competitive features (Mike Tayles 2006).

Intellectual capital contributes to the creation of wealth and other high-value assets". "Intellectual capital in a business includes the wealth of ideas and the ability to innovate, which heavily influences the firms future". Previously, people believed that organizational performance was determined by financial and other factors.

According to (Simona Alfiero 2021), the intellectual property consists of three major components: human capital, structural capital, and relational capital". "Human capital includes workers' skills and creativity, which are enhanced through investments in training programs". "Human capital refers to an organization's employees' skills and expertise". "Employees who are more efficient are more likely to improve the company's performance". Structural capital is a subset of intellectual capital that includes an organization's nonhuman assets" (Simona Alfiero 2021). "It consists of copyrights, patents, procedures and rules, and decision-making policies".

Relational capital refers to the firm's relationship with its external stakeholders" (Nikolay Dmitriev 2021). "This includes trust"". IC has been around for

several decades and concentrates on boosting business performance by exploiting the resources in hand. A number of researches were conducted that endorse the concept of the positive connection between IC and corporate performance for example ((Nassar 2020; Nikolay Dmitriev 2021; Kristina Natalia 2021) as well as many other researchers).

By defining three independent variables—human, structural, and relational capital—and how they affect business organization and influenced by accounting management, the current study will close the research gap. The majority of earlier research has focused on elements that have an impact on financial and organization performance. These three factors are currently being used by researchers to draw different conclusions from various scenarios and generate better solutions for society or the industrial sector with reference to improving organizational performance through the usage of intellectual capital.

## 2 Literature Review

Based on (Youndt 2004) study; IC is the most significant element in enhancing business competency. IC is considered as the most important factor that ensures the sustainability of business. (Choong 2009) declared IC considered as an institutionalized asset that has been leveraged and captured”. The IC assists in value creation as well as in producing pricey assets. (Subramaniam 2005) defines intellectual capital as the skills, knowledge, experience, and customer relationships that give a company a competitive edge over its rivals.

A research by (Daum 2011) “found that intellectual capital could be split into three elementary classes; HC, SC & RC and each component of IC do support one another, according to studies”. Various research has indicated (Choong 2009; Dewi Fariha Abdullaha 2012; Gamal 2011), human capital refers to a company’s or an individual’s ability to provide consumers with solutions. On the other side, structural capital converts knowledge into the organization’s assets, including software databases, patents, and trademarks. Relational capital makes ensuring that relationships with stakeholders like suppliers, customers, and other parties are fostered.

### 2.1 *Intellectual Capital Components*

#### **Human Capital**

Human capital (HC) is one of the IC components. Occupational efficiency, leadership capability, staff incentive, and social specialism are examples of HC. Occupational efficiency includes knowledge and experience that staff has gained during their careers.

Social specialism includes for example communication skills, the ability to enroll in productive discussions, it also boosts the capacity of employees to cooperate successfully and to learn. Professional competency can be influenced through training and opportunities “for further education. (Mike Tayles 2006)

In a business, employee motivation frequently plays a significant role. They are more eager and serious about taking on responsibilities and with this incentive the result will raise the willing and ability to work and get output. By using different type of strategies organizations invest in their employees. Intellectual capital also includes leadership potential. Leaders with a strong capacity for leadership are individuals who can carry out their administrative duties with ease (Nassar 2020). The capacity to create, convey, and put into action plan and vision is also a component of leadership skill.

Human capital, according to (Wiesław Matwiejczuk 2013), is the expertise of employees inside a company. According to (Mike Tayles 2006), HC leaning to be portable and it's owned by staff only not by the organization.

According to research by” (Wiesław Matwiejczuk 2013), human capital frequently serves as a company's main engine of growth. An organization's ability to generate other intellectual assets could derive from effective human capital management. Some human resources may be industry-specific. This is due to the fact that certain personnel has training and expertise in particular industries, such as accounting, engineering, and medical. An organization could ask for specific qualifications from their staff because they are more likely to participate in the worth creation process.

Employees and their skills and competencies do not belong to the organizations. Given the possibility of a high employee turnover rate, it may be difficult to predict the employees' future economic benefits. When employees leave a company, they take their competences with them rather than the information and skills they had previously earned. The organization may only have structural capital remaining after any potential gains from human capital (Wiesław Matwiejczuk 2013).

There are many difficulties in estimating human capital, which adds to the lack of a trustworthy number that can be used to track a company's performance based on the use of its people resources. Thus, comparing the human capital performance of several organizations is challenging. Another issue is keeping track of the likely contribution of human capital to future economic gains. Because of this, human capital cannot be identified on the balance sheet. Since it is difficult to predict the benefits that will accrue in the future, human capital cannot be represented in the financial accounts (Samkin and Schneider 2007). It's necessary for businesses to get data on human capital that could help with more efficient human resource allocation.

The ability of an organization to adapt to environmental changes through the use of human capital, which consists of knowledge, experience, and talents, to improve organizational efficiency, is its most innovative quality.

According to current studies, HC is one of the most significant elements in adequately raising business success.” (Tarus and Sitienei 2015)

### **Structural Capital (SC)**

Managerial methods, manufacturer invention, organization act, inner collaboration, operation development and IT sound knowledge are illustration of SC". "Product innovation helps a company have a brighter future". "This is so that new products can be created, which improves the organization's ability to compete and maintain its survival. Patents and copyrights among other things are the result of product innovation. The structural capital also includes corporate culture. The rules and beliefs that affect how knowledge is shared and how people interact at work are referred to as corporate culture. Compliance with policies is ensured by a positive company culture, which also support the culture of creativity and development" (Joia 2007).

SC contained operations, intangible assets, structures, and systems. "The organizational nonhuman knowledge business act, IT software, and database programs, patents and trademarks" (Mike Tayles 2006). The resources and elements that can be extracted from the business HC are covered in SC. Since it is created by human capital, structural capital frequently depends on it. For instance, individuals within a corporation create patents (Mike Tayles 2006).

The information that an organization has is known as structural capital, as opposed to human capital, which is held by its personnel. Even after employees depart an organization, structural knowledge stays behind. In order to produce structural capital, which an organization uses to boost its competitive edge and create value, human capital is employed within the business. People typically operate better and more intelligently when they have access to structural capital. A research by (Youndt 2004) found that the value creation process entails converting human capital into structural capital, and that the latter supports the workers in the value creation process.

Structured capital is typically employed in organizational processes and is typically kept in organizational databases. The organizational know-how that is typically applied in day-to-day operations and is documented in papers and policies inside an organization is included in structural capital. The organizational infrastructure and the intellectual property within an organization are two major kinds of structural capital that help a company gain a competitive edge. An organization's infrastructure consists of its procedures, regulations, and procedures. Trademarks and patents are just two examples of intellectual property (Choong 2009).

To increase a business performance; business and managerial culture, automation and competency as well as other features work together" (Gamal 2011). Hence, SC is highly utilized by researchers as an important element in developing business performance" (Herzog 2011).

### **Relational Capital (RC)**

Stockholders are instance of RC that involving relationship with suppliers, customers, investors and public. "Relationships with customers are those that exist between a company and its clients". The positive relationship with the customers is enhanced by factors like good customer service. Relationships with suppliers, both existing and

potential, are referred to as supplier relationships. Engaging in actions that strengthen relationships when purchase is part of managing supplier relationships. Businesses take measures to strengthen their ties with investors, such as giving investors reliable information to help them make decisions (Joia 2007).

Customer capital, on the other hand, is made up of a variety of factors, like business share, income per client, client sustain rate. RC, for instance, is frequently influenced by the way a business and its customers communicate with one another. Knowledge that is accessible in multiple relationships inside the organization is referred to as relational capital (Anon 2010).

Strong, long-lasting relationships are essential for gaining a competitive advantage. "These connections should be interrelated. Through the contractual relation with clients which considered as an intangible assets; sales and purchase orders can be categorized as an sometimes can be entered in the accounting records". For instance, the amount of the purchase orders can be accurately measured, allowing for their recognition in the financial accounts. There are some relationships that the financial statements are unable to recognize. This includes connections with customers and other connections with suppliers. As a result of the difficulty in accurately estimating their value, such relationships are not discernible. Regarding the potential future benefits that relationships like customer loyalty are anticipated to bring into a firm, they are challenging to assess and regulate (Joia 2007).

