Technical and Vocational Education and Training:
Issues, Concerns and Prospects 38

Reem Khamis Hamdan
Allam Hamdan · Bahaaeddin Alareeni
Rim El Khoury *Editors*

Information and Communication Technology in Technical and Vocational Education and Training for Sustainable and Equal Opportunity

Education, Sustainability and Women Empowerment

Springer

Technical and Vocational Education and Training: Issues, Concerns and Prospects

Volume 38

The purpose of the Technical and Vocational Education and Training: Issues, Concerns and Prospects Book Series is to meet the needs of those interested in an in-depth analysis of current developments concerning various aspects of education for the world of work with particular reference to technical and vocational education and training. The Series examines areas that are at the 'cutting edge' of the field and are innovative in nature. It presents best and innovative practice; explores controversial topics and uses case studies as examples.

The audience includes policy makers, practitioners, administrators, planners, researchers, teachers, teacher educators, students and colleagues in other fields interested in learning about TVET, in both developed and developing countries, countries in transition and countries in a post-conflict situation. The Series complements the International Handbook of Technical and Vocational Education and Training, with the elaboration of specific topics, themes and case studies in greater breadth and depth than is possible in the Handbook. Topics covered include: training for the informal economy in developing countries; education of adolescents and youth for academic and vocational work; financing education for work; lifelong learning in the workplace; women and girls in technical and vocational education and training; effectively harnessing ICT's in support of TVET; planning of education systems to promote education for the world of work; recognition, evaluation and assessment; education and training of demobilized soldiers in post-conflict situations; TVET research; and, school to work transition.

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Foreword

Access to education is vital including higher education, technical, and vocational; recently, the United Nations highlighted the necessity for integration of ICT and numeracy skills in education at multiple levels as it is the direction towards sustainability. Countries that have a well-established system utilize the qualification frameworks to ensure integrating ICT and numeracy within the offered qualifications. However, there is lack of clarity between technical, vocational, professional, and higher education skills in some countries, and therefore, the value of qualification differs and in some cases is not appreciated. ICT technical and vocational education for training is vital; in some countries, it has been found that ICT jobs are more equipped by males by 75% rather than females. There have been calls for equal opportunity in recruitment in fields related to ICT and engineering to ensure a sustainable future as part of thought leadership. Several studies have highlighted that ICT technical and vocational training is found more convenient to women with families as it is shorter in terms of duration and provides potential skills for progression pathways. This book provides chapters with insights on different practices of integrating ICT in different types of education to support progression and career pathways; the book includes chapters that focus on gender and equal opportunities for a sustainable future. Considering the chapters of this book, I could assure that the chapters include insightful outcomes for researchers and policy makers that could lead to a real impact on the society towards sustainable future. The editor of this book assures a selection of high-quality research papers that supports diversity of case studies and practices that captures the topic from multiple backgrounds.

Ahlia University, Manama, Bahrain Esra AlDhaen

Series Editors' Introduction

The widespread emergence of new, diverse information and communication technologies (ICTs) has had a profound impact on most aspects of human life. ICTs consist of technological tools and resources being used to store, create, share, or exchange information. Technologies include (but are not limited to) the internet, wireless networks, cell phones, computers, software middleware, videoconferencing, social networking, and other media applications and services. These technologies have made it much easier to send messages, by telephone, radio, television, and the internet.

ICTs are routinely used in homes, schools, and workplaces, having become a powerful support for communities of learning and practice. Computers and internet access have transformed the way many people work, with businesses rarely producing written letters or reports or using typewriters anymore. Documents are more likely to be sent by email than by post or fax, while employees with laptops or smartphones can work from home or while they travel. In the areas of education and training, ICT provides flexibility and availability of learning materials to all students in different locations. Students have access to a lot of data, which helps them engage in self-directed learning.

This particular volume is part of a cluster of three, edited by Reem Khamis Hamdan, Allam Hamdan, Bhaaeddin Alareeni, and Rim El Khoury, which examines key aspects of information and communication technologies (ICTs) in technical and vocational education and training.

The overall title of the cluster of three books is **Information and Communication Technology (ICT) in Technical and Vocational Education and Training (TVET) for Sustainable and Equal Opportunity.**

There are three related volumes, namely:

- Education, Sustainability and Women Empowerment
- Business Governance and Digitalisation of Business Education
- Future of Education, Vocational Education and Training After COVID-19

This particular volume (Education, Sustainability and Women Empowerment), of 48 chapters, consists of two parts: Role of ICT, Vocational Education and Training in Women's Empowerment (Part I) and Digital Learning, Innovation and Sustainable Operations (Part II).

This is the latest book to be published in the long-standing Springer book series of *Technical and Vocational Education and Training*. It is the 20th volume to be published to date in this TVET book series.

It is increasingly accepted by governments and policy makers worldwide that skill development for employability and TVET have a crucially important role to play if countries throughout the world are going to be able to achieve the United Nations Sustainable Development Goals (SDGs). In fact, many argue that education and training are the master key to achieving the SDGs, with enhanced skill development for life and employability having a particularly important part to play.

In terms of the Springer book series in which this volume is published, the various topics dealt with in the series are wide ranging and varied in coverage, with an emphasis on cutting-edge best practices and education innovations for development. More information about this book series is available at http://www.springer.com/series/5888.

We know from the feedback received from researchers, policy makers, and practitioners worldwide that this book series makes a useful contribution to knowledge sharing about skill development for the world of work and TVET. Any readers of this book or other volumes in the series who have an idea for writing or editing their own book are enthusiastically encouraged to approach the series editor directly or through Springer to publish their own volume in this series, since we are always willing to assist perspective authors to shape their manuscripts in ways that make them suitable for publication in this series.

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Preface

Information and communication technologies (ICTs) have dramatically changed the way we learn and work. They have created new opportunities along with new challenges, putting profound and urgent implications on vocational education and training (VET). Nowadays, we must think broadly and make the right choices about VET using innovation and digitalization to boost the quality of vocational education and training, enable the upskilling and reskilling of adults, and enhance the employability of learners. The potential and the impact of ICTs in vocational education and training have yet to be fully exploited, leading to an emerging direction of research. The purpose of this book is to provide an in-depth analysis of current development concerning ICTs with reference to vocational education and training. It presents best and innovative ICT-based solutions implemented in education and explores controversial topics such as challenges and opportunities. Practitioners, administrators, researchers, teachers, teacher educators, students, and colleagues are interested in learning about vocational education and training.

This book includes 48 chapters. Part of the chapters of this book are based on direct personal invitations, while the other part was carefully selected from the 6th Equal Opportunities Conference "Sustainable Leadership and Technology Innovation Management" (EO2023). All of the chapters have been evaluated by the editorial board and reviewed based on double-blind peer review system by at least two reviewers.

The chapters of this book are divided into two main parts:

I. Role of ICT, Vocational Education and Training in Women Empowerment
II. Digital Learning, Innovation and Sustainable Operations

The chapters of this book present a selection of high-quality research on the theoretical and practical levels, which ground the uses of smart technologies in business, healthcare, media, marketing, education, entrepreneurship, and other vital areas. We hope that the contribution of this book will be at the academic level and for decision-makers in various economic and executive levels.

Manama, Bahrain — Allam Hamdan
Manama, Bahrain — Bahaaeddin Alareeni
Bahrain, Turkey — Rim El Khoury
Zouk Mosbeh, Lebanon — Reem Khamis

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Part I
Role of ICT, Vocational Education and Training in Women Empowerment

The Digital Transformation for UTMSPACE Educational Sustainability and Technology Innovation: An Enterprise Architecture Approach

Nur Azaliah Abu Bakar, Nik Maria Nik Mahmood, Mohammad Ahmad Nasrul, Roslina Ibrahim, and Suraya Yaa'cob

Abstract Digital technologies are transforming higher education institutions (HEIs) and pedagogy. The digital campus and classroom with an interactive online class platform and the digital learning environment require HEIs to adapt to new technology. However, combining existing education procedures and finding the best cutting-edge technological solutions make it difficult for most HEIs to install the best digital technologies. Due to its adherence to traditional education techniques, the education industry, UTMSPACE, one of the HEIs in Malaysia, is behind in the digital transition. The alignment of the education business process is believed to be essential for the integration of new technologies. UTMSPACE should use complete digital solutions for student admission and registration, academic programme administration, lecture and class delivery, and financial management and governance. Enterprise architecture (EA) is a proven approach to address the alignment of business processes and IT infrastructure, as it can demonstrate integration and standardisation. This chapter describes the development of an EA framework solution to improve the educational environment of UTMSPACE for digital transformation. Consequently, the entire UTMSPACE educational environment is presented in a holistic and integrated view, including business, applications, data, ICT infrastructure, and security. The process begins with an investigation of the current situation and concerns and then with the development of the UTMSPACE EA framework. This will significantly improve operational issues and service delivery and integrate digital education innovations to continue to promote UTMSPACE's education transformation agenda and align UTM Envision 2025.

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Keywords Digital transformation · Enterprise architecture · Higher education institution · Sustainable education · Technology innovation

1 Introduction

Digital technologies are changing higher education institutions, as well as pedagogy, teaching, and learning, at a rapid pace due to technological advancements. Since the introduction of the digital campus and the digital classroom, higher education institutions (HEIs) have been using virtual and augmented reality (VR and AR), interactive walls, and digital learning environment to continuously adapt to new technologies (Kadhim & Aljazaery, 2023). Even so, using cutting-edge digital technologies in higher education is becoming increasingly challenging because it is challenging to integrate current business processes and select the most cutting-edge and quickest technology solutions. The education sector, especially higher education, lags behind other sectors in digital transformation due to its continuous dependence on proven and real teaching and learning strategies (Akgün-Özbek & Özkul, 2023).

The term 'enterprise architecture' (EA) refers to a method of IT and business alignment that helps achieve organisational objectives. By offering a detailed overview of organisational business processes, EA positively influences organisation growth. The EA has shown success in facilitating organisational decision-making in addition to developing plans and artwork as a guide. EA also helps align IT strategies to support organisational decision-making and improve change management (Amiruddin & Bakar, 2022). This idea is embodied in the platform or model for planning the improvement of organisational structures, operational procedures, information systems, and IT infrastructure. To ensure that new technology can be incorporated into current business processes, alignment of organisational structures is deemed essential. HEIs should transition to comprehensive digital solutions for fundamental education business operations such as student admission and registration, academic programme administration, lecture and class delivery, and financial management and governance (Kähkipuro, 2019). The EA shall benefit the HEI by increasing the reusability, reducing the complexity and cost, and improving interoperability and integration. Additionally, EA can act as a convergence of business and technology strategy, strengthening cross-department collaboration, strengthening capability development, and realigning in the digital transformation plan (Marks & Al-Ali, 2022).

The School of Professional and Continuing Education (UTMSPACE) is one of the faculties at UTM that offers and performs teaching and learning activities for UTM academic programmes such as UTM Foundation, UTM Diploma, Bachelor of Business Administration (BBA), Bachelor of General Studies (BGS), and International Degree Programmes (IDP). These academic programmes are categorised under the Public University Private Wing (PUPW) initiative and accredited by Malaysian Qualification Agency (MQA). UTMSPACE provides full-time and part-time academic programmes in partnership with UTM faculties, as well as

seminars, conferences, workshops, and other professional development programmes for working professionals. Beginning in 2000, UTMSPACE experienced remarkable growth as a result of increased public demand for part-time programmes and professional development programmes with various corporate enterprises. UTMSPACE also served as a resource for other higher education institutions involved in lifelong learning programmes. Due to the force of digital transformation and the various services offered by UTMSPACE, the existing operational capacity of UTMSPACE cannot meet these demands optimally (UTMSPACE, 2017).

This chapter explains the EA framework for UTMSPACE to realise the digital transformation of the education ecosystem comprised of business, data, applications, and technology. The objective is to improve current operational issues and the quality of service delivery by improving manual processes, information, and operational solutions of ICT. Significantly, this study will be the inception for the digital transformation of UTMSPACE educational sustainability and technology innovation ranging from strategic to solution architectures in both business and technology aspects.

2 Literature Review

New digital technologies including the Internet of Things (IoT), big data, cloud computing, mobile systems, and collaborative networks have given rise to a new phenomenon known as digital transformation (Zimmermann et al., 2018). The term 'digital transformation' refers to the use of cutting-edge information and communication technology to radically enhance corporate operations and permeate all facets of the customer experience (Reis et al., 2018). Customer experience, operational procedures, and business models are the three most important aspects of an organisation to alter throughout a digital transformation (Nahrkhalaji et al., 2018).

According to (Kaputa, Loučanová, & Tejerina-Gaite, 2022), the digital revolution has an impact on all HEIs, as it pervades all HEI procedures, locations, forms, and goals for education and research. To meet the needs of students and staff in developing new digital skills for their current and future work environments, institutions are upgrading their physical infrastructure and increasing their use of digital media and technologies for teaching and learning, research, support services, administration, and communication (Ostmeier & Strobel, 2022). ICT has recently played a crucial role in shaping the future of education and improving service provision through influencing the digital education ecosystem. Aligning business, data, application, and technology in the real-time ecosystem is always a big challenge because most problems in the digital education ecosystem are related to execution rather than strategy. Higher education institutions (HEIs) in particular lag behind other businesses in terms of digital transformation because they are wedded to outdated teaching and learning techniques and practices (Abad-Segura et al., 2020).

Higher education institutions (HEIs) should establish a well-defined plan for their digital transformation. The university needs a long-term plan that will facilitate

cross-departmental cooperation on digital projects (Coral & Bernuy, 2022). The university's success in the modern era of technology will be due in large part to the dedication of its students, faculty, researchers, staff, and administration. This procedure includes the enhancement of faculty members' digital methods of instruction of faculty members, the development of the digital competence, and the smooth functioning of the institution as a whole (Benavides et al., 2020). Without a doubt, digital transformation has an impact on the sustainability of education. Combining these, digitalisation may represent the key to increasing the number of students who have access to Education for Sustainable Development (ESD). The digital transformation of the global education industry reinforces the future road map to sustainable education management (Ahel & Lingenau, 2020). Reaching a relatively sustainable stance for universities requires their readiness to adapt to significant changes imposed by the external environment, as well as incorporating important trends as part of their digital transformation plan.

In 1992, the Universiti Teknologi Malaysia (UTM) received approval from the Malaysian Ministry of Education to open a School of Professional and Further Education, which marked the beginning of what is now known as the UTMSPACE. Throughout SPACE's history, it served as a hub for continuing education opportunities for working professionals through seminars, conferences, and workshops, as well as part-time academic programmes developed in tandem with UTM faculty. For nearly three decades now, UTMSPACE has provided transnational programmes where academic programmes are delivered through a franchise approach, offshore, or hybrid mode. These programmes have included everything from undergraduate UTM academic programmes to joint and collaborative academic programmes with private universities in Malaysia (UTMSPACE, UTMSPACE STRATEGIC PLAN 2018–2022, 2017).

To highlight the need for integration and standardisation in an organisation's operational model, EA is a concept that aligns business operations with IT infrastructure (Bakar, Selamat, & Kama, 2017). In addition, this architecture is a conceptual blueprint that establishes the structure and operations. This architecture is also a mental map of how things will work. An EA's primary objective is to identify the most efficient approaches to achieving a company's present and future objectives. Gartner predicts that 40% of enterprises will engage enterprise architects to help invent new business breakthroughs made feasible by emerging technologies. 2023 will be a pivotal year for architects and innovators in the field to focus on coordination and artificial intelligence (Gartner, 2019). As can be seen in Fig. 1, enterprise architecture (EA) is composed of four levels: business, data, application, and technological infrastructure. These layers represent the overall operation of an enterprise's information systems, processes, organisational units, and people.

Strategic architecture, segment architecture, and project and solution architecture are the three tiers of architecture defined by the Open Group Enterprise Architecture Framework (TOGAF) (Group T.O, 2023). The finer points of this level of the architectural map are displayed in Fig. 2.

Each level of the architectural map has been broken down into its component parts and explained in detail below. The strategic level architecture describes an

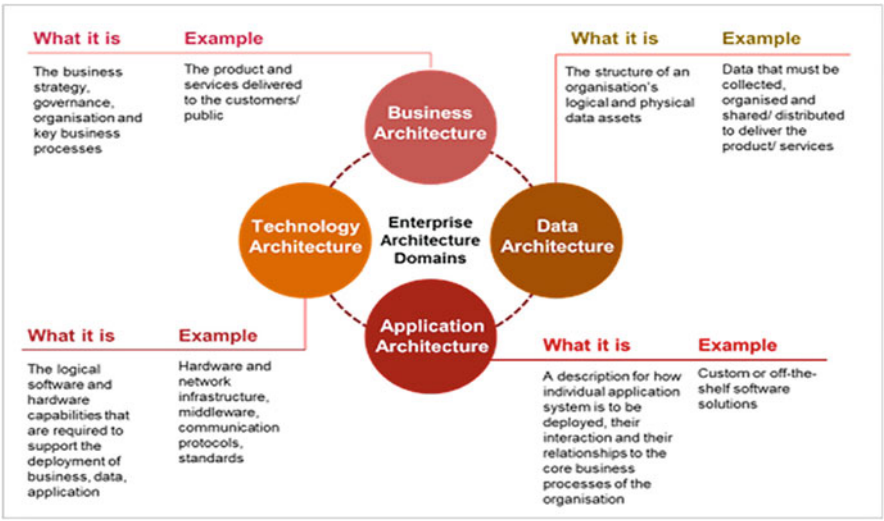

Fig. 1 Enterprise architecture domains

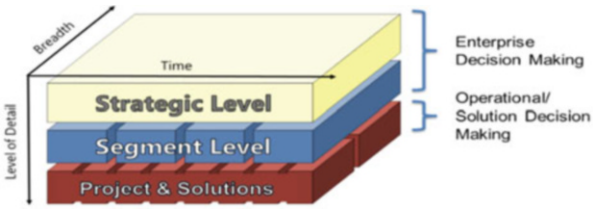

Fig. 2 Enterprise architecture level map (Group, T.O, 2023)

organisation as a whole. The agency's mission and all of its services are set by the data it collects and organises. Compared to the strategic level architecture, the explanations provided by the segment-level design are more in-depth. This is especially true when it comes to core functions, support functions, and additional functions that may or may not be included in the architecture. A comprehensive strategy or programme to realise the desired architecture will be developed using the data collected from the company. Last but not least, the project and solution architectures go further into the architecture details presented in the previous two levels.

The primary goal is to improve the organisation's architecture skills so that they may be used in the products or system applications that are used throughout the company. In summary, a plan to create the desired architecture will be formed from the given details. The overall goal of the UTMSPACE EA architecture is to provide a 360-degree view of the UTMSPACE learning ecosystem. The UTMSPACE management structure and the education business, data, application, and technology ecosystem will serve as the basis for three architecture level maps that will be analysed as part of the framework development.