Relational capital is built on how a company interacts with both its internal and external stakeholders. As a result, it's critical to maintain positive relationships with all of these parties since they provide invaluable input on the effectiveness of the business (Asiaei 2015). In order to boost organizational performance, therefore, the RC is a very important part of the IC.

## ***2.2 Intellectual Capital, Management Accounting Practice and Corporate Performance***

Intangible variables have replaced tangible assets in today's economy which mainly depend on the knowledge base resources it plays the main role in business strategies. in the accounting, management, and finance fields during the past 10 years as main source of competitive characteristic and in promoting corporate sustainability (Tarus and Sitienei 2015). The idea of investing in human capital, technology, research and development, and consumer relationships has become the cornerstone of future advancement in the knowledge-intensive economy in order to preserve organizational competitive power. The capability of these businesses to utilize and control their intangible assets, besides their material assets, is what determines if they are successful because traditional factors of production have lost their role in creating value (Minovski and Jancevska 2018).

Numerous studies have been done based the link among business success and IC. As example, a survey was done regarding the relation among business success and IC

(Briner 2012). In his study, (Briner 2012) discover a positive connection among IC elements and corporate (Swart 2006) also noted in his research that enterprises in the dynamic economy have obstacles that can be overcome with the use of intellectual capital.

Despite being challenging to quantify, intellectual capital exists and has worth. Previously finance perhaps have supposed IC by not considering or eliminating the related property. But in nowadays work environment finance norms like international accounting standards recognize the IC, as patents. Microsoft is highly valuable because of its intellectual property (Joia 2007).

Even with the emphasis on and rising relevance of intellectual capital. In the accounting structure the intangible assets that are important to the business are excluded. "Only those intangible assets that meet the requirements outlined by the International Accounting Standard Board (IASB) are recognized in the accounting statements. Based on the international financial reporting standards (IFRS), intangible assets must be measurable and identifiable in order to be recognized. (Dewi Fariha Abdullaha 2012) "asserts that there may be discrepancies between in real value and the book value of a business because of ignoring some of IC in accounting statement like staff creativity and skills and other forms of IC that are hard to measure.

It can be exceedingly challenging to assign values to an employee's development and skill level". For instance, estimating potential cash flows from human capital can be exceedingly challenging. It is challenging to determine the true worth of human capital since tracking cash flows presents a number of challenges (Asiaei 2015).

For instance, the IFRS has very severe requirements that must be met before an asset might be captured in the accounting statements. The IFRS criteria are important to guarantee that the organization cannot fudge the data in the accounting statement". "Some managers would purposefully distort the accounting statement via exaggerating IC assets to mislead the receiver of the accounting statements if the actions were not existing. When it comes to measurement, several of the intellectual capital components are challenging. This is because they are not verifiable and cannot be accurately measured. The IFRS offers the foundation for the financial statement presentation, which calls for the display of reliable data. Information is considered reliable when it can be verified by the transactions it represents. Due to this circumstance, it is quite challenging to identify internally generated intellectual property (Swart 2006).

The Organization for Economic Cooperation and Development's research from 2009 shows that an organization can gain a lot from investing in its intellectual capital. These advantages include improved clients satisfaction, competitive feature and allocate the resources. Other advantages include more competent and motivated staff. Given the advantages of investing in intellectual capital, managers must recognize the intangible assets crucial to establishing and preserving a competitive advantage within the firm (Daum 2011). The management can learn about intangible resources by studying the experiences of other firms.

According to (Mahoney 2015), companies are becoming more aware of the role that intellectual capital plays in generating wealth and influence. According to (Mike Tayles 2006), The successful organizations are those who considers the important role



of IC in creating a value and utilizing them. Organizations need plans of continuous development in order to increase the employee's competencies in order to thrive in the increasingly competitive market. Additionally, companies must have efficient and effective systems and procedures (Nahapiet 2017).

### ***2.3 Investigating Intellectual Capital***

#### **Intellectual Property**

Organizations that comply with IFRS may consider the IC in their account expenses like R&D expenses. businesses keep track of their intangible assets, such as intellectual capital, patents and corporate copyrights are examples of intangible assets. Assets like brand recognition and trademarks are examples of human capital.

Better future performance is brought about by intangible assets, particularly intellectual ones. The recognition of some intangible assets is nevertheless constrained by some accounting regulations. Consequently, some of IC can't be shown in the account reports (Wiesław Matwiejczuk 2013). A large portion of the expenses incurred in creating intangible assets are frequently recorded as expenses in the income statement. Since the costs will still result in future economic gains, this usually understates the profits. Intangible assets shouldn't be included on the balance sheet, according to (Briner 2012), because it is impossible to predict what future financial advantages the assets will likely generate.

#### **Reputation**

Goodwill is an instance of IC that are as a result of a company's trademark's reputation. Companies with strong brand recognition, elevated status, and devoted clientele may be worth more than the assets they own. Hence the reputation is the contradiction of sales price and the book value For instance, an dominating business must consider the organization reputation value in the accounts. Some factors that can raise an organization's goodwill worth (Youndt 2004). For instance, employing highly competent staff and investing in new products. Additionally, elements like effective marketing strategies, brands, and devoted clients, might increase the worth besides the future earning of organization goodwill.

An intangible asset called goodwill is frequently considered as long-range property. As per IFRS and (GAAP) the general accepted accounting principle mandate that goodwill be continuously evaluated, at least once per year (Choong 2009).

## Patent

Businesses do spend money on patent protection for their ideas. Ideas and created items are simple to copy. Patents shield companies from imitation that could reduce their ability to compete. Since they have no physical form and offer long-term value to corporate entities, patents are intangible assets. For illustration, Since competitors cannot reproduce the concepts, patents grant commercial groups the exclusive right to manufacture with little competition (Daum 2011).

## Trademark

Trademark referred to any tag, signature, or slogan that varies the organization product from the others. Brand names, taglines, and even logos are some examples of trademarks. Business enterprises can readily be recognized and set apart from their rivals thanks to trademarks. Customers may quickly distinguish an organization's products from those of competitors thanks to the motto, brand name, and even logos (Joia 2007). In contrast to patents and copyrights, which may expire after a certain number of years.

Many trademarks are registered, but registration is not required. Business that officially register their trademark get better benefits from who don't. and those who resisted the trademark inform the public of their ownership of the mark. By registering trademarks, businesses can have a distinctive mark that is unlike any other marks by undergoing rigorous examinations (Mahdi Salehi 2021).

Trademarks are assets to an organization because they have the potential to increase future financial worth. Internally developed trademarks typically only have worth equal to what was spent on documentation, legal fees, and registration fees. Some costs related to trademark creation cannot be capitalized. This includes things like payroll, advertising, and promotional fees. These expenses are accounted for in the time period in which they were incurred (Mahdi Salehi 2021).

## Copyright

To prevent unauthorized duplication of their works, certain writers and commercial entities may invest in copyrights. The laws of the United States provide for the protection of copyrights as a type of intellectual property (Nahapiet 2017).

The author's time, effort, and ingenuity are protected by copyrights. The Copyright Act states that authors who have copyrights are entitled to the following rights: to publicly perform or show their works (Daum 2011). Authors who produce work for businesses while they are employed do not possess the copyrights to that work. This arrangement is referred to as "work made for hire" (Daum 2011).

It's crucial to keep in mind that the copyrights may not necessarily be worth something for the entire time they are in effect when calculating their value. Thus, the worth of the copyrights can decrease with time. Consequently, it's crucial to

determine the patents' useful lives. This entails figuring out how long the interested person or firm will likely benefit significantly from the patent. After determining the useful life, it is possible to amortize the copyright over that time. Copyrights are frequently amortized on a straight-line basis. When a copyright life span is reached; it won't be used to make money any longer (Anon 2010).

## **Research and Development**

Organizations in the business world make investments in R&D, which entails creating and enhancing products and procedures. The enhancement and creation of new products are aided by research and development, which is intellectual capital. Organizations are able to become more competitive in the market by investing in research and business improvement the search for new knowledge, developing advanced products designed improving process and introducing modern technologies are just a few of the activities that go under the category of research and development. The expenses incurred during scientific research are known as research costs. Contrarily, development costs are expenses incurred when new items are being designed using research and conclusions (Joia 2007).

According to GAAP, research and development expenses are deducted in the period in which they are incurred. The future economic benefits connected with the research and business improvement are commonly unidentified, it is a problem to declare those costs as an asset. Similar to US GAAP, research expenses are expensed under IFRS (Joia 2007).

## **Accounting for Intangible Assets**

Whether an item of intellectual property was acquired internally or externally generally determines how it is accounted for. It is simple to calculate the expenses for intangible assets that were purchased externally because they are equal to the cost of purchasing the asset. As an illustration, goodwill is recorded at cost, which appears on the balance sheet. Recognizing the internal-developed intangible assets, however, might be challenging. Internally acquired intangibles frequently incur expenses. This covers intangibles like internal goodwill built up over time and advertising, training, research, and training costs. Many of the internally created intangibles are not reflected in the balance sheet since they are difficult to measure. Intangible assets acquired are frequently recorded at fair value (Mahdi Salehi 2021).

## ***2.4 Impact of Intellectual Capital on Corporation***

### **Invention**

In businesses IC assets endorse the invention and creativity operations. For example, study develops concepts that are then developed to create new items and enhance those already on the market. Commercialization, when goods or services are marketed in markets, results from product improvement and development. Each element of intellectual capital supports creativity in some way. Human capital, for instance, supports incentives and competency that enable staff to turn concepts in to products. Processing innovation has been made possible by human capital, enabling companies to carry out their functions in novel ways. According to a (Nahapiet 2017) study, intellectual capital is thought to have a favorable effect on an individual's ability for innovation. For instance, human capital frequently makes a radical or gradual contribution to innovation. Organizations cannot prosper in the current competitive environment if they are not strangely involved in innovation which can be achieved through IC. The capacity to innovate and provide superior output increases with human capital quality.

### **Advantage Over Rivals**

Intellectual capital gives commercial organizations a competitive advantage in the contemporary business environment. Businesses can have successful strategies that are difficult to copy by investing in intellectual capital. Businesses can, for instance, register trademarks, patents, and even copyrights to prevent rivals from copying their products and creative output. Employees can provide value to the business through special talents and abilities that they develop through experience and training, giving the company a competitive advantage. Competence within the workforce fosters product development and innovation (Swart 2006). In order to gain a competitive advantage within the firm, management should work toward assembling and developing the greatest team possible. Additionally, it's crucial to make sure that knowledge is properly stored through intellectual assets, which can further boost an organization's competitive position. An organization's intellectual resources add value and raise the organization's financial value.

### **Research and Developing**

Research and development are made easier by intellectual property. For instance, firms are able to spend in R&D through human capital, which helps develop new goods and improve existing ones. Businesses can acquire internal expertise by making research and development investments. Research and development help an organization generate more income and be more profitable. Additionally, research and

development help an organization's procedures be better. The potential for an organization to contribute to its growth increases in direct proportion to its capacity to invest in research and development. Organizations with highly skilled and competent personnel may conduct research and development because they have the human capital to look for new ideas and opportunities for improvement. It is difficult to engage in research and development and efforts expenditures in this area cannot be successful without intellectual capital, such as the talents and expertise of personnel. Research and development add value to a company and ultimately improves its chances of survival by boosting its competitive edge. Both human capital and structural capital have a favorable impact on this process (Choong 2009).

### **Business Performance**

Better corporate performance is produced by intellectual capital, both qualitatively and quantitatively. Intellectual capital increases profitability, return on assets, and return on investments in numerical terms. The market share and customer retention rate are two additional quantitative company metrics that grow as a result of intellectual capital. Customer loyalty, employee contentment, and employee satisfaction are all quantitative factors. "Intellectual capital, according to (Subramaniam 2005), fosters innovation, which in turn creates a competitive advantage that eventually improves a company's success". "Thus, the relationship between intellectual capital and company performance is favorable". "According to an exploratory study by (Briner 2012), companies that are able to manage their intellectual capital effectively are able to perform better and higher than competitors". "Companies with better management, functionality, a better culture, and better training programs are also seen to make more money". To increase their profitability, many companies, particularly in industrialized nations, have turned to better intellectual capital management (Swart 2006).

### **Value Creation**

Swart (2006) asserts that the value produced by intellectual capital has surpassed the value produced by tangible assets. By investing in intellectual capital, the service sector, for instance, has been able to grow rapidly and even outpace other industries. Intellectual capital helps transform a company from a routine operation into a pioneer in its field and sector. An organization can get into the position of becoming the industry leader by effectively utilizing its intellectual assets. The financial and non-financial performance of the company can be improved by managers who can manage intellectual capital successfully by developing better strategies, procedures, and even ways to run the organization.

### 3 Conclusion and Recommendations

#### 3.1 *Results Conclusion*

The research findings correspond to those of earlier studies (Daum 2011; Gamal 2011; Asiaei 2015; Choong 2009; Tarus and Sitienei 2015; Herzog 2011; Youndt 2004); according to the study, an organization's intellectual capital has a significant impact. Intangible assets such as intellectual capital ensure that ideas, concepts, and products are not copied in the market, giving a business a greater competitive advantage (Subramaniam 2005). The intellectual capital elements must be recognizable and quantifiable in order to be recorded in the financial accounts. Since they cannot be measured, intellectual capital components like employee skills and abilities are not recognized in the financial accounts. According to the research, intellectual capital also fosters innovation. Employees with knowledge and experience can generate fresh concepts and use them to enhance goods and procedures.

The performance of businesses is favorably correlated with intellectual property (Briner 2012). For instance, it helps to increase profitability, return on assets, and return on investments. Intellectual capital enhances consumer loyalty and happiness in addition to the quantitative aspects. Given the advantages of investing in intellectual capital, managers must recognize the intangible assets crucial to establishing and preserving a competitive advantage within the company. The management can learn about intangible resources by studying the experiences of other firms. Businesses who are able to properly manage their intellectual capital are able to outperform rivals (Swart 2006). Profitability is also thought to be higher in companies with stronger management, functionality, culture, and training programs. To increase their profitability, many companies, particularly in industrialized nations, have turned to better intellectual capital management.

In order to gain a competitive advantage, firms are learning more about intangible assets than they are about their actual assets (Joia 2007). Utilizing intellectual capital effectively can transform enterprises from being unremarkable companies into market leaders. The performance of a company, both financially and non-financially, can be improved by managers who are in a position to handle intellectual assets successfully. Additionally, intellectual capital enhances organizational strategy (Swart 2006). For instance, highly skilled people are able to develop superior plans that help move firms in the proper direction. "Organizations can only maintain their competitiveness if they can successfully use knowledge-based intellectual capital to continuously generate, update, and overcome operational and technical issues (Choong 2009).

### 3.2 *Limitation*

The research has some restrictions, which are as follows: The research is based on a theoretical and conceptual review, and data was gathered through books and journals without taking any empirical evidence into account, making it difficult to generalize.

### 3.3 *Recommendations*

Future researchers are advised to perform their studies utilizing a variable that will result in fresh findings for the study: knowledge sharing”. “The study is based on a theoretical analysis, and it is recommended that future research employ interviews as a research instrument or a quantitative approach that includes a questionnaire to gather the study’s primary data”. “The empirical analysis will help analyze the conceptual model of the study, provide a better understanding of the phenomena, and help generalize the research findings”. “This will be a valuable addition to the body of knowledge already known about the study of intellectual capital in modern organizational” settings (Herzog 2011; Briner 2012; Asiaei 2015; Daum 2011).