3 Methodology

The development of the UTMSPACE EA framework will be implemented in accordance with the requirements of the education, service, and digitalisation ecosystem, which comprises the four domains of business, applications and data, ICT infrastructure and security, and governance. Additionally, the development of the UTMSPACE EA framework will be coordinated with the UTMSPACE Vision, Mission, Strategic Direction, Transformation, and other relevant initiatives stated in UTMSPACE Strategic Planning 2018–2022.

The study begins with an investigation of the current situation and concerns and then with the development of the UTMSPACE EA framework. During the investigation phase, this study evaluated the current scenario and issues in the existing business, data, application, and technologies in the UTMSPACE education ecosystem. A series of document reviews and interviews were conducted with the business owner of UTMSPACE services. Based on the current scenario, the UTMSPACE EA framework was developed to illustrate how business services are supported by technology. The framework was developed using EA methodologies, which are TOGAF 9.2 and Archimate 3.0.

4 Results and Discussions

UTMSPACE has a strategic planning, but there is non-existence of IT strategic planning or digitalisation plan. Therefore, the IT operations are based on demand and more towards operational. Due to this nature of traditional IT operation, UTMSPACE is unable to perform the digital transformation, as there is lack of IT strategic planning, lack of resources, and lack of realisation of the existing IT resources. Based on these gaps and limitations, this study analysed and realigned the entire UTMSPACE operation, which consists of stakeholders and users, medium of services, business services, data, service-based applications, and technology services. As a private education institution under UTM, there are various functions available that support the operations of UTMSPACE spanning across relationship management with key stakeholders, managing the delivery of education, as well as back-office operations, for example IT supports, financial, management, people management, and facilities management.

The first step in deploying an EA solution is to define the business requirements. Once these requirements are clarified, the next step is to identify the systems that will need to be integrated into the architecture. This process should include an assessment of existing systems and identification of any new systems that will need to be developed. Once the systems have been identified, the architecture team will need to develop a plan for integrating these systems into a cohesive framework. This plan should include an assessment of existing IT infrastructure and projections for future requirements. The overall architecture developed in this study is shown in Fig. 3.

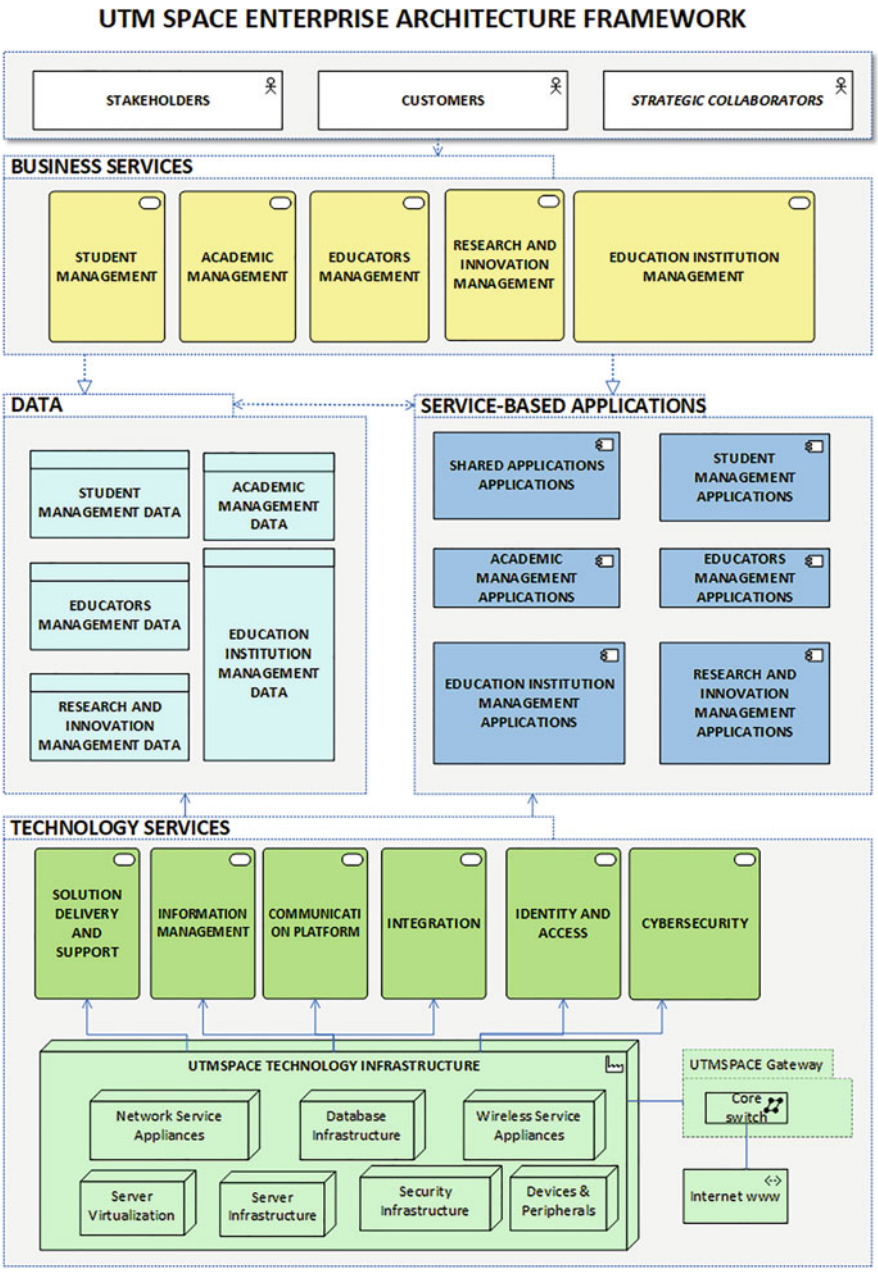

Fig. 3 UTMSPACE enterprise architecture framework

4.1 Business Services Domain

The business services domain includes solutions such as student management, academic management, educator management, research and innovation management, and education institution management. These core elements will help UTMSPACE align their IT initiatives with their overall business strategy and optimise their IT resources, enabling them to modernise their operations. UTMSPACE is currently using several disparate systems to manage their students, academics, and educators. This creates duplication of effort and an inability to share information between departments, reducing efficiency and effectiveness. A single EA solution can streamline the management process by integrating these systems into a cohesive framework that enables better communication, collaboration, and coordination across all divisions within UTMSPACE. Figure 4 shows the business architecture solution for UTMSPACE. Figure 4 shows the UTMSPACE business architecture solution.

The research section covers topics such as online research, academic research, and scholarly resources. It will help UTMSPACE to find and use the best academic resources to improve the quality of their digital education initiatives. The training and support section covers topics such as online training, e-Learning training, and blended learning training. It will help UTMSPACE develop and deliver effective training programmes that meet the needs of its students. UTMSPACE also offers short courses and professional certifications, including online learning certification, e-Learning certification, and adaptive learning certification. This will help

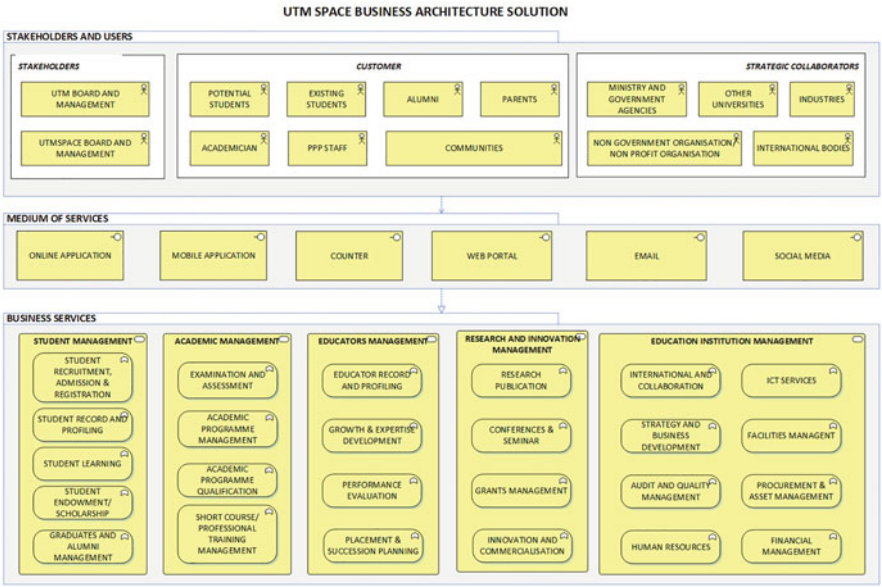

Fig. 4 UTMSPACE business architecture solution

UTMSPACE obtain the appropriate online learning and e-Learning certification to meet the needs of its students. The educator management section covers areas such as educators' communities, blended learning knowledge sharing, and flipped learning communities. It will help UTMSPACE to build strong online and blended learning educators and communities that meet the needs of their students.

4.2 Data Domain

The data domain covers issues such as data governance, data quality, and data integration. It will help UTMSPACE effectively manage and use data to improve the efficiency and effectiveness of its digital education initiatives. This study identified five core groups of the data model that were derived from the business architecture solution. Basically, in each data model group, the subdata model group to describe the information belongs to the same theme, which includes student management information, academic management information, educator management information, education institution information, and research and innovation information. After the data model has been validated, it can be submitted for approval to the business team. If necessary, changes can be made to the model before final approval is granted. Once the architecture has been approved, it can be implemented using a development toolkit. Once users have selected an information modelling tool, it is important to familiarise themselves with its features to create accurate and useful models. Additionally, it is important to test the model using an information modelling tool before submitting it to the business team for approval. In general, designing an information architecture is an important task that should be taken seriously by any organisation looking to improve its efficiency and usability. The details of each data model are shown in Fig. 5.

4.3 Service-Based Application Domain

The service-based applications domain covers the most commonly used software and applications in digital education. It includes concepts such as e-Learning, student portals, and web-based learning tools. These core components will help UTMSPACE develop and deploy effective digital education applications that meet the needs of their students. Applications can be categorised based on the UTMSPACE core business function shown earlier, which falls under student management services, academic management services, educator management services, educational institution services, and research and innovation services. This study also suggested identifying a group of shared applications to highlight their functionality across the organisation. Such applications are but not limited to portal, reporting dashboards, data bank, and business intelligence and analytic systems.

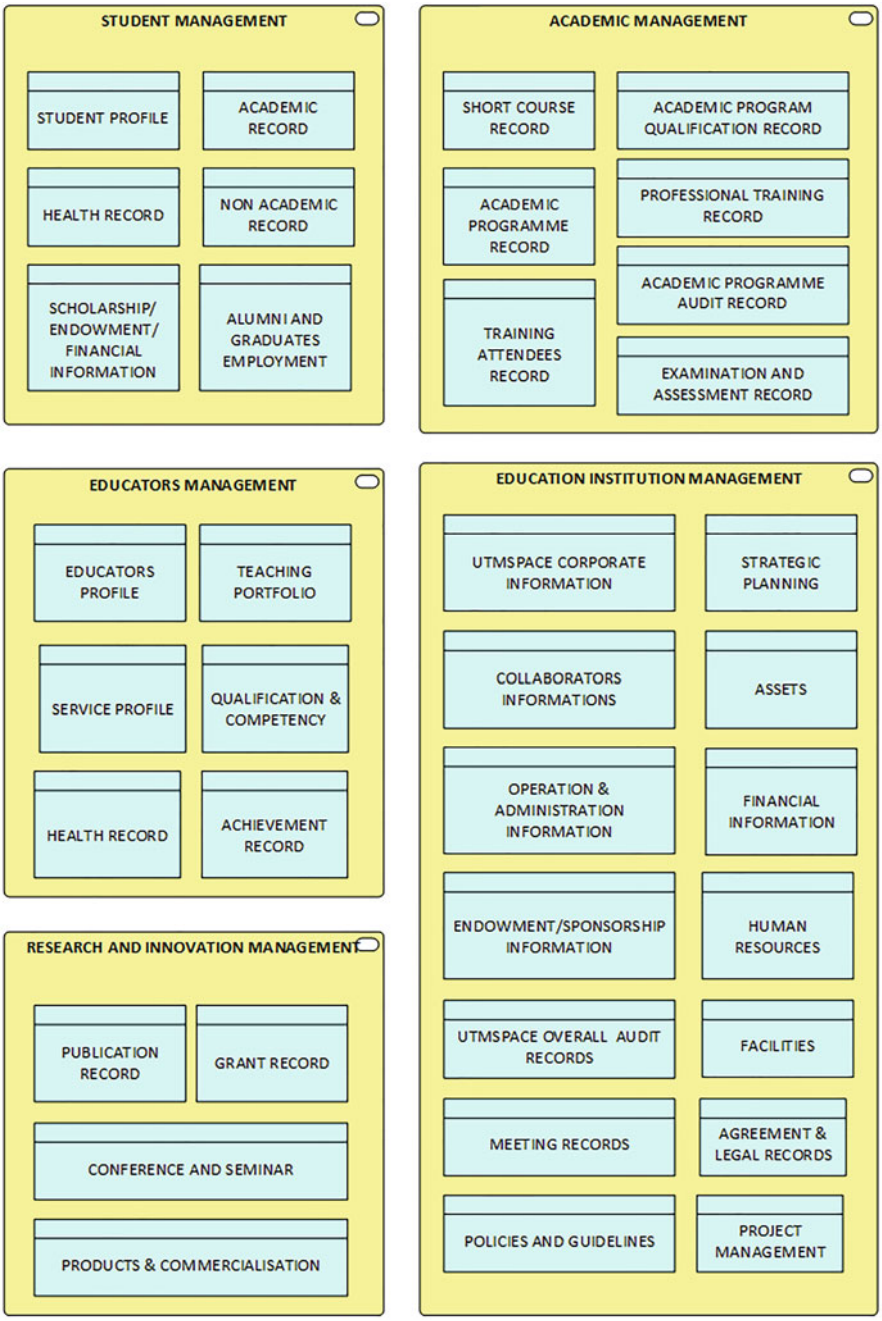

Fig. 5 UTMSPACE data architecture solution

This EA framework is a graphical representation of the system and business components that are included in the current and future solution. This framework should be comprehensive enough to provide a detailed overview of all systems and their relationships, but concise enough to be understood by non-technical personnel. It is important to keep in mind that an EA solution does not simply consist of a collection of systems. Rather, it should provide a comprehensive framework for organising and managing information within an organisation. To achieve this goal, the architecture should include both functional and business components. Functional components include systems responsible for providing core functionality such as student application, examination management, and educator management, while business components focus on supporting specific business processes such as student admission approval or marketing. Therefore, it is important to pay serious attention to the requirement identification step in any future software development project, particularly when deploying an EA solution. By identifying the systems and requirements that will be integrated into the framework, UTMSPACE is able to ensure that the architecture will meet the specific business needs. Additionally, by specifying which systems will be used to support various business processes, they can minimise integration disruptions and maximise efficiency. Figure 6 shows a conceptual framework for the UTMSPACE application architecture solution.

4.4 Technology Domain

The technology domain covers topics such as cloud computing, mobile technologies, big data, and cyber security. It will help UTMSPACE modernise their IT infrastructure and ensure that their digital education initiatives are secure. For example, cyber security components look at information security, data privacy, and cyberattacks. It will help UTMSPACE protect their data and optimise their cyber security measures. UTMSPACE is a leading provider of online learning and digital education initiatives. The technology domain will equip UTMSPACE with the necessary knowledge to ensure that its digital learning environment is secure, efficient, and effective. Taking advantage of this domain, UTMSPACE will be able to improve its overall digital learning experience for students. Furthermore, the domain will help UTMSPACE to comply with current regulations and best practices in the field of cyber security. Figure 7 shows the UTMSPACE technology architecture solution.

5 Conclusion

In conclusion, the proposed EA framework will provide UTMSPACE with the necessary guidance to overcome the challenges of digital transformation. It will also provide a comprehensive view of the current and future IT environment,

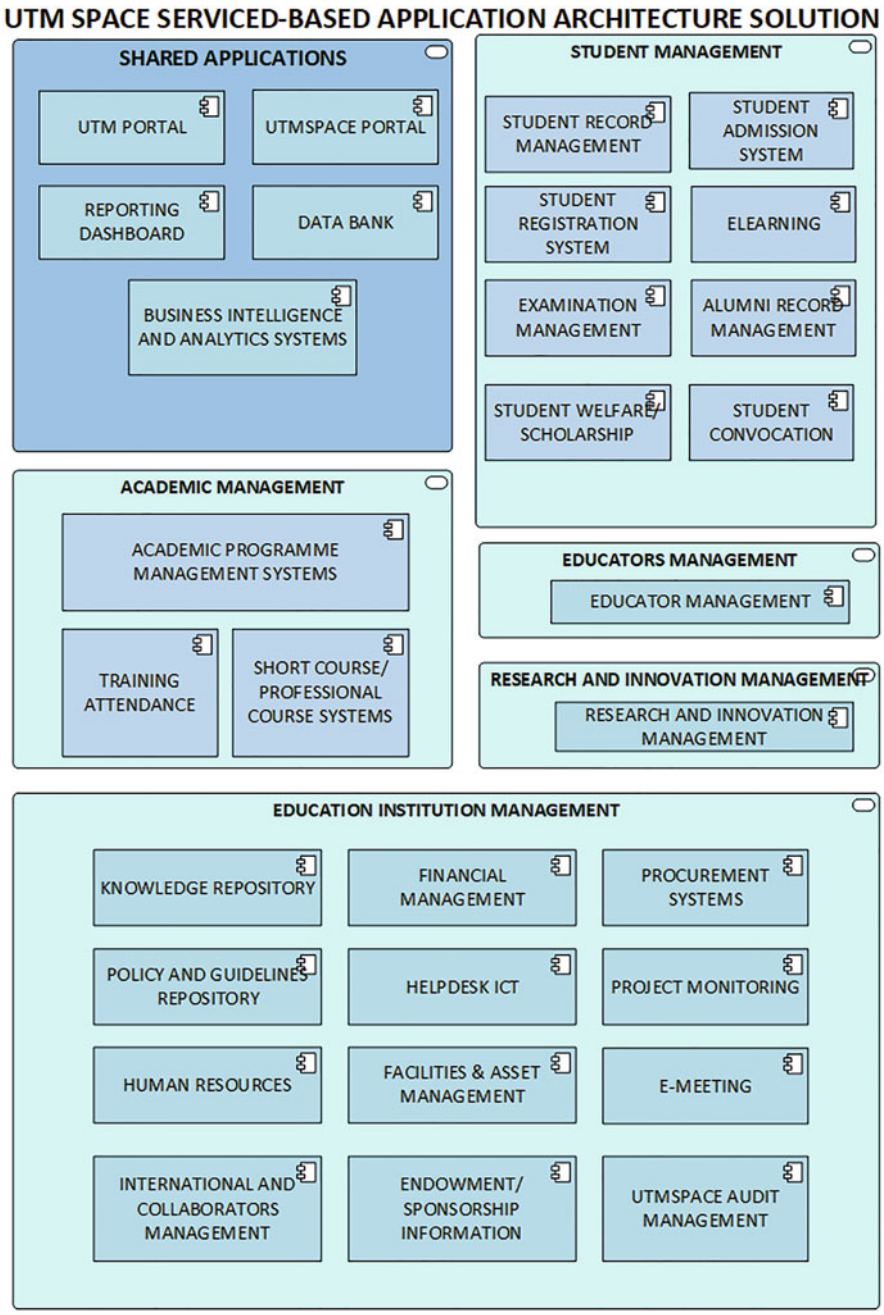

Fig. 6 UTMSPACE application architecture solution

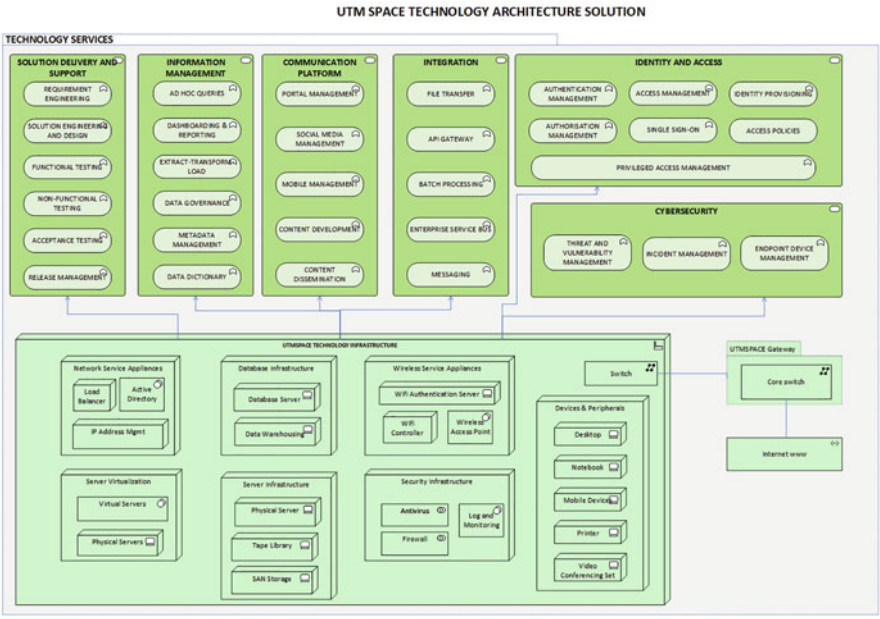

Fig. 7 UTMSPACE technology architecture solution

allowing UTMSPACE to identify the gaps between the current and desired IT environment. From this study, we foresee that the benefits of implementing an EA solution for UTMSPACE include improved information management through system integration, improved process automation through integration of systems, increased efficiency and effectiveness through better coordination and collaboration between departments, and reduced costs through optimisation of its resources.