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# Management Accounting in the Era of Big Data



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**Abstract** Big data has grown quickly in recent years, and it will specifically affect how management accounting develops. Recognizing big data's impact on management accounting and utilizing its key advantages scientifically are crucial to assure the discipline's smooth development. Enterprise transformation presents both possibilities and difficulties for management accounting development. To maximize the role of management accounting, enterprises must utilize big data technology. Combining management accounting and big data has become fundamental in this process, and big data technology can meet this need. Therefore, using big data will inevitably become a trend in the evolution of management accounting. This research paper examines the challenges and opportunities facing the growth of management accounting in the big data era by reporting on the background information of management accounting and big data, respectively. Reveals that there are still certain difficulties in the development of management accounting.

**Keywords** Management accounting · Big data · Challenges · Opportunities · Technology

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## 1 Introduction

Big data has significantly altered past production elements, production tools, organizational behaviours, and management accounting behaviours of businesses. To fully exploit the crucial value of management accounting itself, it is crucial to make the necessary improvements to management accounting and consistently innovate management accounting behaviours. Companies must have a thorough understanding of how big data affects management accounting if they want to attain this goal. Considering the big data era, all industries have been impacted. A crucial component of economic growth is accounting. Reforms must be carried out in order to adapt to the current environment. The big data age is characterized by enormous amounts of data and complex data structures. These traits have made making business decisions more challenging in some ways.

Big data has produced enormous amounts of both organized and unstructured data. These data can help businesses by enabling them to make more complete and precise judgments. Big data's emergence has aided accounting development while simultaneously creating challenges. How will accounting development be impacted by the big data era, and what efforts will be accounting development take to address these impacts? The management accounting transformation in the context of the digitalized world is briefly illustrated in this study. Four components make up the paper. The impact of the big data era on accounting development is discussed in the first section. The second segment focuses on how the big data era has affected financial accounting. The third portion explores how the big data era has affected management accounting. The fourth portion then assesses accounting evolution in the big data era, the fifth section suggests a description of management accounting difficulties, and the sixth section offers appropriate solutions. This essay comes to a conclusion in its final portion.

## 2 Literature Review

Data collection, processing, and storage are the three core technologies of big data. Data collected in big data storage is processed by artificial intelligence and algorithms. After accessing the big data storage, users are able to easily get the information they need. Essentially, the changes that enterprises are experiencing as a result of digital technology are a consequence of the growing demand for cloud computing services, artificial intelligence, big data analysis, and a necessity for building global data infrastructures. New concepts such as accounting intelligence and network accounting have emerged in the new digital economy due to the development of artificial intelligence and algorithms for managing financial documents. In order to improve the quality of financial information and screen useful information for management accounting, computers are used to identify and analyze documents automatically. Financial expectations are captured by network accounting. The article

considers that artificial intelligence will increase the amount of data processed with algorithms as a result of digital transformation and emerging network accounting, thereby improving the process of making empirical decisions based on the latest theoretical explanations of digital transformation and emerging network accounting. It is essential for leaders to extend their vision into the core of the business in order to predict the future of the business, and to enhance business growth capabilities in an intuitive, complex manner. To transform the organization into an ideal one, future leaders and accountants must build real, strong, and trust-based relationships to develop real, strong, and trust-based relationships between them. The goal of prevention is to stop attacks. An attacker cannot change mechanisms that are implemented correctly and intact, so prevention features mechanisms that cannot be offset by users (Singer and Friedman 2014).

## ***2.1 The Effect of the Big Data Era on the Development of Accounting***

Big data is now considered a high-tech period byproduct with the arrival of the information revolution. The DT (data technology) era, which will soon arrive, will be the one in which big data becomes increasingly significant for both social and economic advancement. Big data, according to Gao (2016), is a collection of many types and quantities of data. Big data has a significant impact on the growth of businesses since it not only has a great number of occurrences but also, and perhaps more significantly, a huge amount of value. The traits of big data have been studied by numerous academics. According to Lushen Zeng, Zhengzhi Li, and Dan, big data has four qualities: a lot of data, a lot of variety, low value density, and a lot of speed and timeliness. Zeng et al. (2018) The six qualities of big data, which are the characteristics of 5 V (Veracity, Volume, Variety, Velocity, Value), and 1C, were also explained by Liao (2018). In the big data era, accounting data possesses novel properties (Liao 2018). First, semi-structured and unstructured data are added to the original structured data, with unstructured data predominating. The shift from centralized to distributed data processing is the second change. Combining centralized and distributed processing enables the calculation of numerous forms of accounting data on a big scale. After data analysis from a data warehouse, deep learning comes in third. Only through comprehensive study and analysis of the data can users of accounting data completely comprehend the fundamental value of accounting data. Finally, visualization takes the place of graphing as a technique of data output. Provide the most common information consumers with complex accounting information in a straightforward, understandable, and intuitive way. This not only makes it simpler for consumers to understand and develop accounting information into a tool and means that is accessible to everyone, but it also enables businesses to have a more accurate, current image of the market. The evolution

of future accounting against the backdrop of big data will undoubtedly be significantly impacted by new accounting data alterations. As a result, this has been the subject of substantial investigation. Researchers take a two-pronged approach to studying managerial accounting and financial accounting. Administrative accounting is different from financial accounting. Financial accounting is accounting for external reporting. Its primary responsibility is to gather and summarize financial information and the company's financial condition within the context of accounting standards so that decision-makers can understand the company's current financial situation (Huang 2018). Management accounting, however, is internal reporting accounting. The main objective is to arrange the data and obtain a precise understanding of the company's current financial situation. It is fully aware of the current financial state of the company. It supports some degree of corporate growth and helps organizations manage their managers more effectively (Cheng 2019). Big data's impact on financial accounting has been studied by academics including Gao (2016) and Zhan (2019). It largely affects accounting staff responsibilities, accounting measurement, accounting target setting, and information sources for accounting. Additionally, researchers including Liao (2018), Wang (2019), and Ma (2019) looked at the impact of big data on management accounting. Information security, accounting forecasting and decision-making, performance evaluation and assessment, the breadth of the accounting team, and cost estimating, and measurement are all significantly impacted. This demonstrates how it has become more and more common to consider how the big data era has impacted the development of accounting.

## ***2.2 The Big Data Era's Effect on Financial Accounting***

### **The Effect on the Accounting Information Source**

The amount of data in the previous accounting information system was less than it is now. Any information we learn has a significant effect on accounting data. Additionally, the data must be precise and trustworthy. Data integrity in accounting won't be impacted. As a result, in order to reduce and eliminate errors in the earlier period with small data, we must repeatedly analyze and demonstrate. In the era of big data, people don't need to spend a lot of money to remove the uncertainty of these data because enormous data has the qualities of massiveness and complexity. Second, both structured and unstructured data will be part of the big data era. Unstructured data is data that is not immediately relevant to the organization, brought about by the big data era. The majority of it comes from user reviews and recommendations on social networking platforms like Weibo and WeChat. Accounting professionals will encounter a growing number of intricate sources of accounting data. In order to avoid information asymmetry, accounting personnel must choose valuable data from a huge number of data.

## **Effect on Accounting Measurement**

The initial measurements in traditional financial accounting are historical cost and fair value indicators. Fair value can give information users more current and highly relevant information for decision-making, hence improving the preservation of business capital. However, a fair value purchase has negatives including a lack of dependability and operability. This measurement element is used much less frequently because it is challenging to uphold the “fair exchange” that fair value emphasizes in daily life. With the advent of big data, fair value is becoming more transparent. While significantly reducing the impact of undesirable elements like subjective judgment, it has increased fair value’s accessibility, dependability, and scientific quality overall.

## **Impact on Accountant-Related Tasks**

Corporate accountants gradually freed themselves from the limitations of their conventional roles as society entered the big data era. Analysis of report form data, accounting, and bookkeeping are traditionally the main areas of attention for accountants. But professional financial management and financial analysis are quickly replacing tax preparation as the main duties of accountants. Traditional accountants’ attempts to create simple data bases to satisfy the needs of modern accounting information seekers have been unsuccessful due to the arrival of the big data era and the intensifying market rivalry. Today’s accounting teams must gather a variety of data and information in order to undertake a thorough analysis of the company. Because of the nature of these data, we are able to identify the issues and the stage at which the company is now developing. We can also quickly and impartially assess the operational results and state of the firm’s operations in order to identify any flaws giving the manager’s ideas a clear direction and establishing the framework for senior management’s internal decision-making.