For future work, this study can be expanded to other kinds of HEIs such as multicampus HEIs located in several countries. This will provide other perspectives and other considerations such as rules and regulation, cultural readiness, and enterprise-wide readiness for changes. For a practical contribution, we recommend that this framework be evaluated by the UTMSPACE business owners. By conducting a thorough evaluation of the EA framework, UTMSPACE shall have an effective road map to overcome the challenges of digital transformation. Overall, a well-executed EA solution can provide significant benefits to an organisation, including improved information management, process automation, coordination, and collaboration between departments and cost savings. However, before an architecture can be successfully implemented, it is essential that the required systems and requirements are identified and clarified. With this information at hand, the next step is to develop a plan to integrate these systems into a cohesive framework. This plan should include an assessment of existing IT infrastructure and projections for future requirements. Once the plan has been developed, testing and deployment of the solution can begin within UTMSPACE. This framework shall be used by

UTMSPACE's business and technology owners to ensure its educational sustainability.

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References

Abad-Segura, E., et al. (2020). Sustainable management of digital transformation in higher education: Global research trends. *Sustainability, 12*(5), 2107.

Ahel, O., & Lingenau, K. (2020). *Opportunities and challenges of digitalization to improve access to education for sustainable development in higher education* (pp. 341–356). Universities as Living Labs for Sustainable Development.

Akgün-Özbek, E., & Özkul, A. E. (2023). *E-transformation in higher education and what it coerces for the faculty, in Research Anthology on Remote Teaching and Learning and the Future of Online Education* (pp. 1086–1111). IGI Global.

Amiruddin, I., & Bakar, N. A. A. (2022). Enterprise architecture on Hadoop eco-system development for political tendency support analytics in Malaysia. *Open International Journal of Informatics, 10*(2), 33–47.

Bakar, N. A. A., Selamat, H., & Kama, M. N. (2017). *Assessing the Capability and Priority of Enterprise Architecture Implementation in Malaysian Public Sector*. PACIS.

Benavides, L. M. C., et al. (2020). Digital transformation in higher education institutions: A systematic literature review. *Sensors, 20*(11), 3291.

Coral, M. A., & Bernuy, A. E. (2022). Challenges in the digital transformation processes in higher education institutions and universities. *International Journal of Information Technologies and Systems Approach (IJITSA), 15*(1), 1–14.

Gartner (2019). Gartner enterprise architecture process. Retrieved 2020, from http://www.gartner.com/technology/research/enterprise-architecture.jsp.

Group, T.O (2023). TOGAF 9.2: The Open Group Architecture Framework Version 9.2. 2022 11 Jan 2023.

Kadhim, J. Q., Aljazaery, I. A., & ALRikabi, H. T. S. (2023). Enhancement of online education in engineering college based on Mobile wireless communication networks and IOT. *International Journal of Emerging Technologies in Learning, 18*(1), 176.

Kähkipuro, P. (2019). IT strategy in the era of digital transformation: Case higher education. *European Journal of Higher Education IT, 1*.

Kaputa, V., Loučanová, E., & Tejerina-Gaite, F. A. (2022). Digital transformation in higher education institutions as a driver of social oriented innovations. In *Social innovation in higher education* (pp. 61–85). Springer.

Marks, A., & Al-Ali, M. (2022). Digital transformation in higher education: A framework for maturity assessment. In *COVID-19 challenges to university information technology governance* (pp. 61–81). Springer.

Nahrkhalaji, S. S., et al. (2018). Challenges of digital transformation: The case of the non-profit sector. In *2018 IEEE international conference on industrial engineering and engineering management (IEEM)*. IEEE.

Ostmeier, E., & Strobel, M. (2022). Building skills in the context of digital transformation: How industry digital maturity drives proactive skill development. *Journal of Business Research, 139*, 718–730.

Reis, J., et al. (2018). Digital transformation: A literature review and guidelines for future research. In *World conference on information systems and technologies*. Springer.

UTMSPACE (Ed.). (2017). *UTMSPACE, UTMSPACE STRATEGIC PLAN 2018–2022*. Kuala Lumpur.

Zimmermann, A., et al. (2018). Evolution of enterprise architecture for digital transformation. In *2018 IEEE 22nd international Enterprise distributed object computing workshop (EDOCW)*. IEEE.

The Important Role of Digital Business Intensity on Ambidexterity and Sustaining Organizational Performance

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Abstract This study aims to explore the effect of digital business intensity concept on organizational ambidexterity and sustaining organizational performance. Several studies have explained the role of the concept of digital business intensity, but a comprehensive and in-depth study of the consequences of digital business intensity on ambidexterity and sustaining organizational performance has not been found yet. This study is expected to provide theoretical and practical contributions in developing the concept of digital business intensity and alternative strategies to increase ambidexterity capabilities and achieve sustainable organizational performance in order to achieve competitive advantage in the context of digital business transformation.

Keywords Digital business intensity · Ambidexterity · Maintaining organizational performance

1 Introduction

Digital business transformation is a part of the dynamics of an ever-changing environment. It requires organizations to provide strategic responses in order to maintain their existence and excel in competition. One of the strategic responses that can be made to answer the phenomenon of digital business transformation is the implementation of digital business intensity concept (Nwankpa & Roumani, 2016). Several experts have recently discussed the concept of digital business intensity, which is believed to play an important role in organizational success in the future

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(Nwankpa et al., 2021); (Wairimu & Liao, 2019). Nwankpa and Datta (2017) define the concept of digital business intensity as that which refers to the level of corporate strategic investment in emerging digital technologies such as analytics, big data, cloud, social media, and mobile platforms in an effort to build an information technology portfolio. The definition of digital business intensity concept above strengthens the belief that this concept can bring benefits to the industry in responding to business challenges that arise in the digital transformation era.

The next strategic response to address the issue of digital business transformation is to implement an ambidexterity strategy (Bråthen et al., 2021). In several studies, ambidexterity has a significant role in improving organizational performance (Pertusa-Ortega & Molina-Azorín, 2018; Severgnini et al., 2018). Ambidexterity is explained as an organizational ability to conduct exploitation and exploration in a balanced way (Kafetzopoulos, 2021; Severgnini et al., 2018). Exploitation activities lead to efficiency and cost savings (March, 1991), while exploration leads to innovative practices (O'Cass et al., 2014). Experts reveal that competitive advantage can be achieved if organizations are able to achieve efficiency (exploitation) and innovation (exploration) in a balanced way (Kafetzopoulos, 2021).

It should be noted that ambidexterity can be achieved effectively if the organization is able to properly implement the concept of digital business intensity. This condition has been conveyed in several relevant studies, that is, digital business intensity increases organizational ambidexterity capabilities (Gastaldi et al., 2021; Mardi et al., 2018). This can happen because digital business intensity is able to strengthen an organization's information technology portfolio, which contributes to the effectiveness of exploitation and exploration. Furthermore, both digital business intensity and ambidexterity have a significant impact on sustainable organizational performance (Mardi et al., 2018; Nwankpa & Datta, 2017). This condition can be realized because both of them have proven to be able to bring the organization to survive and excel in the dynamics of a constantly changing business environment (Dean, 2021; Wairimu & Liao, 2019).

Several relevant studies are inconsistent with several other studies in explaining the role of digital business intensity in ambidexterity and sustainable organizational performance. Several studies find that digital business intensity has a significant effect on ambidexterity (Mardi et al., 2018) and sustainable organizational performance (Nwankpa & Datta, 2017). However, in several different studies, digital business intensity has no effect on ambidexterity and organizational performance (Stores et al., 2018; Tam, 2016). Furthermore, a number of studies find that ambidexterity has a significant effect on sustainable organizational performance (Kafetzopoulos, 2021; Peng et al., 2019). However, different studies find that ambidexterity has no significant effect on sustainable organizational performance (Menguc & Auh, 2008; Venkatraman et al., 2018). The inconsistency of these results became a theoretical gap, which then became the impetus to conduct a comprehensive and in-depth study of the role of digital business intensity in ambidexterity and sustainable organizational performance.

This chapter is expected to bring significant theoretical and practical contributions in the field of human resource management (HRM). There are a number of

novelties that can be presented in this chapter. First, several researchers and practitioners in Indonesia have not studied much about the urgency of digital business intensity concept (Nwankpa et al., 2021; Schaarschmidt & Bertram, 2019)–(Nwankpa & Datta, 2017), especially its role in responding to dynamic environmental dynamics. Second, several researchers and practitioners in Indonesia have not conducted many studies related to the role of the digital business intensity concept in explaining ambidexterity and sustainable organizational performance (Nwankpa & Datta, 2017).

2 Proposition

2.1 Digital Business Intensity Increases Sustaining Organizational Performance

Digital business intensity in several articles has been described as an alternative strategy to deal with the dynamics of constantly changing business environment (Nwankpa & Roumani, 2018). Several other studies have also revealed the significant role of digital business intensity on organizational performance (Nwankpa & Datta, 2017; Wairimu & Liao, 2019). These findings reaffirm the importance of investment and technology adoption in organizational business; this has an impact on organizational efficiency and effectiveness (Gastaldi et al., 2021). Technology makes it easy for business organizations, especially in operating activities and providing customer service. All organizational business activities run well with technology, so that it will have an impact on organizational productivity (Lakhwani et al., 2020). This condition expressly reveals the important function of technology in conducting business. The higher the digital business intensity level, the higher the chances of achieving sustainable organizational performance. Referring to the assumptions and a number of empirical findings, the following proposition can be put forward.

P1: Digital business intensity has a significant positive effect on sustaining organizational performance.

2.2 Digital Business Intensity Increases Ambidexterity

Digital business intensity basically aims to strengthen organizational information technology capabilities (Nwankpa & Datta, 2017). Adequate information technology capabilities delivered can have a positive impact on the effectiveness of ambidexterity (Gastaldi et al., 2021). It is in line with Mardi et al. (Mardi et al., 2018), who state that technology adoption has a positive effect on ambidexterity. As it is known that ambidexterity can be achieved if exploitation and exploration can be

achieved simultaneously with the implementation of technology, it would certainly be very helpful during the exploitation and exploration process that will be conducted by the organization (Mardi et al., 2018; Park et al., 2020). In this context, it strengthens the belief that digital business intensity increases the chances of achieving ambidexterity. Referring to the assumptions and a number of empirical findings, the following proposition can be formulated.

P2: Digital business intensity has a significant positive effect on ambidexterity.

2.3 Ambidexterity Increases Sustaining Organizational Performance

Several experts have explained the important role of ambidexterity in organizational performance. Ambidexterity will be achieved if the company is able to achieve balanced exploitation and exploration (Clauss et al., 2021; Van Den Buuse et al., 2021). Exploitation is an activity related to efficiency and cost savings, while exploitation is related to innovation activities. When an organization is able to achieve efficiency and innovation in a balanced way, the potential for organizational success is in sight. This has been explained in several studies that ambidexterity will bring organizations to competitive advantage (Centobelli et al., 2019; Peng et al., 2019). Furthermore, this statement is proven through a number of empirical findings which reveal that ambidexterity has a significant effect on organizational performance (Kafetzopoulos, 2021). If the organization is able to conduct ambidexterity continuously, then it would be possible for the organization to achieve sustainable performance (Pertusa-Ortega & Molina-Azorín, 2018). Referring to the assumptions and a number of empirical results, the following proposition can be put forward.

P2: Ambidexterity has a significant positive effect on sustaining organizational performance (Fig. 1).

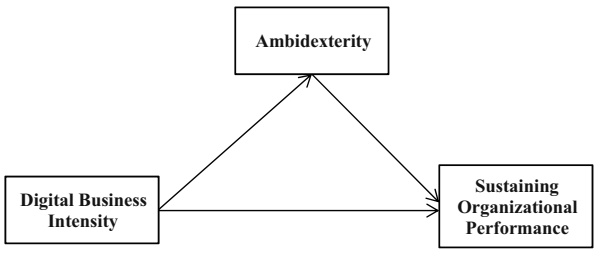

Fig. 1 The conceptual framework

3 Methodology and Approach

Study on the role of digital business intensity in ambidexterity and sustaining organizational performance is conducted using quantitative research methods to confirm the propositions that have been put forward before. This study aims to find out whether digital business intensity plays a role in increasing the exploitation and exploration capabilities (ambidexterity) of an organization and sustaining organizational performance. Furthermore, this study will also apply a survey approach through the distribution of questionnaires and interviews to obtain data and strengthen research findings. In applying quantitative research methods, this study will implement a structural equation model (SEM) approach in the data testing process to obtain study findings.

4 Discussion and Conclusion

This study confirms that the concept of digital business intensity has proven to have an important role as an alternative strategy in dealing with changing environmental conditions. Unpredictable business environment is often a barrier for most organizations in running their business. Many organizations have failed as a result of their inability to respond to environmental dynamics (Cosenz & Rosati, 2020). Those who are able to survive and achieve competitive advantage are those who have adequate courage and preparation in making long-term decisions (Jafari-Sadeghi et al., 2021; Nwankpa & Merhout, 2020).

Digital business transformation is one of dynamic business environment phenomena associated with the application of technology to build new business models and systems with the aim of generating more profitable revenues, competitive advantages, and higher efficiency (Schwertner, 2017). The application of technology is common in today's business context, especially with the emergence of competitors who are starting to adopt high technology in their business processes. This is driven by changes in market behavior that cannot be separated from the role of information technology (Melović et al., 2020). The application of technology will have a significant effect on organizational achievement (Azeem et al., 2020; Ji et al., 2020), where businesses will become more efficient and produce more optimal performance (Gomes et al., 2018).

Many organizations are unable to realize and not prepared to use technology; as a result, many of them have failed in competition (Boso & Adeleye, 2019). A strategic alternative that can be implemented is start implementing the concept of digital business intensity to anticipate organizational unpreparedness in terms of information technology (Ji et al., 2020; Nwankpa & Merhout, 2020). Some researchers say that digital business intensity can minimize possible business risks in the future because digital business intensity is an investment decision in the technological aspect, which aims to strengthen the organization's information technology

portfolio, and can be categorized as an alternative long-term strategy (Nwankpa & Roumani, 2018). Digital business intensity must be conducted properly by considering aspects of behavior and market needs so that technology investment can be achieved effectively (Baden-Fuller & Hae, 2013). Technology investments that match market needs tend to have a lower risk of failure; this will certainly have an impact on increasing profits and higher competitive advantage (Mutunga et al., 2014). This series of reviews is proof of the urgency of the concept of digital business intensity in the context of digital business transformation.

Furthermore, this study also confirms the role of digital business intensity in its impact on ambidexterity and sustainable organizational performance. Several studies find that digital business intensity plays an important role in the process of achieving balanced exploitation and exploration (Mardi et al., 2018; Park et al., 2020). As has been explained, the ability to achieve exploitation and exploration in a balanced way will lead to the concept of ambidexterity (Kafetzopoulos, 2021). Digital business intensity or information technology investment has a significant role in organizational efficiency and innovation (Nwankpa & Merhout, 2020). Technology will provide convenience in business processes so that it will have an impact on efficiency and cost savings. Apart from that, technology can also facilitate businesses to provide innovative services to customers. If efficiency and innovation can be achieved in a balanced way, it would have a direct impact on organizational performance (Kafetzopoulos, 2021; Pertusa-Ortega & Molina-Azorín, 2018). Of course, this condition can be achieved by observing and understanding market behavior and needs (Osiyevskyy et al., 2020). Without this consideration, sustainable organizational performance cannot be achieved. Thus, sustainable organizational performance will be achieved if the organization is responsive to environmental dynamics (Chien & Tsai, 2012), which is then followed by appropriate technology investment decisions (Azeem et al., 2020; Ji et al., 2020; Nwankpa & Datta, 2017). This statement explicitly confirms the role of digital business intensity concept in the ability for ambidexterity of an organization, which in turn will lead the organization to achieve higher performance.

Based on a number of theoretical and empirical foundations that have been presented in the discussion section above, a conclusion can be drawn that the concept of digital business intensity is an alternative strategy in increasing ambidexterity capabilities and sustainable organizational performance. In addition, the concept of digital business intensity can also be adopted to address technological challenges in the digital business transformation era. This study is further expected to bring theoretical contributions, especially regarding the role of the concept of digital business intensity. This study is also expected to be able to contribute practically, especially in the field of human resource management and organizations, especially with regard to the implementation of effective strategies to respond to dynamic environmental changes.

References

Azeem, S., Nasir, N., Kousar, S., & Sabir, S. (2020). Impact of E-commerce investment and Enterprise performance based on customer relationship management. *International Journal of Psychosocial Rehabilitation, 24*(09), 3998–4006.

Baden-Fuller, C., & Hae, S. (2013). Business models and technological innovation. *Long Range Planning, 46*, 419–426. https://doi.org/10.1016/j.lrp.2013.08.023

Boso, N., & Adeleye, I. (2019). The internationalization of African firms: Opportunities, challenges, and risks. *Thunderbird International Business Review, 61*(1), 5–12. https://doi.org/10.1002/tie.21977

Bråthen, M., Doan, E., & Breunig, K. J. (2021). Ambidexterity to overcome the challenges of digital transformation. In *ISPIM Innovation Conference* (pp. 1–15). Oslo Metropolitan University.

Centobelli, P., Cerchione, R., Esposito, E., & Shashi. (2019). Exploration and exploitation in the development of more entrepreneurial universities: A twisting learning path model of ambidexterity. *Technological Forecasting and Social Change, 141*, 172–194. https://doi.org/10.1016/j.techfore.2018.10.014

Chien, S.-Y., & Tsai, C.-H. (2012). Dynamic capability, knowledge, learning, and firm performance. *Journal of Organizational Change Management, 25*(3), 2012.

Clauss, T., Kraus, S., Lukas, F., Bican, P. M., Brem, A., & Kailer, N. (2021). Organizational ambidexterity and competitive advantage: The role of strategic agility in the exploration-exploitation paradox. *Journal of Innovation & Knowledge, 6*(4), 203–213. https://doi.org/10.1016/j.jik.2020.07.003

Cosenz, F., & Rosati, F. (2020). Dynamic business modeling for sustainability: Exploring a system dynamics perspective to develop sustainable business models. *Business Strategy and the Environment, 29*(2), 651–664. https://doi.org/10.1002/bse.2395

Dean, B. P. (2021). Multiteam systems as integrated networks for engaging ambidexterity as dynamic capabilities. *International Journal of Organization Theory & Behavior, 24*(4), 300–319.

Gastaldi, L., Sina, L., Tedaldi, G., & Miragliotta, G. (2021). Companies' adoption of smart technologies to achieve structural ambidexterity: An analysis with SEM. *Technological Forecasting and Social Change, 174*(1), 121187.

Gomes, A. O., Alves, S. T., & Silva, J. T. (2018). Effects of investment in information and communication technologies on productivity of courts in Brazil. *Government Information Quarterly, 35*(3), 480–490. https://doi.org/10.1016/j.giq.2018.06.002

Jafari-Sadeghi, V., Garcia-Perez, A., Candelo, E., & Couturier, J. (2021). Exploring the impact of digital transformation on technology entrepreneurship and technological market expansion: The role of technology readiness, exploration and exploitation. *Journal of Business Research, 124*, 100–111. https://doi.org/10.1016/j.jbusres.2020.11.020

Ji, P., Yan, X., & Yu, G. (2020). The impact of information technology investment on enterprise financial performance in China. *Chinese Management Studies, 14*(3), 529–542. https://doi.org/10.1108/CMS-04-2019-0123

Kafetzopoulos, D. (2021). Organizational ambidexterity: Antecedents, performance and environmental uncertainty. *Business Process Management Journal, 27*(3), 922–940. https://doi.org/10.1108/BPMJ-06-2020-0300

Lakhwani, M., Dastane, O., Satar, N. S. M., & Johari, Z. (2020). The impact of technology adoption on organizational productivity. *Journal of Industrial Distribution and Buisness, 11*(4), 7–18. https://doi.org/10.13106/jidb.2020.vol11.no4.7

March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science, 2*(1), 71–87.

Mardi, M., Arief, M., Furinto, A., & Kumaradjaja, R. (2018). Sustaining organizational performance through organizational ambidexterity by adapting social technology. *Journal of the Knowledge Economy, 9*(3), 1049–1066. https://doi.org/10.1007/s13132-016-0385-5

Melović, B., Jocović, M., Dabić, M., Vulić, T. B., & Dudic, B. (2020). The impact of digital transformation and digital marketing on the brand promotion, positioning and electronic business in Montenegro. *Technology in Society, 63*, 101425. https://doi.org/10.1016/j.techsoc.2020.101425

Menguc, B., & Auh, S. (2008). The asymmetric moderating role of market orientation on the ambidexterity - firm performance relationship for prospectors and defenders. *Industrial Marketing Management, 37*, 455–470. https://doi.org/10.1016/j.indmarman.2007.05.002

Mutunga, S. L., Minja, D., & Gachanja, P. (2014). Innovative adaptation and operational efficiency on sustainable competitive advantage of food and beverage firms in Kenya. *European Journal of Business and Innovation Research, 2*(2), 32–50.

Nwankpa, J., & Roumani, Y. (2018). Relationship between digital business intensity and process innovation: an empirical examination. In *AMCIS Proceedings* (p. 15).

Nwankpa, J. K., & Datta, P. (2017). Balancing exploration and exploitation of IT resources: The influence of digital business intensity on perceived organizational performance. *European Journal of Information Systems, 26*(5), 469–488. https://doi.org/10.1057/s41303-017-0049-y

Nwankpa, J. K., & Merhout, J. W. (2020). Exploring the effect of digital investment on IT innovation. *Sustainability, 12*, 1–26.

Nwankpa, J. K., & Roumani, Y. (2016). IT Capability and Digital Transformation: A Firm Performance Perspective. In *International Conference on Information Systems* (pp. 1–16).

Nwankpa, J. K., Roumani, Y., & Datta, P. (2021). Process innovation in the digital age of business: The role of digital business intensity and knowledge management. *Journal of Knowledge Management, 25*, 1–23. https://doi.org/10.1108/JKM-04-2021-0277

O'Cass, A., Heirati, N., & Ngo, L. V. (2014). Achieving new product success via the synchronization of exploration and exploitation across multiple levels and functional areas. *Industrial Marketing Management, 43*(5), 862–872. https://doi.org/10.1016/j.indmarman.2014.04.015

Osiyevskyy, O., Shirokova, G., & Ritala, P. (2020). Exploration and exploitation in crisis environment: Implications for level and variability of firm performance. *Journal of business research, 114*, 227–239. https://doi.org/10.1016/j.jbusres.2020.04.015

Park, Y., Pavlou, P. A., & Saraf, N. (2020). Configurations for achieving organizational ambidexterity with digitization. *Information Systems Research, 31*(4), 1376–1397.

Peng, M. Y.-P., Lin, K.-H., Peng, D. L., & Chen, P. (2019). Linking organizational ambidexterity and performance: The drivers of sustainability in high-tech firms. *Sustainability, 11*, 1–17.

Pertusa-Ortega, E. M., & Molina-Azorín, J. F. (2018). A joint analysis of determinants and performance consequence of ambidexterity. *Business Research Quarterly, 21*, 84–98. https://doi.org/10.1016/j.brq.2018.03.001

Schaarschmidt, M., & Bertram, M. (2019). Digital business intensity and constructive process deviance: A study of reactions to digitisation-focused process innovation. *International Journal of Innovation Management, 24*(07), 1–30. https://doi.org/10.1142/S1363919620500656

Schwertner, K. (2017). Digital transformation of business. *Trakia Journal of Sciences, 15*, 388–393. https://doi.org/10.15547/tjs.2017.s.01.065

Severgnini, E., Vieira, V. A., & Galdamez, E. V. C. (2018). The indirect effects of performance measurement system and organizational ambidexterity on performance. *Business Process Management Journal, 24*(5), 1176–1199. https://doi.org/10.1108/BPMJ-06-2017-0159

Stores, F., Diah, M. L. M., Abdullah, N. H., & Kadir, Z. A. (2018). The impact of information technology investment on firms performance. *IJEBD (International Journal Of Entrepreneurship And Business Development), 2*(1), 43–55.

Tam, K. Y. (2016). The impact of information technology investments on firm performance and evaluation: Evidence from newly industrialized economies. *Information Systems Research, 9*(1), 85–98.

Van Den Buuse, D., Van Winden, W., & Schrama, W. (2021). Balancing exploration and exploitation in sustainable urban innovation: An ambidexterity perspective toward smart cities. *Journal of Urban Technology, 28*(1), 175–197. https://doi.org/10.1080/10630732.2020.1835048

Venkatraman, S., Cheung, C. M. K., Lee, Z. W. Y., Davis, F. D., & Venkatesh, V. (2018). The 'Darth' side of technology use: An inductively derived typology of Cyberdeviance. *Journal of Management Information Systems, 35*(4), 1060–1091. https://doi.org/10.1080/07421222.2018.1523531

Wairimu, J., & Liao, Q. (2019). Digital business intensity and entrepreneurial alertness in organizational learning. In *AMCIS Proceedings* (p. 5).

Sustainable for Business: Case Study Poland

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Abstract The purpose of this chapter is to determine the level of innovation in sustainable management in Polish companies. Research shows that today the main advantages of an innovative organization comprise a high degree of flexibility and growth, efficient exchange of resources, quick response to external opportunities, and peer support in difficult situations. Innovation is an inherent feature of progress and modernity that significantly contributes to economic development and serves as its most important driving force. Companies that operate in the market undergoing dynamic development require innovation to survive. A company that aims to achieve market success should strive to implement innovation to gain market share.

Keywords Business · Innovation · Sustainable management · SME

1 Introduction

When an enterprise aims to be a modern one, it must produce modern products (Rzepka, 2018a). Goods that are produced traditionally are often inferior in quality compared to those created using advanced technologies. The necessity to be innovative is a feature of the business world of the twenty-first century (Olesiński et al., 2016).

The impact of innovation on businesses is continually debated, and scientists are constantly developing theories. There is a good reason why several authors [P. Drucker, E. Stawasz, P. Głodek, K. Łobacz, P. Niedzielski] have addressed this topic in their studies. Introducing innovation is a continuously exercised activity in today's environment by enterprises that want to profit and develop their business

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(Rzepka, 2023). The operation of an enterprise in the market involves constant rivalry with competitors. Organizations are looking for sources of advantage that could effectively allow them to master the economic sector, which could be innovations (Bao & Wang 2022).

However, creating innovation (Rzepka, 2019a) is not a straightforward activity as it requires the company to demonstrate specific capabilities in several areas. Organizations change as a result of implementing new solutions (Rzepka, 2019b). Innovation has a positive impact on businesses. Innovative enterprises create a suitable environment for development not only for themselves but also for the environment.

Innovation analyses must take sustainability (Yao & Huang, 2022) into account, which is an essential component for organizations today. We describe it as a stable and ongoing process that benefits both the organization and the environment (Beckmann et al., 2020). Managing sustainable development is not easy since it requires identifying and examining many factors, recognizing influential factors, and applying knowledge from various spheres (Fatuła, 2020). Taking the environment into account in a company's development plans is a desirable activity within the framework of a sustainable economy. It is a company's responsibility to ensure that any actions it takes do not harm future generations.

2 Impact of Innovation on the Development of the SME Sector

2.1 Development of SMEs

It is estimated that small and medium-sized enterprises (SMEs) represent the most significant portion of businesses in the EU. Thus, we believe that SMEs play a crucial role in shaping a country's economy, so attention should be paid to their development.

In general, the development of a business involves specific changes to its structure that lead to the achievement of set goals (Yildirim et al., 2022). Additionally, developing organizations gain an advantage over their competitors. To analyze the development of small and medium-sized enterprises, we must define the sector. Identifying the size of an organization is also essential for managers in determining what strategy or operating model is appropriate. A breakdown of business units proposed by the European Union in the EU recommendation 2003/361 (European Union Commission, 2003) appears in Table 1.

The term "SME" generally refers to organizations with fewer than 250 employees and revenues of less than €50 million. In terms of economic importance, this area is vital for Poland. Over 99% of Polish businesses are small or medium-sized enterprises (of which 96% are microenterprises, according to the Polish Agency for

Table 1 Business unit division proposed by the European Union

Category	Maximum staff head count	Balance sheet total [in millions of euros]	Turnover [in millions of euros]
Micro	9	2	2
Small	10–49	10	10
Medium	50–249	43	50

*Source: Own elaboration based on (*European Union Commission, 2003*)*

Table 2 Development definitions

Authors	Definition
Z. Pierścionek	Intentional changes carried out in the enterprise's systems. They occur constantly and consist of improvement or introduction of new elements
J. Skalik	The overall growth of the enterprise is defined as a qualitative phenomenon that determines the progression and greater strength of operations
B. Godziszewski	The organization's growth as a whole (which is its sole identifier)

*Source: Own elaboration based on (*Godziszewski, 2010*;* Skalik, 2021*;* Wierzbic, 2011*)*

Enterprise Development, 2022); their share in the national GDP exceeds 50%, and they constitute a workplace for 69% of all employees (PARP, 2023).

Development, like other phenomena, is defined in many ways [see Table 2]. Many authors have attempted to define development. Definitions selected based on a literature review appear in Table 2.

The development of a company is influenced by many conditions from the inside of the organization and the environment as well. The environment in which the company operates allows the company to use the resources available in the environment and satisfy the company's needs (Rzepka, 2018b). These factors can enhance an entity's progress or inhibit it with myriad barriers, i.e., infrastructure or employee skill shortages (Danielak et al., 2017). Assessing an enterprise's growth level should include an analysis of all components, and continuous development allows SMEs to operate more efficiently and for longer.

2.2 The Role of Innovation Organizations

Many organizations compete in today's markets. Their goal is to make as much profit as possible, thereby having a competitive advantage. The ability to innovate greatly determines a company's competitive advantage. It is often the introduction of innovations that characterizes companies that have an advantage in the market.

To understand innovation's role, let us define it (see Table 3).

We are increasingly encountering terms such as inclusive innovation, which play a critical role in a sustainable economy because they involve a part of society that would not typically be involved in development (Murzyn, 2020). These activities aim to boost the country's economy, including all regions. Organizations

Table 3 Definitions of innovation

Authors	Definition
E. Stawasz, P. Głodek, K. Łobacz, P. Niedzielski	Changes, new solutions, or ideas perceived as pioneering regardless of their nature. Their result is a new or modernized product, manufacturing method, or work organization
P. Drucker	New revenue prospects as generated by an enterprise's tool or specific action
OCED	An improved or completely new product or process that has been implemented

*Source: Own elaboration based on (*Drucker, 1992*;* Oslo, 2008*;* Stawasz et al., 2018*)*

Table 4 Definitions of the concept of innovation

Authors	Definition
A. Rzepka	All ideas generated in the company determining the creation of new products or services
E. Stawasz, P. Głodek, K. Łobacz, P. Niedzielski	An organization's ability to seek and implement new solutions that will cause increased competitiveness and advancement
A. Osterwalder, Y. Pigneur, F. Etiemble, A. Smith	Radical changes in the value proposition, resources, or profit

*Source: Own elaboration based on (*Osterwalder et al., 2021*;* Rzepka, 2018b*;* Stawasz et al., *2018)*

implementing inclusive innovations cooperate with the environment regardless of social status, thus playing an essential role in sustainable development.

Relational concepts like innovativeness also appear in the concept of innovation (Table 4).

When a company begins operating, it usually introduces product innovations aimed at capturing the largest market share. It is only in subsequent years of operation that innovations of a different nature are introduced, like those relating to marketing or organization of work. However, introducing each planned change is associated with high risk (Audretsch & Belitski, 2022). A thorough examination of the investment's validity is necessary to reduce uncertainty. It is also essential to analyze the company's environment for potential benefits (Lachiewicz, 2018). The organization should be able to identify and take advantage of market opportunities. As well as being used for growth, new solutions mitigate risks as well. Regardless of their type, innovations are the basis for success, and their creation and implementation are crucial for development (Lachiewicz, 2018).

3 Research Methodology

3.1 Description of the Company Under Study

The company reviewed in this chapter has been in business for years. It enjoys a good reputation in the industry and is a significant supplier for global contractors. The activities undertaken by this organization are considered innovative and therefore lead to specific effects presented in this study.

The organization has been operating in the Polish market since 1995, and its operation revolves around carbon black. The company also provides storage and road transportation of the material to ensure effective sales. The product primarily finds use in the automotive tire industry, where the company has the most critical contractors.

Over the years, the company has opened several distribution centers in the country and worldwide. To fulfill contracts with corporations such as Goodyear (Dębica, Poland) and Michelin (Olsztyn, Poland), a branch in Żurawica opened in 1996. In the following years, the company's group of contractors grew steadily. The company's affiliates included Trelleborg (Sweden), Fenner Dunlop (Great Britain), and Continental (a global company). The increased number of established relationships accelerated the company's infrastructure development process. Two more distribution centers have opened in Poland, and numerous offices and warehouses abroad. The organization's current overseas structure includes the United States, Russia, Ukraine, and Spain units. The company's international activities align with the organization's vision to become a significant partner for tire and rubber manufacturers worldwide.

Currently, the company's offer includes 17 types of specialized carbon black. It is an unquestionable advancement for the company, which initially offered only four types of this raw material. Internally, the organization operates and processes orders according to "just-in-time" principles. In essence, this method relies on proper management of the inventory. Delivery processes ensure that orders arrive on time and as quickly as possible (Rzepka, 2018b). All the equipment and premises needed for this process run according to the organization's "carbon black only" motto, which ensures that contractors always receive a clean and integral product.

The organization's reloading processes take place remotely, thanks to high-tech machinery. Laboratories are also located in each subsidiary to ensure the proper properties of carbon black. Through periodic audits, the company's management monitors the activities carried out across all units in tandem with its main contractors. Additionally, an ISO certificate indicating compliance with ISO 9001:2015 restrictions confirms the high quality of the company's operations.

3.2 Research Thesis

The research thesis for this study says that innovation is the driving force for the company and illustrates the primary considerations and dilemmas presented in this chapter (Golarz, 2016). The research thesis also assumes that the innovation introduced in the company has had a significant impact on the high degree of competitiveness of the organization.

The study confirmed the influence of innovation on the company's competitive advantage. For this research, we adopted the following definition of innovation: a tool a company uses that, when properly applied, results in a wholly new or modernized product or method of doing things. It was developed based on our considerations in Table 3.

3.3 Methodology

The study focused on two companies within one organization—the Polish headquarters and its Spanish branch. The survey took place in the second quarter of 2022. All respondents were company employees, and participation in the survey was open to all (regardless of age or education level). The survey tool accounted for these characteristics, and the response distribution appears in Table 5. Only a part of the survey that determined the company's innovation activities and level of competitiveness was included in the analysis.

Most of the respondents (70%) worked for the Poland-based company. The higher number stems from the fact that this is the organization's headquarters and employs far more than its branches. Half of the respondents were between the ages of 30 and 40, and only one employee was over 50. On the other hand, the education level of employees showed that 80% had a university degree.

The research tool used in the study was a questionnaire. The questionnaire included closed-ended questions to identify innovative activities and a numerical

Table 5 Responses according to the place of employment, age, and education

Place of employment	Percentage of respondents
Poland	70
Spain	30
Age	Percentage of respondents
30–40	50
41–50	40
50 or over	10
Education	Percentage of respondents
High school	20
Bachelor's degree	20
Master's degree	60

Source: Own elaboration

scale (1–10). The survey used the CAWI method, which is a method of surveying respondents via hyperlinks or virtual mailboxes (Chaithanapat et al., 2022).