## ***2.3 How the Big Data Era Affects Management Accounting?***

### **Effect on Determining and Measuring Costs**

Financial accounting’s main challenge in the big data era is the accounting theory’s slow evolution. Some conventional accounting methods are no longer enough to meet the demands of the big data era. Financial accounting in the modern era has both new challenges and obstacles. The growth of financial accounting principles is the overarching trend of the big data era. On the one hand, the concerned departments ought to research big data accounting theory and work to solidify the basis of financial accounting theory. But in order to institutionalize and standardize the growth of financial accounting in the big data era, pertinent institutions should update fundamental laws and regulations and tighten supervision.

## **The Effect on Accounting Forecasts and Decisions**

Promote sustainable corporate growth is the primary goal of enterprise management accounting. Due to the Internet's explosive growth, management and enterprise management will undoubtedly be impacted by big data when making predictions and judgments in the big data era. A business needs substantial data to aid in the creation of both short-term and long-term business goals. Management and management can only foresee and make judgments that are comprehensive and precise in this way. Producing accurate estimations is necessary for businesses if they want to make informed choices. Ketomiel-theory Schornberg asserts that the fundamental use of big data is prediction in his book "The Age of Big Data." It is feasible to calculate the possibility of anything happening as long as the data is sufficiently enriched. Management accounting staff can help firms by assisting them in timely changing their production and operation plans, increasing their competitiveness in the market, by conducting quantitative analysis and applying logical thinking to the data acquired.

## **Impact on Accounting Information Security**

Because of the sluggish advancement of big data and information technology, information security has grown into one of the most urgent issues for both consumers and corporations. In the age of big data, there are both threats that are hidden by huge volumes of data and tremendous amounts of data that are provided. In the modern world, data and information leaks are common. Information breaches will have a major effect on how an enterprise operates. Accounting data is essential for businesses. In addition to serving as the cornerstone for corporate decision-making, it is employed by management and the organization's management. The company's future expansion and innovation depend on it as well. There are two crucial areas where information security is exposed to hidden vulnerabilities in the big data era. First, it poses a threat to corporate data and information. Personal information leaks will reduce customer trust in the organization. Second, it endangers the transfer of business data and information. The management of the company and its capacity to make sound decisions are impacted when information is stolen or manipulated while being sent.

## ***2.4 The Accounting Development Countermeasures in the Big Data Era***

### **Rapidly Develop the Financial Accounting Theory**

The delayed development of accounting theory is the primary issue facing financial accounting in the big data era. The needs of the big data era can no longer be satisfied by some classic accounting techniques. Both new demands and difficulties are present in contemporary financial accounting. The overall trend in the big data era is to develop and support the expansion of concepts in financial accounting. The relevant departments should, on the one hand, look into big data accounting theory and seek to strengthen the foundation of financial accounting theory. However, to make the development of financial accounting in the big data era more institutionalized and standardized, relevant organizations should strengthen monitoring and improve fundamental rules and regulations.

### **Reasonable Unstructured Data Use**

The immense volume of data generated by the big data era has unpredictably high value. Companies may immediately understand information relevant to them by efficiently and timely gathering big data information, which helps businesses become more competitive. The source of accounting data has changed from being primarily organized to semi-structured and unstructured under the influence of big data. An organization's accounting staff should learn to leverage unstructured data, such as customer reviews and opinions, in addition to structured data that is directly connected to the business. Senior management of the organization will receive useful information from this, enabling quicker and more effective decision-making.

### **Encourage Accounting-Related Staff to Undergo Change**

With the ongoing advancement of information technology, financial accounting work has moved beyond straightforward accounting and report analysis to include additional data mining related to company needs and information discovery. Additionally, to identify the path for enterprise innovation and development, the company's financial-related data is merged with the data from other departments and compared. As a result, in contrast to the old financial accounting work, the modern financial accounting employees need to be more proactive and have a forward-looking awareness. Accountants need to be well-versed in financial accounting, on the one hand. On the other hand, pertinent staff members require a specific set of management skills. It must also possess certain information technology skills and be proficient in the usage of contemporary financial software in order to process data for businesses in an effective and precise manner.

### **Improve Enterprise Cost Management Capability Using Big Data Technology**

Ability to manage costs has an impact on an enterprise's profitability and competitiveness. The profitability and competitiveness increase in direct proportion to the level of cost management capability. Strategic cost management has increasingly taken over as the cost management development trend with the arrival of the big data era and the ongoing development of information technology. Enterprises can use strategic cost information to help their management make better decisions by mining, obtaining, and analyzing it. Big data technology enables businesses to transcend the constraints of time and geography. Anytime, everywhere, you can gather pertinent data for analysis and processing in order to constantly lower company costs. In order to increase the enterprise's ability to compete and help it grow more steadily in the long run.

### **Increase the Use of Data Mining Technology Across Management Accounting**

The big data era has an advantage over traditional data collection methods in that it allows for thorough correlation analysis of complicated data. Data mining must be even better, whether it is used for data collecting or the integration of analytical data. The most crucial aspect of management accounting in the big data era is to effectively utilize data mining technology. Businesses must be able to extract important components that are advantageous to their business from complex and seemingly unconnected information data. Businesses should fully utilize this information to identify countermeasures for business growth. As a result, businesses need to expand the use of data mining technology in management accounting. Businesses should research data on industry rivals, present and potential customers, and the product life cycle.

### **Strengthening the Security of Enterprise Accounting Data**

Big data's era provides enormous amounts of data as well as the risks that lurk in these data. Every organization now has a worry about information security. Enterprises should first raise employee understanding of safety. On the one hand, the business should appoint qualified personnel to manage and maintain the computer server, conduct routine maintenance checks, and promptly fix the server; on the other hand, the business should upgrade its information network, install a strong and trustworthy firewall, and perform adequate data backups. Second, businesses should carefully choose their accounting service providers, giving preference to those with a high level of security and dependability. Finally, state agencies must swiftly create and update pertinent laws and regulations, severely sanction breaches of corporate information security, and safeguard societal information security as a whole.



## ***2.5 Challenges of Management Accounting in the Big Data Era***

### **A Shortage of Talented Management Accountants**

The capability of accountants determines how well management accounting performs in businesses. Higher standards are set forward for compound talents that combine management skills and computer technologies in the age of big data. Management accounting is not always as advanced in emerging nations as it is in developed nations. For instance, management accounting in China is ineffective mostly due to a dearth of qualified personnel and a late start to development, making it less developed than management accounting systems in western nations. States The majority of the financial audit, finance, and other specialized accounting employees are in charge of management accounting; yet, because they lack the requisite computer and data mining abilities, they are unable to effectively use big data in business management accounting. Management accountants should not only have contemporary management competence, such as finance, but also be Master of Computer knowledge and big data's technological understanding to avoid falling into the trap of low-end accounting abilities and structural redundancy in domestic management accounting.

### **Information Security**

For anticipating phases, management accounting needs a lot of data. The big data era has so far made information security one of the major issues. "Data of the cyber domain encompasses a large spectrum, such as sensors, social networks, and emails," it was noted. The risk of information leaking is inevitably increased with data collection. Evidently, management accounting in businesses is influenced by the level of data security. Enterprise's view information leaking as an incredible threat since they don't want their competitors to discover the information that is confidential to them. As a result, it has an impact on market equality and competition. Big data offers managers a variety of relevant information, improves the efficiency and convenience of management accounting, while also increasing the risk of leaks that could have an adverse effect on the business in some areas. However, big data is likely to become a prime target for cyberattacks. Hackers have the ability to steal financial data online and sell it to rivals for personal gain. Enterprises should take additional steps to address the concerns by building big data security platforms and raising managers' understanding of the need to ensure information security in the face of the danger to information security in the age of big data.

## **Upgrade the Equipment and Expand Storage**

It is true that there is a shortage of storage space at the moment because more and more businesses are using online storage. As a result, storage space will soon encounter the issue of not being able to store information. The challenge of expanding management accounting storage capacity and modernizing system hardware has grown significantly as a result of the extensive engineering.

## **2.6 Related Solutions**

The five layers of the big data security platform are described in the literature as follows: data storage, data processing, interface, data application, and data management. The security of data storage, according to this research, should be taken into account. It is first necessary to encrypt the data and devise pertinent disclosure security procedures. Furthermore, the data backup process must be done correctly, and hackers must erase data on purpose. In order to ensure that there are no processing errors and to make the data easy to identify, the data processing should be divided into stream processing and batch processing. When extracting information from massive amounts of data, we must thirdly ensure that the network firewall is safe. Big data is useful for management accounting tasks, but it must be handled correctly and safely, which necessitates a speedy resolution of data security issues and the upgrading of security systems.

## **3 Conclusion**

In this article, managerial accounting is literary described in the age of digitization. Over the past few decades, there has been a substantial change in the business climate. Disruptive technologies are being used more and more to manage business operations, and platform-oriented business models are widely available to handle this digital transition. Consequently, the study explores the question of whether and how management accounting has evolved to take into account digitization. There are numerous key conclusions. The traditional idea of management accounting as a decision support system has been superseded by an integrated solution appropriate for massive data environments and strategic planning. A number of technological concerns must be taken into account during the design and deployment of such an integrated MAC. The deployment of ERP, cloud-based technologies, big data analytics, the Internet of Things, blockchain technology, machine learning, and other topics are among the problems. Third, platform-based businesses are growing as a result of the digital revolution, and they heavily rely on agreements between and within companies as well as partnerships in the supply chain. For the MAC to

function in this scenario, confidence is essential. The three key levels where trust-based management accounting is evident are contract, competency, and reputation. An inventive open-book accounting is also advised for inter-firm agreements when related parties (suppliers, vendors, contractors, etc.) are connected through a web of business contracts. The advanced information network enables the distinctive open-book accounting. Finally, the professional landscape has shifted. Management accountants are no longer thought of as the traditional “bin-counters,” who work alone and monitor expenses to control the cost of goods and services. Instead, in the modern, digitalized workplace, management accountants are increasingly taking on the role of business partners. To deal with the issues of a digitalized environment, professionals are increasingly in need of abilities in software, IT, big data analytics, and empathy.

Despite the fact that the essay provides important insights into global economization, the background of future social growth is large-scale and rapid updates in information technology. Modern accounting must keep up with the pace of the big data era and consistently innovate and grow if it is to survive. Future accounting theory and practice will alter significantly, as well as the functions of accounting professionals. On the one hand, as we gradually moved into the big data era, big data technology has enhanced accounting. It does, however, also introduce new challenges. Therefore, in order to keep up with contemporary changes, important departments must quickly adopt and improve pertinent laws and regulations. To sustain steady long-term growth, businesses must seize opportunities, overcome challenges, and increase their competitiveness. Accounting professionals should continuously improve their professional attributes and all-around abilities by learning new material fast.

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# The Impact of Military Expenditure on the Economic Growth in Developing Countries: Evidence from Jordan



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**Abstract** Unquestionably, all nations' top priorities are international peace and long-term, sustainable economic growth. The objective of this study is to scientifically assess how Jordan's military spending has affected economic development between 1970 and 2020. The current study defined a growth equation proposed by Solow based on the body of knowledge already available on growth theories. As a result, we add to the empirical literature in this work by utilizing the OLS approach to investigate the connection between military spending and economic growth. As a result, the goal of this study is to examine the relationship between military spending and economic development in Jordan from 1970 to 2020. Jordan has a rapidly rising economy and a middle-level military budget. According to the empirical findings, military spending has little effect on GDP. Additionally, the result indicates that the macro factors each represents (GDP per Capita, Gross Capital Formation, and Population Growth) have a favorable influence on GDP in Jordan.

**Keywords** Military expenditure · Economic growth · Jordan

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## 1 Introduction

According to the Keynesian perspective, government consumption, which increases demand for goods and services, is a component of military expenditure. Military investment has a variety of effects on economic expansion. Increases in military spending often increase capacity utilization, raise profits, and ultimately boost investment and overall output when aggregate demand is lower than anticipated supply (Abu-Bader and Abu-Qarn 2003). The results of several earlier research (Ahmed et al. 2017; Aizenman and Glick 2006; Al-Adamat et al. 2020; Aldiabat et al. 2022) have been used to support the Keynesian military view of the beneficial impact of military spending on national production. Military expenditure has various favorable benefits on capital, labor, growth, and the efficient use of existing resources, according to a research by Alghusin et al. (2020). There are three main conclusions from the literature: a positive relationship (Al-Okaily et al. 2023a; Al-Omoush et al. 2019; Alrawashdeh et al. 2022), primarily because of the creation of positive externalities (such as a developed infrastructure, peace, and a secure environment for investment, to name a few); a negative relationship (Alshirah et al. 2021), primarily because of the misallocation of resources; and, in a number of papers, there is no obvious relationship between military spending.

Since it is situated in a region that is perpetually unstable and where LDCs have managed to strike a sustainable balance between security and prosperity, Jordan, a small and developing nation in the Middle East, has long been counted among the major military spenders (Alshirah et al. 2022). It is critical to comprehend how a geopolitically significant country has managed in recent decades as Jordan strives to strike a balance between security and economic prosperity. While the actual link differs among nations, research on Jordan has mostly concentrated on multi-country, cross-section analysis, which suggests that military expenditure slows economic development. As a result, a deeper investigation of case studies is essential, particularly for decision- and policy-making (Alsmadi et al. 2023, 2019, 2022a, 2022b; Alsmadi and Alzoubi 2022).

The remainder of the paper is organized as follows. The next section provides short review of the existing literature. Section 3 contains the empirical specification and discusses the data. Section 4 presents the econometric methodology and discusses the empirical results, while Sect. 5 concludes the.

## 2 Literature Review

There is a sizable amount of empirical work looking at how military expenditure affects the economy, but there is no agreement on what these consequences could be. The present discussion was started by early cross-country correlation analyses that supported (Alsmadi et al. 2020; Alsyouf et al. 2021; Aws et al. 2021; Aye et al.

2014; Dimitraki and Menla-Ali 2015), conclusion that military spending has a beneficial impact on economic growth in LDCs. Benoit's equations, correlations, and regressions, according to Dixon and Moon (1986). Most of the later criticism of Benoit is based on the spontaneous nature of his approaches (Doane and Seward 2013) provided a thorough critique of Benoit's study, objecting to both the statistical procedures utilized and the inferences made from the data. Similar to Dunne et al. (1996) findings were viewed as exceptional because the majority of subsequent research has shown that military spending has a negative impact on economic development. A number of literature assessments have also been published, although there is no consensus on the nature of the connection between military spending and economic development. In 102 investigations, (Dunne and Uye 2008) found that 62 cross-sectional studies revealed a favorable association in 19% of them, a negative relationship in 39% of them, and an unclear relationship in 42% of them. The disparities, according to the authors, are the outcome of econometric modeling. For 103 nations, (Dunne and Nikolaidu 2001) observed a favorable association, which was corroborated by (Faini et al. 1984; Halicioglu 2004; Hammouri et al. 2021; Hasan et al. 2021; Hassan and Al-Saci 2004; Hess 1989).

Jordan's military spending and economic development have been the subject of a small number of studies, the majority of which featured Jordan as one of many nations in their cross-section. Be aware that Jordanian data are crucial to Benoit's influential work. Benoit's discovery of a positive correlation between military spending and economic growth, according to Dixon and Moon (1986), Faini et al. (1984), was based mostly on a small number of observations, and Taiwan and Jordan had a significant impact on the overall findings (kasasbeh et al. 2022) revealed similar findings for Turkey and Middle Eastern nations. According to Yaseen (2017), nations with strong military administrations, like Jordan, may exaggerate their rates of economic growth.