4 Results

For this chapter, we used only a portion of the survey. To analyze the impact of innovation on the company in this case study, it was necessary to examine several specific areas. In the first part of the survey, employees listed activities related to innovation development in their enterprise. A summary of the responses appears in Table 6.

Employees reported the organization's innovative activities in each of the three specified areas. Both branches reported participating in research programs and investing in R&D concerning the organization's innovativeness (70% of all responses). Half of the respondents also said that the company is involved in activities related to developing inventions. The second aspect of the study involved analyzing the capabilities and development of the company. We analyzed the impact of innovations that the company introduced on the organization's growth (see Table 7).

As can be seen from Table 7, respondents agree on all four capabilities, with particular emphasis on the ability to acquire and use knowledge in practice (90% and 80% of respondents, respectively).

When it comes to analyzing the sources of innovation, it can be concluded that the organization draws from internal sources (managerial skills, R&D) and external ones (collaboration with other branches of the company, collaboration with business partners), as shown in Fig. 1. In particular, respondents emphasized the importance of sourcing innovation from cooperation within the organization's structure as well as managers' expertise (90% of responses). The company also conducts research and draws on partnerships with contractors as part of its growth strategy.

Table 6 Responses concerning activities relating to innovation in the organization

Activity	Total number of responses
Developing inventions	50%
Participation in research programs	70%
Investment in R&D	70%

Source: Own compilation based on research

Table 7 Responses regarding identification of the organization's capabilities

Capability	Number of responses
Knowledge acquisition	90%
Knowledge implementations	70%
Knowledge processing	70%
Use of knowledge	80%

Source: Own compilation based on research

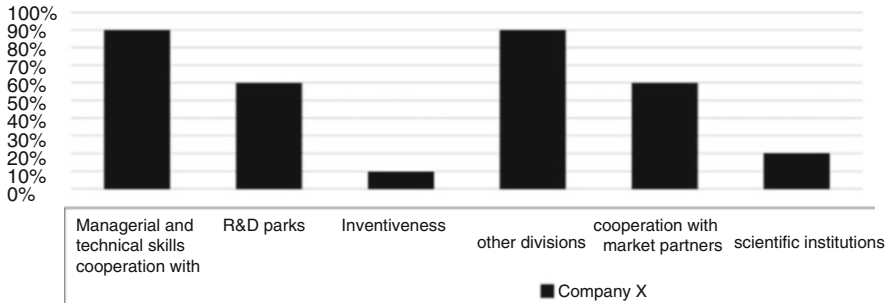

Fig. 1 Responses regarding sources of innovations in the company. (*Source: Own elaboration*)

Table 8 Respondents' evaluation of the competitive characteristics of enterprises

Competitive strength	Response average (Poland)	Response average (Spain)
Understanding of the competition	8.9	9.0
Understanding of customer needs	9.3	9.7
Reputation of the company	9.1	9.0
Ability to forecast changes in the market	8.6	9.0
Range of products	8.0	8.0
Processing of orders on time	8.7	9.7

Source: Own elaboration

Innovation impacts the activities and development of the organization under study. The organization has created the internal capabilities necessary for effective knowledge management. The question arises as to whether the innovations implemented by the company and the skills it acquired affect its competitiveness.

To analyze the level of competitiveness of the surveyed company, six elements were taken into account (as seen in Table 8). The data collected in the Spanish branch show that the following activities are performed at a higher level: timely order processing, understanding of customer needs, and knowledge of the market. From the aspects of competitiveness shown, we can see that the overseas branch focuses particularly on delivering customer orders. The Polish branch focuses on its reputation and insightful analysis of customer needs. Nowadays, every manager should view his firm's long-term development, adapt its products and services to the changing conditions, and implement innovations.

Various studies have shown that innovation is crucial (Turulja & Bajgoric, 2019). Nearly 75% of companies say that innovation is one of their top three management priorities, and 35% put it at the top (Hughes et al., 2018). We should not be surprised since a winning innovation strategy combined with the right innovation system can make a huge difference. Nevertheless, developing innovation is difficult, and only

about 30% of companies think that they are good at this. Therefore, it is a growing challenge (Long et al., 2020). Even the most capable innovators need to constantly learn new skills and develop faster and more agile R&D processes when it comes to digital technologies and data.

Today, in the post-pandemic era, high flexibility and market expansion, efficient exchange of resources, quick response to external opportunities, and peer support in difficult situations are the main advantages of an innovative organization/enterprise. They make it possible not only to withstand crises and grow by achieving increasingly ambitious goals but also to overcome independent thinking in enterprises, fear of collaboration which stems from lack of trust, or coordination difficulties between partners and the headquarters of the network structure.

5 Discussion

In recent years, technological changes have forced a reorientation in business and operating models toward innovation. However, despite well-described case studies, practical methodologies, and framework programs, many companies still need to develop effective innovation capabilities.

Innovation rarely occurs in isolation—it is a highly interactive process involving collaboration in growing and diverse networks of stakeholders. Collaboration leads to an expanded scope of development programs and enhances the company's skill set. According to the Innovation Activity of Enterprises in 2018–2020 report, 23.6% of industrial enterprises and 20.9% of service enterprises collaborated on innovation-related activity in 2018–2020. Most industrial and service enterprises that actively developed innovation and collaborated in innovation activities in 2018–2020 were enterprises that employed 250 or more employees.

Nowadays, one's success in introducing innovation is increasingly dependent on continuously developing new innovation-related capabilities or acquiring skills and capabilities from the environment. A strategy allows an innovation system to flourish by identifying critical areas for investment. However, an innovation-oriented strategy is necessary but insufficient (Bouncken et al., 2019). Creating value in the world of shortening product life cycles and business models (Kraus et al., 2019) requires quick and decisive steps.

6 Summary

The company we discussed in this chapter has grown steadily since it began operations. It has all the necessary capabilities to recognize and implement innovation, and through its pioneering solutions, it has also achieved a very high level of competitiveness. Numerous collaborations with contractors have contributed to the organization's growth and opened up new opportunities. The company possesses

various innovative features; computer-controlled (Xu et al., 2021) shipping processes and in-house laboratories are among the many improvements (Fullana et al., 2022) made by the company.

The role of innovation in the industry is crucial. Without it, companies fail to grow and remain stagnant. Today, businesses are under tremendous pressure from global competition and the complexities of running a business. Innovation is a way to create better products, generate more profits, and thereby ensure a prosperous future, which is what business professionals and managers should strive to achieve.

Organizations wishing to compete at the highest level must be innovative. In the early stages of doing business, a company should focus on working on product improvement or upgrading. It is product innovation that is directly perceived by customers and shapes the company's reputation. Only in the next phase of activity should the organization focus on innovations concerning other areas of functioning (e.g., work organization, production). It is also worth adding that an enterprise, in order to effectively create and implement innovations, should create a number of nonessential capabilities internally. The whole process of innovation creation is based on the identification of a market opportunity, followed by appropriate processing of the collected information and the ability to apply it. For this reason, innovative enterprises should be characterized by the ability to absorb knowledge, i.e., the ability to recognize and apply acquired information.

Consequently, an essential recommendation for many young and small and medium-sized companies that have come to operate in sustainable management and thrive in today's challenging economic environment is not to operate in isolation but to collaborate and participate in organizations that form networks.

References

Audretsch, B. D., & Belitski, M. (2022). The limits to open innovation and its impact on innovation performance. *Technovation, 152*, 245–259. https://doi.org/10.1016/j.technovation.2022.102519

Bao, Z., & Wang, C. (2022). A multi-agent knowledge integration process for enterprise management innovation from the perspective of neural network. *Information Processing and Management, 59*, 102873. https://doi.org/10.1016/j.ipm.2022.102873

Beckmann, M., Schaltegger, S., & Landrum, N. E. (2020). Sustainability management from a responsible management perspective. In O. Laasch, R. Suddaby, E. Freeman, D. Jamali, & D. (Eds.), *The research handbook of responsible management*. Edward Elgar.

Bouncken, R., Kraus, S., & Roig-Tierno, N. (2019). Knowledge- and innovation-based business models for future growth: Digitalized business models and portfolio considerations. *Review of Managerial Science, 15*, 1. https://doi.org/10.1007/s11846-019-00366-z

Chaithanapat, P., Punnakitikashem, P., KhinKhinOo, N. C., & Rakthin, S. (2022). Relationships among knowledge-oriented leadership, customer knowledge management, innovation quality and firm performance in SMEs. *Journal of Innovation and Knowledge, 7*, 100162. https://doi.org/10.1016/j.jik.2022.100162

Danielak, W., Mierzwa, D., & Bartczak, K. (2017). *Małe i średnie przedsiębiorstwa w Polsce. Szanse i zagrożenia rynkowe*. Wydawnictwo Exatne.

Drucker, P. (1992). *Innowacja i przedsiębiorczość: praktyka i zasady*. Wydawnictwo PWE.

European Union Commission. (2003). Zalecenie Komisji z dnia 6 maja 2003 r. dotyczące definicji przedsiębiorstw mikro, małych i średnich (notyfikowane jako dokument nr C(2003) 1422). *Dziennik Urzędowy, 46*(L124), 36–41.

Fatuła, D. (2020). *Zarządzanie zrównoważonym rozwojem organizacji*. Wydawnictwo Oficyna.

Fullana, O., Priego de la Cruz, A., & Toscano, D. (2022). The role of financial performance of Eurostoxx listed hotel companies in determining CEO compensation. *International Journal of Hospitality Management, 104*(1), 103242.

Godziszewski, B. (2010). Zasobowe uwarunkowania rozwoju przedsiębiorstwa. In M. Stankiewicz (Ed.), *Pozytywny potencjał organizacji. Wstęp do użytecznej teorii zarządzania* (p. 18). TNOiK Dom Organizatora.

Golarz, M. (2016). Zastosowanie metody Just In Time w zarządzaniu organizacją. *Journal of Modern Management Process, 2*.

Hughes, M., Rigtering, J. P. C., Covin, J. G., & Bouncken, R. B. (2018). Kraus S innovative behaviour, trust and perceived workplace performance. *British Journal of Management, 29*, 750–768. https://doi.org/10.1111/1467-8551.12305

Kraus, S., Palmer, C., Kailer, N., Kallinger, F. L., & Spitzer, J. (2019). Digital entrepreneurship: A research agenda on new business models for the twenty-first century. *Int Journal EntrepBehaviour Res, 25*, 353–375. https://doi.org/10.1108/IJEBR-06-2018-0425

Lachiewicz, S. (2018). Rola innowacji w osiąganiu sukcesów biznesowych przez małe przedsiębiorstwa. In K. Najman (Ed.), *Zarządzanieifinanse. Journal of management and finance* (pp. 54–57). Zakład Poligrafii Uniwersytetu Gdańskiego.

Long, T. B., Iñigo, E., & Blok, V. (2020). Responsible management of innovation in business. In O. Laasch, D. Jamali, R. E. Freeman, & R. Suddaby (Eds.), *Chapter 40, Research handbook of responsible management*. Edward Elgar.

Murzyn, D. (2020). Rozwój inkulzywny w Unii Europejskiej i rola polityki spójności UE w jego osiągnięciu. In *Ekonomia społeczna i przedsiębiorczość – Innowacje – Środowisko* (pp. 229–241). Wydawnictwo CeDeWu.

Olesiński, Z., et al. (2016). *Międzyorganizacyjne sieci wpsólpracy gospodarczej na przykładzie Polski, Kanady i Gruzji* (p. 31). Text.

Oslo, P. (2008). *Zasady gromadzenia i interpretacji danych dotyczących innowacji. OECD/ Wspólnoty Europejskie 2005* (p. 48). PARP.

Osterwalder, A., Pigneur, Y., Etiemlbe, F., & Smith, A. (2021). *Niezwyciężona firma. Jak nieustannie odkrywać swoją organizację na nowo i czerpać z najlepszych modeli biznesowych*. Wydawnictwo Onepress.

PARP (2023). Raport o stanie sektora małych i średnich przedsiębiorstw w Polsce, https://www.parp.gov.pl/storage/publications/pdf/PARP-26_Raport-2021-07-22 _WCAG_21072 6.pdf, Accessed 01 Dec 2023.

Rzepka, A. (2018a). Innovative character of the contemporary enterprise and determinants of innovation. In *New Trends in process control and production management* (p. 445). CRC Press.

Rzepka, A. (2018b). *Relacje międzyorganizacyjne i kapitał intelektualny jako czynniki rozwoju mikro i małych przedsiębiorstw*. Wydawnictwo Difin.

Rzepka, A. (2019a). Innovation, inter-organizational relation, and co-operation between enterprises in Podkarpacie region in Poland. *Procedia Manufacturing, 30*, 642–649.

Rzepka, A. (2019b). Soft management factors and organizations – outcome of research. In Mihalcova et al. (Eds.), *Production Management and Business Development* (pp. 195–200). Taylor & Francis Group.

Rzepka, A. (2023). *Innovation in the digital economy new approaches to Management for Industry 5.0*. Routledge.

Skalik, J. (2021). Kulturowe uwarunkowania wzrostu i rozwoju organizacji gospodarczych. In B. Mikuła (Ed.), *Historia i perspektywy nauk o zarządzaniu* (pp. 123–130). Uniwersytet Ekonomiczny w Krakowie.

Stawasz, E., Głodek, P., Łobacz, K., & Niedzielski, P. (2018). *Kształtowanie konkurencyjności małej firmy. Rola doradztwa biznesowego*. Wydawnictwo Uniwersytetu Łódzkiego.

Turulja, L., & Bajgoric, N. (2019). Innovation, firms' performance and environmental turbulence: Is there a moderator or mediator? *European Journal of Innovation Management, 22*(1), 213–232. https://doi.org/10.1108/EJIM-03-2018-0064

Wierzbic, A. (2011). Wzrost i rozwój przedsiębiorstwa – przegląd koncepcji teoretycznych. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu. *Nauki o Zarządzaniu, 216*, 400.

Xu, X., Lu, Y., Vogel-Heuser, B., & Wang, L. (2021). Industry 4.0 and industry 5.0 – Inception, conception and perception, journal of manufacturing systems. *Vol., 61*, 530–535., ISSN 0278–6125. https://doi.org/10.1016/j.jmsy.2021.10.006

Yao, H., & Huang, W. (2022). Effect of R&D subsidies on external collaborative networks and the sustainable innovation performance of strategic emerging enterprises: Evidence from China. *Sustainability, 14*(8), 4722. https://doi.org/10.3390/su14084722

Yildirim, E., Ar, I. M., Dabić, M., Baki, B., & Peker, I. (2022). A multi-stage decision making model for determining a suitable innovation structure using an open innovation approach. *Journal of Business Research, 147*, 379–391. https://doi.org/10.1016/j.jbusres.2022.03.063

Sustainable Strategies and Business Responsibility Practices: An Evidence from India

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Abstract Due to the dynamic business operations in a globalised era, the economy, environment, and society are facing an uncertain future. This is because of the unavoidable exploitation of natural resources, unethical business practices, and lack of concern for society's well-being by business organisations operating today. This has created a trend of environmental conservation by various NGOs, market protection by governments, and promoting of society's well-being through mandatory corporate responsibility activities. By keeping these aspects in mind, business organisations should refine and alter their nature of functioning and also be required to align their business strategy with economic, environmental, and social sustainability aspects. This study attempted to analyse the sustainable strategies and business responsibility practices of selected Indian companies using BRSR as a reference. The outcome of the study revealed that there are significant differences (a 'gap') between SBS and BRSP. On the other hand, the results of simple linear regression analysis suggest that having a business strategy significantly predicts business practice. Finally, it revealed that having a sustainable business strategy significantly influences the BRSP. It can also be inferred that having a sustainable business strategy is crucial to achieving targeted business responsibility and sustainability practices.

Keywords Sustainability · Sustainable business · Sustainable strategies · Business responsibility · Sustainable leadership · Sustainable development · UNSDGs · SDG8 · SDG17

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1 Introduction

Due to the dynamic business operations in a globalised era, the economy, environment, and society are facing an uncertain future. This is because of the unavoidable exploitation of natural resources, unethical business practices, and lack of concern for society's well-being by business organisations operating today. This has created a trend of environmental conservation by various NGOs, market protection by governments, and promoting of society's well-being through mandatory corporate responsibility activities. In addition, the United Nations Organization (UNO) established goals known as UNSDGs (United Nations Sustainable Development Goals) that must be met by 2030. By keeping these aspects in mind, business organisations should refine and alter their nature of functioning and also be required to align their business strategy with economic, environmental, and social sustainability aspects (Watson et al., 2008). Therefore, it is necessary to have a new business model that certainly addresses the triple bottom line (profit, people, and planet) issues (Al Breiki & Nobanee, 2019; Birkin et al., 2009; Dyllick & Muff, 2016; Haseeb et al., 2019a; Nosratabadi et al., 2019; Yang et al., 2017). Further, there is a need for comprehensive guidelines and regulations that monitor the efforts and contributions of companies towards sustainable development. For instance, Business Responsibility and Sustainability Reporting (BRSR) guidelines by Securities Exchange Board of India (SEBI) are promoting Indian companies' moves towards sustainable development. This study attempted to analyse the sustainable strategies and business responsibility practices of selected Indian companies using BRSR as a reference. The rest of the chapter is organised as a literature review with a purpose, methodology, analysis, discussion, and conclusion.

2 Literature Review and Research Gap

To get an idea about conceptual aspects, issues, problems, and research questions to be addressed, an extensive literature review has been conducted. The summary of the same is presented below.

2.1 Literatures on Sustainable Business Concept

Sustainable economic development was named the top concern in a global UN study to identify the problems defining the future. The existing pattern of resource consumption is untenable and causes adverse effects on the environment. Technology is a crucial tool for solving this worldwide issue. A lot of business executives are integrating sustainability into their corporate plans. Because companies dominate the

global economy, sustainability necessitates sustainable business practices (Watson et al., 2008).

There is a clear-cut interaction between environmental sustainability issues and commercial solutions if the business operations are modified in such a way that they are environmentally friendly so as to help in combating the problems relating to the environment, economy, and society at large (Kopnina & Blewitt, 2014).

In light of the sustainable development goals, new business models have provided companies with a competitive advantage in terms of sustainability performance. Therefore, sustainable business models are more popular and more successful across all application fields (Al Breiki & Nobanee, 2019; Haseeb et al., 2019b; Nosratabadi et al., 2019; Yang et al., 2017). There is a need for the concepts of business models, which address sustainability issues (Caldera et al., 2019; Shakeel et al., 2020; Weissbrod & Bocken, 2017). In addition, the comprehensive reforms are required to ensure long-term social and environmental sustainability. This can be done by integrating sustainability into strategic missions and operational procedures, and this serves as a significant source of advantage (Bilan et al., 2020; Bocken et al., 2013, 2014, 2015; Geissdoerfer et al., 2018; Mackie & Campbell, 2023; Van Bommel, 2018).

However, the company's success in one sector has not always depended on its success in another. The experience provides compelling evidence for the idea that resources for adopting strategies for sustainable development can be gathered concurrently rather than consecutively (Fowler & Hope, 2007). Furthermore, the ability to incorporate social and environmental factors into corporate decision-making procedures can promote the understanding and practice of good governance and aid in the development of sustainable leadership in a specific business environment (Hind et al., 2009). To achieve sustainable business leadership, three versions of business models must be adopted: business sustainability 1.0 as refined shareholder value management, business sustainability 2.0 as managing for the triple bottom line, and business sustainability 3.0 as true sustainability (Dyllick & Muff, 2016). In the context of Industry 4.0, there is a necessity to keep the direction in which existing traditional business conceptions need to be evolved so as to address sustainability issues with the help of the blending of the virtual and physical industrial worlds (Prause, 2015; Sanders & Wood, 2019).

2.2 Literatures on Sustainable Business Strategies and Its Practices

In the growth of businesses, boom-and-bust patterns are widespread. There are several instances of businesses that first succeed and then subsequently fail. Despite the fact that evolutionary economists frequently support the emergence and extinction of businesses and the idea of the fittest surviving, business owners and managers have a different emphasis: they seek a sustainable business model. However,

developing and putting into practice a sustainable strategy is a significant issue (Strohhecker & Größler, 2012). Every company should devise a strategy for implementing it in its operations in a sustainable manner. Having a strategy in place before beginning practice allows the firm to enjoy market leadership (Gauthier, 2017; Obermiller et al., 2008). Setting strategies for sustainable business does not contribute to the environment alone. It needs financial assistance; therefore, financial institutions are essential enablers of sustainability. In the near future, the demands of financial players about a company's operations and sustainability goals will be crucial (Dobers & Wolff, 2000; Lamming et al., 1999).

Pursuing corporate social responsibility strategically increases the firm's revenue and also helps in gratifying various stakeholders' needs. Furthermore, CSR expenditures are critical to a company's long-term survival and ability to gain a competitive advantage (Lo, 2010; Samy et al., 2010). Aligning regular business strategies with sustainable development strategies certainly takes the business organisation towards the top of its best corporate responsibility practice (Caldera et al., 2019; Lamming et al., 1999; Van Bommel, 2018). The voluntary commitment of the business towards undertaking the best economic, environmental, and social practices automatically helps the organisation to indirectly recognise itself in the list of organisations that are working in line with the United Nations Sustainable Development Goals (Calandra et al., 2022).

According to a critical examination of previous literature, it is observed that they are clearly focused on fundamental issues of sustainable business models and ways and means available to practise sustainable strategies and benefits of sustainable business aspects, and no studies have attempted to analyse the intended sustainable business strategies of business organisations and their business responsibility practices in line with intended strategies. *This chapter is intended to analyse sustainable strategies and business responsibility practices in an Indian context.*

3 Research Questions

Based on the research gap, the study framed the following research questions:

1. Are there any clear-cut sustainable business strategies among select companies?
2. Are the companies committed to business responsibility practices as per the strategy?
3. Are the sustainable business strategies influencing business responsibility practices among select companies?

4 Objectives

To address the research questions, the following research objectives have been framed:

1. To examine the difference between sustainable business strategies and business responsibility and sustainability practices among select companies
2. To study the influence of sustainable business strategies on business responsibility and sustainability practices among select companies

5 Conceptual Framework and Hypothesis Development

The figure, which highlights the conceptual range, offers a theoretical frame of reference for sustainable business strategy to create sustainable leadership (Jabareen, 2008). Every policy, practice, and procedure in a sustainable company strategy takes into account social, environmental, and economic concerns (Anbarasan, 2018). Serving the needs of the business, its clients, staff, and stakeholders is the goal of a sustainable business plan, which also aims to protect resources and create long-term sustainable policies and practices (Crittenden et al., 2011). A sustainable business strategy is influenced by environmental, economic, organisational culture, governance practices, quality education, innovations in selling green products, value positioning and development, customer orientation, user satisfaction, knowledge dissemination, ethical behaviour, transparency, and accountability. And also, the social factor is influenced by enabling the community, and employee participation leads to sustainability in businesses (Baker & Jones, 2008; Baumgartner, 2014).

The organisation prioritises long-term consequences and outcomes over short-term gain when considering the impact it has on the welfare of its workers, society, environment, and economic situations (Baumgartner, 2014). The organisations considering the BRSP strategy get executive support, identify key challenges, integrate goals with corporate values and organisational culture, develop a vision template, develop an execution and accountability structure, and provide transparency and disclosure—measures that are in fact crucial (Schaltegger et al., 2011; Shad et al., 2019). The success conditions of organisations, employees, internal activities promoting adoption, market-related variables, and external actions furthering development are all components in the execution of BRSP strategies (Lüdeke-Freund, 2010). However, business organisations have various strategies on various aspects, but the execution of such strategies is a significant issue. Hence, it is hypothesised *(H_1)* that *'there is no significant difference between sustainable business strategies and business responsibility and sustainability practices among select companies'.*

The technique of persuasion offers direction, coherence, and resolution by promoting social, ecological, and financial problems (Rao et al., 2022). Cross-border networks of leaders who cooperate across boundaries, exercise influence without formal power, and are comfortable dealing with complexity recognise the significance of self-leadership (Varadarajan, 2017). In light of this, enduring leadership emphasises the company's long-term objectives, long-term vision, and responsibilities to each individual, group, organisation, and society; an effective organisational culture; a high degree of goodwill and trust; setting of moral standards; empowering and strengthening of stakeholders; and assessing of the effectiveness of the

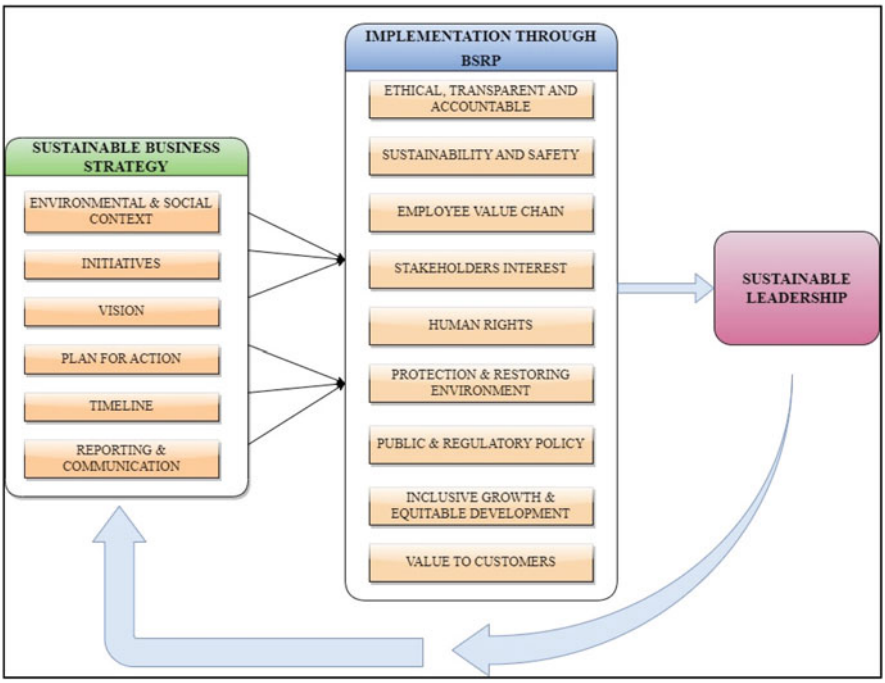

Fig. 1 Conceptual model for the study. (Source: *Compiled by Researcher)*

corporation (Aldieri et al., 2020; Morioka & de Carvalho, 2016). From this model, it is hypothesised *(H_2)* that *'there is a significant influence of sustainable business strategies on business responsibility and sustainability practices'* (Fig 1).

6 Methodology

This study is both quantitative and qualitative research conducted to analyse the sustainable business strategies, business responsibility, and sustainability practices of select companies.

6.1 Type of Data

This study is purely based on secondary sources of information, which were gathered from two perspectives. One is for analysing the earlier literature and building a conceptual model to construct the hypotheses. The data pertaining to the above is gathered through journal articles, published reports, books, etc. On the

other hand, secondary data was gathered from the annual reports of select companies to analyse their sustainable business strategies, business responsibility, and sustainability practices.

6.2 Data Collection

The previous literature was gathered from a variety of journal websites like ResearchGate, SSRN, and academia. The annual reports of the companies were collected through the websites of select companies.

6.3 Sample Companies

For the purpose of studying sustainable business strategies and business responsibility and sustainability practices, 30 sample companies were randomly selected from the 100 NSE-listed companies in India.

6.4 Content Analysis and Data Recording Method

This study is based on the disclosures made by the companies in their annual reports, business responsibility reports, and integrated reports. As a result, the best tool for recording the data is an archival or content analysis tool (Beattie et al., 2004).

Content analysis is a method of recording data in disclosure-based studies. Under this method, data is recorded based on a pre-developed research instrument (the content marking tool, Appendix A) (Holsti, 1969). There are two ways of recording data from companies' reports. First is the binary code method, in which the presence or absence of specific information is recorded with the help of a binary code, i.e. '1' for presence and '0' for absence (Marston & Shrives, 1991). The second method is the ordinal scale method, in which qualitative data is recorded. In this study, the ordinal scale was used to record the data. The scale ranges from 1 to 3, where '1' is poor practice and '3' is good practice (Guthrie & Abeysekera, 2006).

6.5 Disclosure Index

To measure the gathered data from the selected companies' disclosures, a disclosure index was calculated for both the data pertaining to sustainable business strategies and business responsibility and sustainability practices. The index value ranges from 0 to 1, where '0' indicates poor practice and '1' indicates best practice. This method

was previously applied by many authors (Jones & Shoemaker, 1994; Kavitha & Nandagopal, 2011; Marston & Shrives, 1996). The following two indices were calculated for the study.

Sustainability Business Strategy Index (SBSI)
This index was calculated with the help of the following formula:
SBSI = Actual SBS Score / Maximum SBS Score.

Business Responsibility and Sustainability Practices Index (BRSPI)
This index was calculated with the help of following formula:
BRSPI = Actual BRSPI Score / Maximum BRSPI Score.

6.6 Statistical Tools Used

To analyse sustainable business strategies and business responsibility and sustainability strategies, different tools are used for different purposes.

The t-test was used to examine the significant differences in sustainable business strategies, as well as business responsibility and sustainability practices, among a group of companies (Jansen, 2003).

To test the influence and predict the dependent variable, simple linear regression with the equation '$Y = a + b\ x + e$' is used. Here, business strategy is considered an independent variable, and business practice is considered as dependent variable (Sadjiarto et al., 2020).

7 Results and Discussions

This section of the chapter is concerned with data analysis and interpretation in relation to the study's objectives. There are three parts to this section. The first part deals with the analysis of sustainable business strategies and the Business Responsibility and Sustainability Practices (BRSP) of select companies. The second part deals with the analysis of the differences between sustainable business strategies, BRSP, among select companies. The last part deals with an analysis of the influence of sustainable business strategies on BRSP (Table 1).

The given table depicts the sustainable business strategies (SBSs) of select companies. All companies have a clear strategy to understand the environmental and social context of their business environment. Therefore, all the companies have an index value of 1 on SBS1. In regard to SBS2, i.e. sufficient initiatives in addressing sustainability issues, the index values range from 0.333 to 1, which means selected companies are taking sufficient initiatives in addressing sustainability issues. In regard to SBS3, i.e. sustainability vision, the index values of select companies range from 0.667 to 1, which means all the companies have a clear vision on economic, environmental, and social sustainability aspects. However, the clarity

Table 1 Sustainable business strategies of select companies and their disclosure index

Companies	SBS1I	SBS2I	SBS3I	SBS4I	SBS5I	SBS6I	OSBS Score	OSBSI
Reliance	1.000	1.000	1.000	1.000	0.778	0.889	5.667	0.944
TCS	1.000	1.000	1.000	1.000	0.667	0.778	5.444	0.907
HDFC Bank	1.000	1.000	1.000	0.889	0.667	0.778	5.333	0.889
ITC	1.000	0.667	1.000	1.000	0.667	1.000	5.333	0.889
Maruti	1.000	1.000	1.000	1.000	0.667	0.667	5.333	0.889
Wipro	1.000	0.889	0.889	0.889	0.667	1.000	5.333	0.889
HDFC Life	1.000	1.000	1.000	1.000	0.667	0.667	5.333	0.889
ONGC	1.000	0.667	1.000	1.000	0.333	1.000	5.000	0.833
Titan	1.000	1.000	1.000	1.000	0.667	0.667	5.333	0.889
BPCL	1.000	0.333	1.000	0.667	0.667	0.667	4.333	0.722
SBI Life	1.000	1.000	1.000	1.000	0.667	0.667	5.333	0.889
Bajaj Auto	1.000	0.667	1.000	1.000	0.333	1.000	5.000	0.833
TECHM	1.000	1.000	1.000	0.333	0.667	1.000	5.000	0.833
Indigo	1.000	1.000	0.667	1.000	0.667	1.000	5.333	0.889
M&M	1.000	1.000	1.000	1.000	0.667	0.667	5.333	0.889
Tata Steel	1.000	1.000	1.000	1.000	0.667	1.000	5.667	0.944
HINDPETRO	1.000	1.000	1.000	0.444	0.667	0.667	4.778	0.796
Bosch Ltd.	1.000	0.667	1.000	1.000	0.667	0.667	5.000	0.833
Naukri	1.000	1.000	1.000	0.889	0.667	1.000	5.556	0.926
MRF	1.000	0.889	1.000	1.000	0.667	1.000	5.556	0.926
Tata Motors	1.000	0.889	1.000	1.000	0.667	0.667	5.222	0.870
Muthoot Fin	1.000	1.000	0.889	1.000	0.667	0.667	5.222	0.870
DLF	1.000	0.667	1.000	1.000	0.667	0.667	5.000	0.833
JSW Steel	1.000	1.000	0.889	1.000	0.667	1.000	5.556	0.926
Asian Paints	1.000	0.667	1.000	0.667	0.667	1.000	5.000	0.833
DMart	1.000	1.000	1.000	0.667	1.000	0.667	5.333	0.889
Coal India	1.000	0.778	1.000	1.000	0.667	1.000	5.444	0.907
IOC	1.000	0.889	1.000	1.000	0.667	1.000	5.556	0.926
Hind Zinc	1.000	1.000	0.889	1.000	0.667	0.667	5.222	0.870
Adani Ports	1.000	0.667	1.000	1.000	0.667	1.000	5.333	0.889

Source: *Reports of select companies*

of vision is not the same among the select companies. In regard to SBS4, i.e. sufficient plans for action on sustainability issues, the index values range from 0.333 to 1, which means selected companies have plans for action but there is no similarity in such plans. In case of SBS5, i.e. predetermined timelines to address sustainability issues, the index values of select companies range from 0.333 to 1, which means all the companies have timelines to execute, but these timelines are not the same among all the select companies. The index values of companies regarding SBS6 (reporting and communication of sustainability issues) range from 0.667 to 1, which means all companies have policies in regard to reporting and communication of sustainability aspects, but they are not the same among all the

select companies. By analysing the SBS of select companies, it was evidently observed that all the selected companies have clear strategies, but they are not the same. This means that the level of engagement of businesses in sustainability issues varies from one to the next. This observation is consistent with some studies (Al Breiki & Nobanee, 2019; Haseeb et al., 2019a; Kopnina & Blewitt, 2014; Watson et al., 2008) (Table 2).

Table 2 shows the descriptive analysis of business responsibility and sustainability practices (BRSP). For the purpose of analysing BRSP, the study considered nine aspects outlined in Business Responsibility and Sustainability Reporting (BRSR) guidelines of Securities Exchange Board of India (SEBI).

In respect of BRSP1, i.e. businesses are ethical, transparent, and accountable, the index values ranges from 0.67 to 1, which means all select companies are having ethical, transparent, and accountable business operations, but it is not similar among all the companies. In regard to BRSP2, i.e. goods and services in sustainability and safety, the index values range from 0.67 to 1, which means the select companies are involved in producing goods and services which aid in sustainability and safety. In case of BRSP3, i.e. best practices which promote the well-being and value chain of employees, the index values range from 0.89 to 1, which means all the select companies are having best practices in relation to their employees' well-being. In relation to BRSP4, i.e. best practices which protect stakeholder's interest, the index values range from 0.67 to 1, which means the select companies are engaged in protecting various stakeholders of their business in different levels.

In BSRP5, i.e. practices which promote human rights, the index values range from 0.67 to 1, which means all the select companies are involved in promoting human rights but their level of involvement in practice is different from one company to another. In respect of BSRP6, i.e. practices that protect and restore the environment, index values range from 0.78 to 1, which means all the select companies are involved in the activities which promote protection and restoring of environment, but there is no similarity in the level of their involvement in this aspect.

In BRSP7, i.e. practices to fulfil public and regulatory policy, the index values of select companies range from 0.67 to 1, which indicates that all the companies are involved in fulfilling and obeying public and regulatory policies at different levels. In respect to BRSP8, i.e. best practices to promote inclusive growth and equitable development, the index values of select companies range from 0.89 to 1, which means all the select companies are highly involved in this aspect. In relation to BRSP9, i.e. best practices which provide value to customers, the index values of select companies range from 0.78 to 1, which means all the select companies are involved in providing value to customers but their level of involvement is different from one company to another.

By analysing business responsibility and sustainability practices of select companies, it is evidently observed that all the select companies are involved in BRSP at different levels and they are unique in their contribution towards sustainable development. This observation is consistent with some studies (Al Breiki & Nobanee, 2019; Caldera et al., 2019; Haseeb et al., 2019a; Kopnina & Blewitt, 2014; Lamming et al., 1999; Van Bommel, 2018; Watson et al., 2008).