Despite the fact that (Looney and Frederiksen 1986) incorrectly referred to Jordan as having a "military government," he insisted that the omission of Jordan, along with Burma and South Vietnam, had no impact on his findings. Lutfi (2020) found that, overall, the military burden appears to slow economic growth in the Middle Eastern nations that don't export oil. They also included a threat index in their analysis because military spending may simply be a response to external threats (Lutfi 2021, 2022; Alzoubi et al. 2022; Mintz and Stevenson 1995; Morgan et al. 2019; Noe 2020; Nusairat et al. 2021) found a link between Jordan's military spending rise and economic expansion.

The foregoing research only paints a limited picture of the link between military spending rise in Jordan. Multi-country studies inherently lack depth at the level of the particular nation. Additionally, a lack of consistency on whether the relationship in Jordan is favorable, negative, or not discernable is revealed by a review of earlier studies. A closer examination of Jordanian growth and military spending over a longer period of time may provide light on the nature of the link and either support or refute the findings of earlier research.

### 3 Method

#### 3.1 Empirical Methodology

##### Model Specification

Based on the body of research on growth theories, the current study defined a growth equation first proposed by Solow, which was also utilized by (Nusairat et al. 2021; Oudat et al. 2020a) This equation states that aggregate production is produced by inputs, particularly physical and human capital, when they are combined. The four inputs that make up the Solow model are output (Y), capital (K), labor (L), and “knowledge” or the “effectiveness of labor” (A), while time (t) serves as the fifth input. The economy uses a mix of a particular quantity of labor, capital, and knowledge to generate output. The following is how the model may be expressed mathematically:

$$Y = A(t)F(K, L) \quad (1)$$

Following the current research, such as (Oudat et al. 2020b), define the empirical model by include military spending in the growth equation. To experimentally validate the effect of military spending as a proportion of GDP, a multivariate probabilistic model based on the augmented production function is utilized in this study. In earlier research papers, such as those by Qasaimieh et al. (2022a), similar growth models that include military spending were also often utilized. The following symbols can be used to describe the multivariate regression equation employed in this study:

$$y_t = \alpha_i + \alpha_1 y_{t-1} + \alpha_2 \times 1_t + \alpha_3 \times 2_t + \alpha_4 \times 3_t + \alpha_5 \times 4_t + \epsilon_t \quad (2)$$

In Eq. (2)  $\alpha_1, \alpha_2, \alpha_3, \alpha_4,$  and  $\alpha_5$  symbolizes the estimated coefficients, the  $t$ th time period, respectively ( $i = 1, 2, \dots, N = 35; t = 1, 2, \dots, T = 50$ ). where  $y$  is the growth rate of GDP per capita,  $\times 1$  the initial level of GDP per capita represents the degree of development,  $\times 2$  gross fixed capital formation as a share of GDP (a proxy for investment),  $\times 3$  military spending as a share of GDP,  $\times 4$  the rate of population growth, and  $\epsilon_t$  is an error term that depicts the effects of other variables not taken into account in the model. The assumption is that the error term ( $\epsilon_t$ ) will be distributed independently and identically ( $\epsilon_t \text{ iid } (0, 2)$ ).

##### Data and Sources

The 50-year period from 1970 to 2020 in Jordan is covered by the yearly time-series data used in this study. All information was taken from the World Bank and the World Development Indicators.

## 4 Data Analysis and Hypothesis Examination

In order to present the results of the study's statistical analysis, the current chapter points to the descriptive analysis of the study's variables, selects the availability of data for the suggested model for the study, and chooses the study hypothesis. The results of the study's tests are based on data collected over a specified time period through CBJ that are related to military expenditure and macroeconomic factors and their impact on GDP.

Descriptive statistics tests were handled based on the following Table after data regarding the study's variables were extracted from the CBJ, which is represented in a time series beginning in 1977 and finishing in 2020.

The results of the descriptive statistics of the study's data on GDP throughout the study period are shown in Table 1. By examining the arithmetic mean for the research's data on GDP, we can see that throughout the study period, it reached (1.052972) with a standard deviation of (5.369143), with the greatest value being (17.38409) and the lowest value being (- 14.47883). Regarding GDP per capita, the median value throughout the study period was (1508.447), with a standard deviation of (947.9365), while the greatest and lowest values, respectively, were (3127.896 and (316.7901). Gross capital creation averaged 27.07891 over the research period, with a standard deviation of 7.292747; the greatest value was 46.02747 and the lowest value was 11.94205. Regarding military spending, the median value for the research period was (7.060447), with a standard deviation of (2.434523), while the greatest and lowest values, respectively, were (12.52930 and (4.241490. Regarding population growth, the midpoint throughout the research period was (3.567683), with a standard deviation of (1.283696), and the greatest and lowest values were (5.614540) and (0.999209), respectively. The previous table shows that the skewness and kurtosis indicators are within the acceptable range between (- 1.5) and (+ 1.5) for skewness and between (- 3.5) and (+ 3.5) for kurtosis. Alghazzawi et al. (2022) claims that this supports the prior Jarque-Bera test finding that the study's variable information is appropriate for the circumstances of a normal distribution. Prior to performing a statistical analysis test for data obtained using an Ordinary Least Squares (OLS) analysis, it is crucial to ensure that the data are suitable for statistical analysis by performing a number of statistical tests, including those for normal distribution, autocorrelation, and linear interference in addition to a data stability test for the study variables (Stationary Test) associated with the study model (Liang et al. 20). Numerous studies, such as (Al-Okaily et al. 2022; Oudat et al. 2020b), contend that if the study is to be applied to a sample relevant to the study community, the study variables must conform to the normal distribution in order to demonstrate that this sample shares the characteristics of the study community. If the study is applied to a sample from the study population and there is a time series with more than 30 observations, it is possible to infer that the variables exhibit the properties of a normal distribution, (Qasaimeh et al. 2022a) are all in agreement. But when the study model's data distribution moderation was evaluated using the Jarque-Bera test, the results were as follows:



**Table 1** Descriptive statistics

Variable	GDP	GDP per capita	Gross capital formation	Military expenditure	Population growth
Mean	1.052972	1508.447	27.07891	7.060447	3.567683
Median	0.338619	1141.467	26.55642	6.219327	3.834170
Maximum	17.38409	3127.896	46.02747	12.52930	5.614540
Minimum	− 14.47883	316.7901	11.94205	4.241490	0.999209
Std. Dev	5.369143	947.9365	7.292747	2.434523	1.283696
Skewness	0.451727	0.592007	0.253928	0.689682	− 0.167358
Kurtosis	1.088108	1.757559	2.858160	2.214983	1.931998
Observations	44	44	44	44	44

The Jarque–Bera test results shown in Table 2 may be evaluated using the moderation of data distribution in the research model. It is feasible to analyze all study variables that follow the normal distribution since (Qasaimeh et al. 2022b) report that the probability value (Sig) for all variables rose from (0.05). To make sure that the study model did not encounter the problems of auto-correlation and multi-collinearity for the purpose of conducting the (OLS analysis test), it was necessary to conduct the multi-collinearity test based on the variation coefficient and the auto-correlation test based on the Durbin-Watson test as these issues may hinder the model’s ability to interpret the results optimally.

Because all of the research variables had a lower value of the VIF index ( $VIF = 5$ ), the findings in Table 3 demonstrate that there is no problem with multi-collinearity across the variables. This demonstrates that multi-collinearity between the research variables does not provide a problem that might impair the validity of the results of the study model (Sandri et al. 2022). There is also no auto-correlation in regard to the research models, as indicated by the Durbin-Watson test result value of (1.929154). In the research model, a Durbin-Watson test result between 0 and 1.5 denotes a positive correlation, a value between 2.5 and 4 denotes a negative correlation, while a value between 1 and 1.5 denotes no auto-correlation, according to Abu-Salih et al. (2022) and Lutfi et al. (2022). As a result, it is possible to trust the study model’s variables to deliver accurate results Table 4.