Table 2 Business responsibility and sustainability practices of select companies and their score and index

Companies	BRSP1I	BRSP2I	BRSP3I	BRSP4I	BRSP5I	BRSP6I	BRSP7I	BRSP8I	BRSP9I	Total BRSP score	OBPSPI
Reliance	1.00	1.00	1.00	0.78	0.78	1.00	0.78	1.00	1.00	**8.33**	**0.93**
TCS	1.00	1.00	1.00	1.00	0.89	1.00	0.67	0.89	1.00	**8.44**	**0.94**
HDFC Bank	0.89	1.00	1.00	0.89	0.89	1.00	0.67	0.78	0.89	**8.00**	**0.89**
ITC	1.00	0.67	1.00	1.00	1.00	1.00	0.67	0.89	0.78	**8.00**	**0.89**
Maruti	1.00	0.89	1.00	0.89	0.67	1.00	0.67	0.89	1.00	**8.00**	**0.89**
Wipro	0.89	1.00	1.00	0.67	0.67	1.00	0.78	0.89	1.00	**7.89**	**0.88**
HDFC Life	0.78	1.00	1.00	0.89	0.78	1.00	0.67	1.00	0.89	**8.00**	**0.89**
ONGC	1.00	1.00	1.00	0.78	1.00	0.89	0.78	0.89	0.89	**8.22**	**0.91**
Titan	0.78	0.89	1.00	0.78	0.78	1.00	0.67	1.00	1.00	**7.89**	**0.88**
BPCL	0.89	0.89	1.00	0.78	0.67	0.89	0.89	0.89	1.00	**7.89**	**0.88**
SBI Life	1.00	0.89	1.00	0.67	0.89	0.89	0.67	0.89	0.89	**7.78**	**0.86**
Bajaj Auto	0.67	1.00	1.00	0.78	0.89	0.89	1.00	1.00	1.00	**8.22**	**0.91**
TECHM	0.78	1.00	1.00	0.89	1.00	0.78	0.78	0.89	1.00	**8.11**	**0.90**
Indigo	0.89	0.89	1.00	1.00	0.89	0.78	0.67	0.89	1.00	**8.00**	**0.89**
M&M	0.78	0.78	1.00	0.89	0.78	0.89	0.78	0.89	0.89	**7.67**	**0.85**
Tata Steel	0.78	0.89	1.00	1.00	0.78	0.89	0.78	0.78	0.89	**7.78**	**0.86**
HINDPETRO	0.78	1.00	0.89	0.89	0.78	1.00	0.67	0.89	1.00	**7.89**	**0.88**
Bosch Ltd	0.89	1.00	0.89	1.00	0.89	0.89	0.89	1.00	1.00	**8.44**	**0.94**
Naukri	0.89	0.89	1.00	0.78	1.00	1.00	0.89	1.00	0.89	**8.33**	**0.93**
MRF	0.89	0.89	1.00	0.89	1.00	1.00	0.78	1.00	1.00	**8.44**	**0.94**
Tata Motors	0.89	1.00	1.00	1.00	1.00	0.78	0.67	1.00	0.89	**8.22**	**0.91**
Muthoot Fin	0.89	1.00	1.00	0.89	0.78	0.89	0.89	0.89	0.89	**8.11**	**0.90**
DLF	0.89	0.78	1.00	0.89	0.78	0.78	0.78	1.00	0.89	**7.78**	**0.86**
JSW Steel	0.78	1.00	1.00	0.89	1.00	0.89	0.89	1.00	1.00	**8.44**	**0.94**
Asian Paints	0.89	1.00	1.00	0.78	1.00	0.89	0.78	0.89	0.89	**8.11**	**0.90**

(continued)

Table 2 (continued)

Companies	BRSP1I	BRSP2I	BRSP3I	BRSP4I	BRSP5I	BRSP6I	BRSP7I	BRSP8I	BRSP9I	Total BRSP score	OBPSPI
DMart	0.89	0.89	0.89	1.00	0.89	0.78	1.00	1.00	1.00	**8.33**	**0.93**
Coal India	1.00	0.89	1.00	0.78	1.00	0.89	0.78	0.89	1.00	**8.22**	**0.91**
IOC	0.78	1.00	0.89	0.78	1.00	0.89	0.89	1.00	1.00	**8.22**	**0.91**
Hind Zinc	1.00	1.00	1.00	0.89	0.89	0.78	1.00	0.89	1.00	**8.44**	**0.94**
Adani Ports	0.89	1.00	1.00	1.00	0.89	0.78	0.78	0.89	0.89	**8.11**	**0.90**

Source: *Reports of select companies*

7.1 Analysis of Difference in the Sustainable Business Strategies and Business Responsibility and Sustainability Practices Among Select Companies

There is a lot of debate in the corporate field about the gap between plan and action. Many companies put plans and strategies in their prospectuses, but only a few companies are able to achieve those plans. Therefore, converting a plan into action is a real success for a company. Researchers calculated the level of sustainable business strategies, as well as business responsibility and sustainability practices, in this direction.

Table 3 shows that the mean score of sustainable business strategy is 2.63 and the mean score of business practice is 2.70. Further, the researcher identified whether there is a significant difference between sustainable business strategy and business responsibility and sustainability practices with an independent sample t-test result showing that *there is significant ($p < 0.05$) gap between strategy and practice with a mean difference of −0.722, which means companies are able to achieve more than their strategy.* In other words, most companies that practise business responsibility and sustainability go beyond simply having a sustainable business strategy.

7.2 Analysis of Influence of SBS on BRSP

On the other hand, researchers are also interested in knowing whether having a sustainable business strategy has a significant influence on business responsibility and sustainability practices. The earlier literature showed that there is a positive relationship between having a business strategy and business practices. Therefore, the researcher conducted simple linear regression with an equation of '$Y = a + bx + e$' to test the influence and predict the dependent variable. Here, sustainable business strategy is considered an independent variable, and business responsibility and sustainability practices are considered dependent variables.

Table 4 reveals that there is a significant positive relationship ($R = 0.365$) between business strategy and business practice. Further, it showed that having a sustainable business strategy (SBS) significantly predicts business responsibility and sustainability practices (BRSP) ($F = 1.728$, $p < 0.05$). Finally, it revealed that having SBS has a significant influence ($B = 0.241$, $p < 0.01$) on BRSP, which explains that the insertion of one sustainable business strategy leads to an increase of 0.241 times the impact on business responsibility and sustainability practices. From

Table 3 Sustainable business strategy and business responsibility and sustainability practices

	N	Mean	Std. deviation	t (p value)	Mean difference
SBS	30	2.6315	0.14106	−2.460 (0.017)	−0.07222
BRSP	30	2.7037	0.07720		

Table 4 Regression estimates

Model		Unstandardised coefficients		Standardised coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	**2.357**	0.265		8.909	0.000
	Strategy	0.132	0.100	**0.241**	1.314	0.000

a. Dependent Variable: Practice
$R = 0.365$
$R^2 = 0.1332$
$F = 1.728$ (0.019)

the analysis, it can be inferred that having a sustainable business strategy is crucial to achieving targeted business responsibility and sustainability practices. This outcome is consistent with the findings of (Caldera et al., 2019; Van Bommel, 2018).

8 Conclusion

The main purpose of this study was to examine the difference between sustainable business strategies and business responsibility and sustainability practices among select companies and to study the influence of sustainable business strategies on business responsibility and sustainability practices among select companies. The results of independent t-test revealed that there are significant differences (a 'gap') between SBS and BRSP. It is also noticed that the majority of select companies are practising BRSP beyond the strategy. This shows that the companies chosen are voluntarily committed to long-term development. The results of simple linear regression analysis suggest that having a business strategy significantly predicts business practice ($F = 1.728, p < 0.05$). Finally, it revealed that having a sustainable business strategy significantly influences ($B = 0.241, p < 0.01$) the BRSP. It can also be inferred that having a sustainable business strategy is crucial to achieving targeted business responsibility and sustainability practices. This outcome is consistent with the findings of (Caldera et al., 2019; Van Bommel, 2018).

In this light, the results of this study add to the expanding field of sustainable business leadership and corporate responsibility. Further, it also supports the various earlier studies (Al Breiki & Nobanee, 2019; Caldera et al., 2019; Haseeb et al., 2019a; Kopnina & Blewitt, 2014; Lamming et al., 1999; Van Bommel, 2018; Watson et al., 2008). In addition, the outcome of this study may become a reference for business leaders who are intended to set sustainable business strategies and monitor their implementation.

A major limitation of this study is the small sample size of companies, which did not allow us to conduct an extensive study, and it was only limited to the top NSE-listed companies and did not consider unlisted, small, or medium-sized companies. A further study could consider these issues in the future. Considerably more work needs to be done so as to assess the business responsibility and sustainability practices and their influence on the long-term survival of organisations.

Further, the study also recommends that there is a need of having proper monitoring and auditing standards for sustainable business strategies and their implementation in an efficient manner by companies. Hence, regulatory bodies are required to address this issue by framing a policy that will lead to ensuring assured sustainability contributions from corporates.

Appendix

Statements relating to intended sustainable business strategies

1: No strategy. 2: Moderate strategy. 3: There is a strategy.

Sl. No.	Statements	1	2	3
1.	There are strategies to understand environmental and social context in which it is operating			
2.	Sufficient initiatives have been taken to address sustainability issues			
3.	There is a clear sustainability vision (vision to environmental, social, and economic aspects)			
4.	There are sufficient plans for action			
5.	There are predetermined timelines to address sustainability issue			
6.	Companies properly reporting and communicating these issues as per well-accepted standards			

Note: These statements are developed based on the conceptual framework and literature review

BRS (Business Responsibility and Sustainability) Activities

1: Poor. 2: Fair. 3: Good.

Sl. No.	Statements	1	2	3
1.	There are practices which are ethical, transparent, and accountable			
2.	There are practices which enable to produce goods and services in confirmation with sustainability and safety			
3.	There are practices which promote well-being and value chains of employees			
4.	There are practices that protect various stakeholders' interests			
5.	There are initiatives to promote human rights			
6.	There are initiatives which protect and restore the environment			
7.	There are practices which are responsible and transparent in influencing public and regulatory policy			
8.	There are initiatives which promote inclusive growth and equitable development			
9.	There are initiatives which provide value to their consumers			

Note: These statements are adopted from SEBI's BRSR guidelines, conceptual framework, and literature review

References

Al Breiki, M., & Nobanee, H.: The role of financial management in promoting sustainable business practices and development. Available SSRN 3472404 (2019).

Aldieri, L., Kotsemir, M., & Vinci, C. P. (2020). The role of environmental innovation through the technological proximity in the implementation of the sustainable development. *Business Strategy and the Environment, 29*(2), 493–502.

Anbarasan, P. (2018). Stakeholder engagement in sustainable enterprise: Evolving a conceptual framework, and a case study of ITC. *Business Strategy and the Environment, 27*(3), 282–299.

Baker, J., & Jones, D.: A theoretical framework for sustained strategic alignment and an agenda for research (2008).

Baumgartner, R. J. (2014). Managing corporate sustainability and CSR: A conceptual framework combining values, strategies and instruments contributing to sustainable development. *Corporate Social Responsibility and Environmental Management, 21*(5), 258–271.

Beattie, V., McInnes, B., & Fearnley, S. (2004). A methodology for analysing and evaluating narratives in annual reports: A comprehensive descriptive profile and metrics for disclosure quality attributes. *In Accounting forum, 28*(3), 205–236.

Bilan, Y. V., Pimonenko, T. V., & Starchenko, L. V. (2020). *Sustainable business models for innovation and success: Bibliometric analysis* (Vol. 159).

Birkin, F., Cashman, A., Koh, S. C. L., & Liu, Z. (2009). New sustainable business models in China. *Business Strategy and the Environment, 18*(1), 64–77.

Bocken, N., Short, S., Rana, P., & Evans, S. (2013). A value mapping tool for sustainable business modelling. *Corporate Governance, 13*, 482.

Bocken, N. M., Short, S. W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production, 65*, 42–56.

Bocken, N. M. P., Rana, P., & Short, S. W. (2015). Value mapping for sustainable business thinking. *Journal of Industrial and Production Engineering, 32*(1), 67–81.

Calandra, D., Secinaro, S., Massaro, M., Dal Mas, F., & Bagnoli, C. (2022). The link between sustainable business models and Blockchain: A multiple case study approach. *Business Strategy and the Environment, 32*, 1403.

Caldera, H. T. S., Desha, C., & Dawes, L. (2019). Evaluating the enablers and barriers for successful implementation of sustainable business practice in 'lean' SMEs. *Journal of Cleaner Production, 218*, 575–590.

Crittenden, V. L., Crittenden, W. F., Ferrell, L. K., Ferrell, O. C., & Pinney, C. C. (2011). Market-oriented sustainability: A conceptual framework and propositions. *Journal of the Academy of Marketing Science, 39*(1), 71–85.

Dobers, P., & Wolff, R. (2000). Competing with 'soft' issues – from managing the environment to sustainable business strategies. *Business Strategy and the Environment, 9*(3), 143–150.

Dyllick, T., & Muff, K. (2016). Clarifying the meaning of sustainable business: Introducing a typology from business-as-usual to true business sustainability. *Organization & Environment, 29*(2), 156–174.

Fowler, S. J., & Hope, C. (2007). Incorporating sustainable business practices into company strategy. *Business Strategy and the Environment, 16*(1), 26–38.

Gauthier, J. (2017). Sustainable business strategies: Typologies and future directions. *Society and Business Review, 12*, 77.

Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018). Sustainable business model innovation: A review. *Journal of Cleaner Production, 198*, 401–416.

Guthrie, J., & Abeysekera, I. (2006). Content analysis of social, environmental reporting: What is new? *Journal of Human Resource Costing & Accounting, 10*, 114.

Haseeb, M., Hussain, H. I., Kot, S., Androniceanu, A., & Jermsittiparsert, K. (2019a). Role of social and technological challenges in achieving a sustainable competitive advantage and sustainable business performance. *Sustainability, 11*(14), 3811.

Haseeb, M., Hussain, H. I., Ślusarczyk, B., & Jermsittiparsert, K. (2019b). Industry 4.0: A solution towards technology challenges of sustainable business performance. *Social Sciences, 8*(5), 154.

Hind, P., Wilson, A., & Lenssen, G. (2009). Developing leaders for sustainable business. *Corporate Governance: The international journal of business in society, 9*(1), 7–20.

Holsti, O. R. (1969). *Content analysis for the social sciences and humanities Reading*. Addison-Wesley (content analysis).

Jabareen, Y. (2008). A new conceptual framework for sustainable development. *Environment, Development and Sustainability, 10*(2), 179–192.

Jansen, L. (2003). The challenge of sustainable development. *Journal of Cleaner Production, 11*(3), 231–245.

Jones, M. J., & Shoemaker, P. A. (1994). Accounting narratives: A review of empirical studies of content and readability. *Journal of Accounting Literature, 13*, 142.

Kavitha, D., & Nandagopal, R. (2011). Disclosure studies â€“ a commentary on the methods and measures". *Indian Journal of Corporate Governance, 4*(1), 29–46.

Kopnina, H., & Blewitt, J. (2014). *Sustainable business: Key issues*. Routledge.

Lamming, R., Faruk, A., & Cousins, P. (1999). Environmental soundness: A pragmatic alternative to expectations of sustainable development in business strategy. *Business Strategy and the Environment, 8*(3), 177–188.

Lo, S. F. (2010). Performance evaluation for sustainable business: A profitability and marketability framework. *Corporate Social Responsibility and Environmental Management, 17*(6), 311–319.

Lüdeke-Freund, F. (2010). In R. Wever, J. Quist, A. Tukker, J. Woudstra, F. Boons, & N. Beute (Eds.), *Towards a conceptual framework of 'business models for sustainability'. Knowledge collaboration & learning for sustainable innovation* (pp. 25–29).

Mackie, L., & Campbell, D. (2023). Sustainability and the supply chain. In *Fashion Marketing in Emerging Economies 1* (pp. 163–220). Palgrave Macmillan.

Marston, C. L., & Shrives, P. J. (1991). The use of disclosure indices in accounting research: A review article. *The British Accounting Review, 23*(3), 195–210.

Marston, C. L., & Shrives, P. J. (1996, May). A review of the development and use of explanatory models in financial disclosure studies. In *In 19th Annual European Accounting Association Congress*.

Morioka, S. N., & de Carvalho, M. M. (2016). A systematic literature review towards a conceptual framework for integrating sustainability performance into business. *Journal of Cleaner Production, 136*, 134–146.

Nosratabadi, S., Mosavi, A., Shamshirband, S., Zavadskas, E. K., Rakotonirainy, A., & Chau, K. W. (2019). Sustainable business models: A review. *Sustainability, 11*(6), 1663.

Obermiller, C., Burke, C., & Atwood, A. (2008). Sustainable business as marketing strategy. *Innovative Marketing, 4*(3).

Prause, G. (2015). Sustainable business models and structures for industry 4.0. *Journal of Security & Sustainability, 5*(2), 159.

Rao, P., Verma, S., Rao, A. A., & Joshi, R. (2022). A conceptual framework for identifying sustainable business practices of small and medium enterprises. *Benchmarking: An International Journal, 30*(6), 1806–1831.

Sadjiarto, A., Hartanto, S., & Octaviana, S. (2020). Analysis of the effect of business strategy and financial distress on tax avoidance. *Journal of Economics and Business, 3*(1).

Samy, M., Odemilin, G., & Bampton, R. (2010). Corporate social responsibility: A strategy for sustainable business success. An analysis of 20 selected British companies. *Corporate Governance: The international journal of business in society, 10*(2), 203–217.

Sanders, N. R., & Wood, J. D. (2019). *Foundations of sustainable business: Theory, function, and strategy*. John Wiley & Sons.

Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2011). *Business cases for sustainability and the role of business model innovation: Developing a conceptual framework*. Leuphana Universität Lüneburg.

Shad, M. K., Lai, F. W., Fatt, C. L., Klemeš, J. J., & Bokhari, A. (2019). Integrating sustainability reporting into enterprise risk management and its relationship with business performance: A conceptual framework. *Journal of Cleaner Production, 208*, 415–425.

Shakeel, J., Mardani, A., Chofreh, A. G., Goni, F. A., & Klemeš, J. J. (2020). Anatomy of sustainable business model innovation. *Journal of Cleaner Production, 261*, 121201.

Strohhecker, J., & Größler, A. (2012). Implementing sustainable business strategies. *Systems Research and Behavioral Science, 29*(6), 547–570.

Van Bommel, K. (2018). Managing tensions in sustainable business models: Exploring instrumental and integrative strategies. *Journal of Cleaner Production, 196*, 829–841.

Varadarajan, R. (2017). Innovating for sustainability: A framework for sustainable innovations and a model of sustainable innovations orientation. *Journal of the Academy of Marketing Science, 45*(1), 14–36.

Watson, R. T., Boudreau, M. C., Chen, A., & Huber, M. (2008). Green IS: Building sustainable business practices. *Information Systems*, 1–17.

Weissbrod, I., & Bocken, N. M. (2017). Developing sustainable business experimentation capability – a case study. *Journal of Cleaner Production, 2663-2676*, 2663.

Yang, M., Evans, S., Vladimirova, D., & Rana, P. (2017). Value uncaptured perspective for sustainable business model innovation. *Journal of Cleaner Production*, 1794–1804.

A Study on the Impact of Sustainable Leadership on Sustainable Performances with Reference to Information Technology (IT) Sector

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Abstract Sustainable development is a new area of cross-disciplinary study. Recently formed to address problems associated with sustainable development, the field of sustainable leadership is an innovative approach to effective leadership. In order to include sustainable development as part of a company's strategy, top executives must first incorporate sustainability into daily operations. Even while leaders play a critical role in bringing about change, there is still a shortage of understanding about leadership and its connection to sustainable practices, so more research is needed to show this. A gap exists in the literature between sustainable practices, sustainability performance, and leadership skills of IT workers. As a result, a survey questionnaire was developed to gather information, and structural equation modeling (SEM) was used to examine the moderating effect of IT managers' leadership abilities on the links between sustainable practices and sustainability performance. The results of research confirmed that all the leadership practices lead to sustainability performance. The findings proved that adoption of sustainable leadership practices in the form of labor relations, valuing employees, and shared vision improves the performance of firm.