**Table 2** Results of Normal distribution test

Variable	Sig.	Statistic (Jarque–Bera)
GDP	0.086950	9.490115
GDP per capita	0.067200	5.400172
Gross capital formation	0.775020	0.509734
Military expenditure	0.099362	4.617974
Population growth	0.317183	2.296551

**Table 3** The validity of the study data for statistical analysis

Variable	VIF
GDP per capita	2.876489
Gross capital formation	1.778233
Military expenditure	2.589474
Population growth	1.325648
Durbin-Watson = 1.929154	

**Table 4** Multicollinearity matrix test results, to determine the strength and type of correlation between all variables as follows

Correlation						
Probability	GDP	GDP per capita	Gross capital	Formation	Military expenditure	Population growth
GDP	1.000000					
	–					
GDP per capita	– 0.264046	1.000000				
	0.0833	–				
Gross capital formation	0.427178	– 0.503435	1.000000			
	0.0038	0.0005	–			
Military expenditure	0.249697	– 0.678149	0.461340	1.000000		
	0.1021	0.0000	0.0016	–		
Population growth	– 0.282301	– 0.010323	0.430239	0.084778		1.000000
	0.0434	0.9470	0.0036	0.5843		–

There are some correlations between the macroeconomic factors and GDP, with the highest correlation being between gross capital formation and GDP (Correlation = 0.427178; Sig. = 0.0038), which shows a positive correlation at a (1%) significant level; and population growth and GDP, which shows a statistically significant negative correlation at a significance level of (5%) with a value of (Correlation = – 0.427178; Sig. = 0.0038).

The aforementioned test also revealed some correlations between independent variables represented by macro factors. The strongest correlation was (Correlation = – 0.678149; Sig. = 0.00), indicating a negative correlation between GDP per capita and military expenditure at a (%) significant level; this was followed by (Correlation = – 0.503435; Sig. = 0.0005), indicating a negative correlation between GDP per capita and health care spending between gross capital formation and military expenditure; which suggest that there is a positive correlation between both variable, while

**Table 5** Unit root test

Variable	T-Statistic	Prob.*	The result
GDP	- 3.397704	0.0165	Stability
GDP per capita	- 3.576683	0.0148	Stability
Gross capital formation	- 4.884127	0.0004	Stability
Military expenditure	- 3.100172	0.0257	Stability
Population growth	- 3.229129	0.0255	Stability

the lowest correlation is reflected between gross capital formation and population growth, indicating a statistically significant negative correlation at a significance level of (1%) with a value of (Correlation = 0.430239; Sig . = 0.0036). The findings of the multi-collinearity test between the independent variables, which found that there is no multi-collinearity between the independent variables based on the decrease in the correlation values between these variables for less than (75%).

#### ***4.1 Data Stability Test for the Study Variables (Stationary Test)***

If the significance level of the test value is higher than 0.05, the unit root (unstability in the time series) will be used as the basis for the Dickey-Fuller test. The following outcomes were dispersed throughout the study sample's data:

Table 5 shows the results of the Dickey-Fuller test's stability analysis of data pertaining to the research variables. This demonstrates that all data from time series utilized in the study is stable throughout time since all P-values for variables are less than 5%. We reject the idea that a stable time series would have a unit root for this reason.

#### ***4.2 Main Results***

The primary hypothesis and its supporting hypotheses were put to the test, and the findings showed that macroeconomic factors have no effect on Jordan's GDP when using ordinary least squares:

The computed T value is also shown (Prob. = 0.5972; T-Statistic = 0.532827), which is over the 5% level of significance and indicates that the effect is not statistically significant. The null hypothesis, which argues that "there is no impact of military expenditure on GDP in Jordan," is accepted in light of this finding, which shows that there is no relationship between military spending and GDP. The effects of the macroeconomic variables each represents (GDP per Capita, Gross Capital Formation, Military Expenditure, and Population Growth) on the GDP in Jordan are

also shown in Table 6. The statistical analysis's findings revealed a decline in the F test's significant level, with the value of estimated F reaching (Prob(F-statistic) = 0.000061; F-Statistic = 8.300694) which is less than (0.05) indicates that there is statistically significant evidence that macro variables have an influence on GDP in Jordan. As a result, the null hypothesis is rejected and the alternative hypothesis, "There is an impact of macro factors on GDP in Jordan," is accepted.

The findings show how specific macro issues affect Jordan's GDP. are displayed individually as follows: The GDP in Jordan is unaffected by GDP per capita. The influence of several macroeconomic factors on Jordan's GDP is also shown in Table 6, along with a calculation of the T value (Prob. = 0.3873; T-Statistic = 0.874325), which is over the 5% level of significance and denotes that it is not statistically significant. The first null sub hypothesis, "There is no impact of GDP per capita on GDP in Jordan," is accepted since this result shows that there is no relationship between GDP per capita and GDP. Additionally, Table 6 illustrates the effect of gross capital formation on GDP in Jordan, suggesting that the computed T value is statistically significant (Prob = 0.00; T-Statistic = 4.635771), lower than the significant level of (0.05). This finding suggests that gross capital expansion has a favorable effect on GDP (t-Statistic = 4.635771). The alternative hypothesis, which argues that "there is an impact of gross capital formation on GDP in Jordan," is accepted as a result of the rejection of the first hypothesis. The value of estimated T (Prob = 0.0001; T-Statistic = - 4.443255), which is less than the significant level of (0.05), indicates that it is statistically significant, according to Table 6. According to this finding (t-Statistic = - 4.443255), population expansion has a negative effect on GDP. As a result, the fourth null sub hypothesis is disproved, and the alternative hypothesis—that population increase has an effect on Jordan's GDP—is accepted.

**Table 6** Results of the OLS

Variable	Coefficient	Std. Error	T-Statistic	Prob.
GDP per capita	0.000988	0.001131	0.874325	0.3873
Gross capital formation	0.535616	0.115540	4.635771	0.0000
Military expenditure	0.222539	0.417657	0.532827	0.5972
Population growth	- 2.518146	0.566735	- 4.443255	0.0001
C	- 7.529211	5.150755	- 1.461768	0.1518
R-squared	0.459855	Mean dependent var		1.052972
Adjusted R-squared	0.404455	S.D. dependent var		5.369143
S.E. of regression	4.143451	Akaike info criterion		5.787580
Sum squared resid	669.5594	Schwarz criterion		5.990329
Log likelihood	- 122.3268	Hannan-Quinn criter		5.862769
F-statistic	8.300694	Durbin-Watson stat		1.929154
Prob(F-statistic)	0.000061			

## 5 Conclusion

The empirical literature has not yet provided a comprehensive response to the important topic of how military spending affects economic growth in emerging nations. As a result, we add to the empirical literature in this work by utilizing the OLS approach to investigate the connection between military spending and economic growth. The purpose of this study is to ascertain the relationship between military spending and economic development in Jordan from 1977 to 2020, a country with a rapidly growing economy and a middle-range level of military spending. According to the empirical findings, military spending has little effect on GDP. Additionally, the result indicates that the macro factors each represents (GDP per Capita, Gross Capital Formation, and Population Growth) have a favorable influence on GDP in Jordan.

The country's macroeconomic fundamentals can also be used to explain the outcomes. Al-Okaily et al. (2021) while there is a one-way relationship between economic development and military spending for a number of nations, there is a two-way relationship for the G7 nations. Therefore, from that perspective, there are at least two theories that might account for our findings: First, Jordan's military expenditure is still limited by its low GDP and slow economic growth as a developing nation with limited resources. Therefore, the government can only raise its spending to strengthen its military capability as the economy expands. The first reason and the second explanation are connected. Jordan is a net importer of weapons, according to the Stockholm International Peace Research Institute, which indicates that the country's limited resources and foreign exchange reserves should be used to pay for military expenses. Jordan therefore cannot afford to pay for its military expenses without a greater GDP growth rate. However, it appears that this effect is only relevant for developed countries that have more advanced military technology and export capacity. Proponents of the spin-off effect assert that military expenditures contribute to economic growth through modernization, training, and infrastructure.

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