Keywords Sustainable leadership · Sustainable performance · IT sector

1 Introduction

Today's enterprises face increased complexity as a direct result of the speed with which their environments are changing. Financial scandals, bankruptcies, disasters, and public, government, and NGO pressure will continue to drive businesses to factor in greater levels of complexity in their operations if they want to be sustainable in the long run. Evidence-based management methods are advocated by sustainable

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leadership (SL) as part of a comprehensive strategy for directing a business that seeks to strike a balance between people, profits, and the environment. Positive labor relations, a shared vision, a commitment to social responsibility, and treatment of employees with respect are all examples of sustainable leadership practices that contribute to a company's long-term success (Suriyankietkaew & Avery, 2016).

There is a pressing need to develop this area of study further, as the literature on sustainable leadership is still in its infancy (Burawat, 2019).

To a greater or lesser extent, today's managerial researchers agree on the critical importance of organizational learning in the context of sustainable growth. Realigning the processes and structures of an organization takes into account the social, economic, and environmental perspectives that are revealed via learning at the organizational level. It is characterized by a commitment to method, an emphasis on teamwork, and a focus on the fundamentals of business and its goals.

1.1 Research Question

In this study, we have narrowed our attention to methods that are tailored to the problem of long-term growth and change. These methods are not all there is. They were picked because of the obvious impact they would have on long-term viability and systemic shifts.

The necessity to alter the economic system as a whole is something that Senge (2008), who also takes a holistic leadership stance, has emphasized. What it takes for executives to push sustainability initiatives within organizations is something Lueneburger and Goleman (2010) investigated. These three perspectives, transformational leadership, systems thinking, and emotional intelligence, each come from a unique academic background, which will deepen the comparison. An organization's view of sustainability shifts from a compliance issue to a strategic opportunity as it raises the bar and finds new ways to use sustainability to gain a competitive edge, and as a result, it uses long-term metrics to evaluate its success in this area through leadership practices. Therefore, the sustainability leader needs to be good at seeing ahead and assessing long-term sustainability trends, as well as finding new possibilities and devising strategies to reposition the organization so that it can take advantage of them.

2 Literature Review and Hypothesis Development

From a survival perspective, it is no longer possible to proceed with "business as usual," an approach in which the short-term financial interests of shareholders are prioritized over the long-term interests of stakeholders. Not unlike information technology, globalization, and quality movement before it, sustainability has been identified by top corporations as the next business "mega-trend" that will have a

significant impact on the companies' capacity to remain competitive in the future (Senge 2008; Lubin and Esty 2010). The only legitimate business is a sustainable one, as Frank Horwitz put it (Horwitz and Grayson, 2014).

For proponents of the NRBV framework, this is the notion that best describes how an organization can capitalize on its own set of assets.

This managerial framework places an emphasis on the importance of a company's strategic resources and competencies in building the foundation for long-term competitive advantages. However, firms that incorporate nature into their operations cannot use the NRBV framework (Hart, 1995). It is often not possible for modern businesses to deal with sustainability issues without factoring in the state of the environment (Hart & Dowell, 2011). A source of competitive advantage, according to NRBV theory, is having access to resources and capabilities that promote environmentally sustainable economic activity (Hart, 1995). In order to effectively address the environmental concerns of their many stakeholder groups, organizations with unique resources must respond to the external environment with ambitious initiatives (Berrone et al., 2008). To maintain a competitive edge, businesses can capitalize on leadership's rarity, uniqueness, value, and non-replaceability (Harris & McMahan, 2015). Leadership that is sustainable considers the interests of the organization as a whole and encourages the incorporation of social, economic, and environmental considerations (Iqbal et al., 2020). This study took advantage of this source, which is apparent in the way NRBV theory is defined.

Developing, amassing, integrating, disseminating, and employing various forms of information are key to a dynamic capability (Verona, 2001). Organizational learning in the context of knowledge-based dynamic capabilities entails the generation of new information and the codification of existing facts into a shared body of understanding. Superior performance is driven by the organization's dynamic capabilities, which are bolstered by the learning organization's emphasis on knowledge production and application (Tsai et al.,, 2012). As a result, with organizational learning present, an organization's adaptable capacity might potentially accommodate and fulfil the needs of a wide range of stakeholders. Therefore, the dynamic capability is a foundational notion that bridges the gap between organizational learning and long-term success.

Leadership is crucial to sustainable growth because it shapes the attitudes and actions of a company's workers.

Sustainable leaders, as argued by Iqbal et al. (2020), foster a climate that encourages people to open up to one another at work and share information (Leroy et al. 2012). Therefore, successful learning inside an organization is driven by a psychologically safe environment. In addition, sustainable leadership emphasizes creativity, foresight, growth, morality, a willingness to share information, and accountability to the community and the environment (Kantabutra & Rungruang, 2013). Sharing long-term goals facilitates organizational development, as stated by Lenka et al. (2019). Furthermore, sustainable leaders encourage the sharing of information within their businesses by encouraging free flow of information (Park & Kim, 2018). Managers may view unions as a detriment to productivity, which has led to union avoidance, suppression, and substitution, according to some data (Chen,

2007; Kochan et al., 1999). Yet other studies show that unions can help an organization become more competitive by promoting the adoption of high-performance work practices (HPWPs) (Gill & Stott, 2009). Shared value solutions are one way to address societal issues, according to Donohue-Porter et al. (2019).

Sustainable and authentic leadership aids in achieving technical support, effective strategic policies, and joint efforts to uphold the learning of the organization and permit the its employees to enhance their abilities, share knowledge, and boost the organization's performance. The connection between sustainable leadership and genuine leadership that leads to long-term success in reaching development goals is mediated by the presence of a learning organization (Guinot et al., 2020). However, Saleem et al. (2020) argue that leaders' morality alone is not enough to sway employees' pro-environmental actions. Ethical and sustainable leadership has a little direct effect on employees' pro-environmental behavior, but this effect is amplified when specific variables act as mediators (Uddin, 2021). Therefore, variables like employee passion to protect the environment and motivation are necessary for ethical leaders to impact employee behavior (Peng & Kim, 2020), as well as a psychological green climate (Khan et al., 2019; Saleem et al., 2020). From what has been said above, however, it is clear that this perspective only applied to the actions of employers in the workplace.

Shared value, however, allows businesses to take the lead in social change by making use of their expertise, resources, and management capacity in ways that even the most well-intentioned governmental and social sector organizations can seldom equal. Businesses can regain the public's trust in this way. Consequently, the following hypothesis is proposed for this investigation:

2.1 Research Objectives

1. To study the factors affecting sustainable performance
2. To determine the impact of sustainable leadership practices on sustainable performance

2.2 Research Hypothesis

Figure 1 shows the relationship between the study variables, and from it, the following hypotheses can be built:

H: Sustainable leadership practices significantly influence sustainability performance of SMEs.

H1: Labor relations have a direct and significant impact on the sustainability performance.

H2: Valuing employees has a direct and significant impact on sustainability performance.

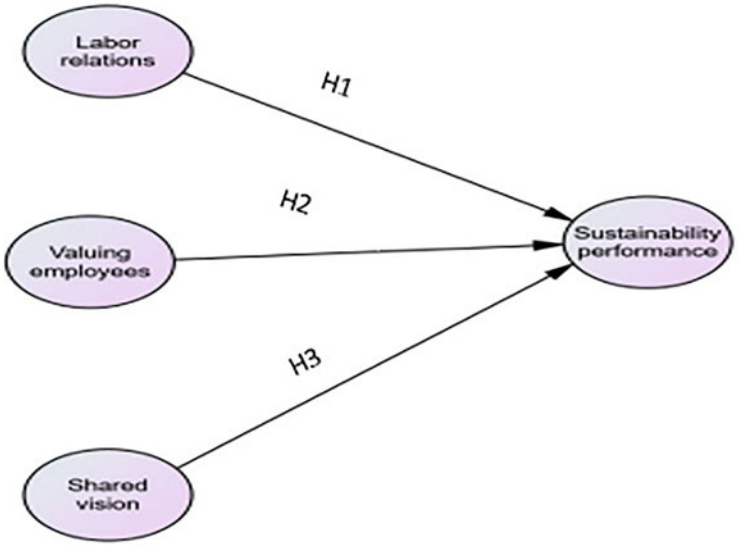

Fig. 1 Conceptual framework of the study

H3: Shared vision has a direct and significant impact on sustainability performance.

3 Research Methodology

The research was carried out empirically on a sample of Mumbai-based SMEs. The survey's respondents were selected at random, and they were all business owners or top executives with extensive understanding of their companies' operations. There are two parts to the semi-structured questionnaire: questions about the respondents and the business, and questions about the study variables. Opinions were solicited from respondents using a 5-point Likert scale (where 5 = strongly agree and 1 = strongly disagree). Out of 280 questionnaires returned back by respondents, during data screening process, data having missing values were rejected and finally 268 samples were selected for further analysis.

The measures for the scale were derived and adapted from previous studies. For measuring sustainability performance of firm, methods were selected from study. Sustainable leadership practice scales were derived from the studies of Iqbal, Q., and Piwowar-Sulej, K. (2021) and Suriyankietkaew, S., and Avery, G. (2016).

Statistical analysis was performed on the data using SPSS and AMOS version 26 to conduct both descriptive and inferential statistical tests. Descriptive statistics provide an overview of the data, as mentioned in Tables 1 and 3.

Table 1 Details of respondents from selected SMEs ($n = 268$)

Measures	Items	Frequency	Percentage
Gender	Male	147	55
	Female	121	45
Age	Below 24	2	0.74
	25–30	48	18
	30–35	78	29.1
	35–40	112	41.7
	40 and above	28	10.4
Education	Secondary	1	0.03
	Undergraduate	134	52.2
	Postgraduate	92	34.3
	Others	41	15.29
Type of business	Micro	53	20
	Small	97	36
	Medium	118	44
Industry	Food and beverages	31	11.5
	Durables, consumer electronics, and machinery	67	25
	Chemicals, pharmaceutical, and plastics	18	6.7
	Textile, leather, and clothing	21	7.8
	Other manufacturing	131	48.8

Source: Primary survey

The study has performed first exploratory factor analysis (EFA) for identifying the structure of measures data, followed by confirmatory factor analysis (CFA) to determine construct validity and reliability. Finally, structural equation modeling (SEM) was conducted to test the research hypothesis.

3.1 Factor Analysis

A preliminary factor analysis was performed to ensure that selected scale items were loaded properly with a factor loading score of >0.5, and no cross-loading was observed. The Kaiser–Meyer–Olkin (KMO) value determines if a sample size is adequate for further study. A high value of KMO (0.889) and small value of significance (<0.05) of Bartlett's test of sphericity indicate that factor analysis is useful for our data. The 13 items were subjected to principal component analysis (PCA) with promax rotation method Kaiser normalization. Based on factor extraction criteria having values greater than 1, results into four factors, explaining total variance of 81.79% (Table 2).

The descriptive statistics table of perception of SME owners/mangers towards sustainability performance is highest with mean value ($M = 4.47$) above neutral value 3. The mean values of labor relations ($M = 4.24$), valuing employees

Table 2 Factor loadings of variables

Factor	Items	Item loadings
Labor relations	LR1: High-performance work is easier to implement when unions and managers have good relations with their workers.	0.861
	LR2: The unionized workplace with strong employee connections is expected to outperform those with weaker ties between management and workers as well as non-unionized workplaces.	0.872
	LR3: Trust among workers and continuity within teams will be impacted.	0.890
Valuing employees	VE1: Adding to society's well-being is a great way for businesses to boost their bottom line.	0.764
	VE2: Many opportunities to meet unmet needs, increase efficiencies, distinguish products, and grow markets are made possible by strengthening the ties between business success and society progress.	0.862
	VE3: Company profits, workers and their families enjoy better health, and society as a whole reaps the rewards of reduced sick days and increased output.	0.765
	VE4: In all sectors of public policy, the idea of value creation should direct spending.	0.839
Shared vision	SV1: Businesses' capacity to share a common vision helps speed up their progress towards environmental management competence.	0.849
	SV2: A shared vision establishes standards for conduct and recommends the kinds of learning that employees should prioritize.	0.761
	SV3: Managers delegate authority by conveying the company's vision to its employees, who then bear a portion of the burden of making those aims a reality.	0.844
Sustainability performance	SP1: Leadership in your company strikes a healthy balance between profit and doing good.	0.761
	SP2: When a mistake is made that has an impact on sustainability, your organization's management makes it official.	0.801
	SP3: Your company's leadership is open to fixing problems that could compromise sustainability.	0.838

($M = 4.30$), and shared vison ($M = 4.38$) are near to agreement degree; it indicates that respondents are agreeing on involvement of sustainable leadership practices and performance of their firm.

The given table also shows correlation of independent variables with each other and dependent variables. The correlation coefficients of all relationships with performance are positive and significant, highlighting that increase in sustainability leadership practices leads to improvement in sustainability performance of SMEs.

Finally, Table 3 shows Cronbach's alpha value, which was used to assess the reliability of research variables. According to the threshold requirements, the alpha value for all four components is greater than 0.7, verifying the data's reliability.

Table 3 Cronbach's alpha, mean, Std. deviation, and correlation of variables

	Labor relations	Valuing employees	Shared vision	Sustainability performance
Reliability (alpha value)	0.921	0.882	0.879	0.856
Mean	4.2388	4.2985	4.3818	4.4776
Standard deviation	0.90231	0.76436	0.81938	0.69831
Labor relations	1	0.387[a]	0.444[a]	0.532[a]
Valuing employees	0.387[a]	1	0.420[a]	0.515[a]
Shared vision	0.444[a]	0.420[a]	1	0.491[a]
Sustainability performance	0.532[a]	0.515[a]	0.491[a]	1

Note: [a] indicates that correlation is significant at 0.01 level (two-tailed)

4 Hypothesis Testing Using Structural Equation Modeling

The study runs SEM analysis using maximum likelihood method to test the causal relationship between research constructs. The study assessed the impact of three exogenous variables (independent variables) on sustainability performance as endogenous dependent variable of the study. The criteria for accepting or rejecting a study hypothesis are based on a critical ratio value of 1.96 and a p-value less than 0.05 at the 5% level of significance.

Table 4 displays the outcomes of our path analysis and hypothesis testing. For each association, we display the standardized path coefficient and associated p-value. By referring to Table 4 and Fig. 2, it is concluded that the standardized path coefficient (β) of labor relations to performance is positive and significant as $\beta = 0.315$ with $p = 0.000$. Since p-value is <0.05 and CR (4.946) is >1.96, hypothesis H1 is accepted.

The impact of valuing employees on performance of SMEs is positive and significant having $\beta = 0.355$, CR = 5.370, and $p = 0.000$ ($p < 0.05$), provided that there is sufficient evidence to accept hypothesis H2. Similarly, performance of SMEs is positively influenced by shared vision with $\beta = 0.239$ and $p = 0.000$. This

Table 4 Path coefficients of the structural model

Hypotheses	Outcome variables		Causal variables	SE	CR	P	Path coefficient	Result
H1	Sustainability performance	←	Labor relations	0.050	4.946	***	0.315	Accepted
H2	Sustainability performance	←	Valuing employees	0.060	5.370	***	0.355	Accepted
H3	Sustainability performance	←	Shared vision	0.051	3.708	***	0.239	Accepted

*Note: SE Standard error, CR Critical ratio, Path coefficient: Standardized regression weights, and p: probability of significance. *** indicates $p < 0.000$*

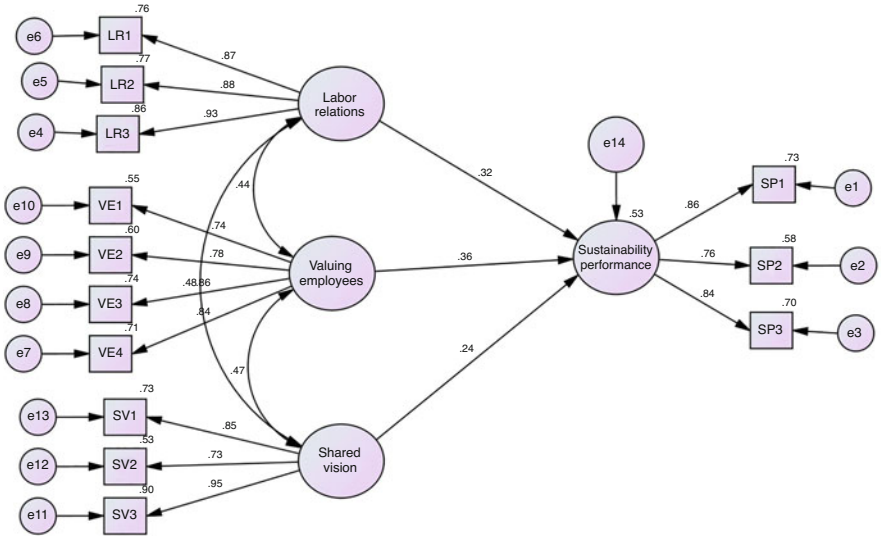

Fig. 2 Causal model

relation is significant as p-value is less than 0.05; therefore, hypothesis H3 was supported from this finding.

The findings also revealed that the influence of valuing employees is more on performance compared to other sustainable leadership practices as standardized regression value is higher for valuing employees.

The coefficient of determination (R (Burawat, 2019)) value is 0.534, indicating that 53.4% of variations in sustainability performance are explained by three sustainable leadership practices, i.e., labor relations, valuing employees, and shared vision.

The fit indices of the measurement model are CMIN/df = 2.742, RMSEA = 0.068, CFI = 0.947, NFI = 0.925, and AGFI = 0.853. The results indicate that the structure model fits prediction and interpretation (Table 5).

Table 5 Overall model fit

Indices	Recommended criteria	Model values
Normed chi square ($\chi 2$/DF)	$1 < \chi 2/df < 3$	2.742
Goodness-of-fit index (GFI)	>0.90	0.905
Adjusted GFI (AGFI)	>0.80	0.853
Comparative fit index (CFI)	>0.95	0.947
Root mean square error of approximation (RMSEA)	<0.05 good fit <0.08 acceptable fit	0.068
Tucker-Lewis index (TLI)	$0 < TLI < 1$	0.930

(Source: Researcher's calculation based on primary survey). Threshold criteria suggested by Hair et al. (2010) study

5 Discussion and Implications

This study has explored the effects of various sustainable leadership practices on the performance of select SMEs in Mumbai. The findings of the study are elaborated below:

The results of research confirmed that all the leadership practices lead to sustainability performance. The findings proved that adoption of sustainable leadership practices in the form of labor relations, valuing employees, and shared vision improves the performance of firm. The finding of the present study explored that the impact of valuing employees on sustainability performance is positive, significant, and highest.

The most important managerial implication for CEOs, business owners, and managers is the ability to recognize key sustainable leadership behaviors that boost performance. This can help them learn the fundamentals of good leadership and management methods that boost efficiency and productivity in the workplace and lead to greater success in the marketplace over time. In the end, the keys to sustaining leadership practices are provided by these sustainable leadership practices.

It is clear from studying effective sustainable business practices and contrasting various leadership practices that the leaders of the future will need to make significant adjustments to their way of thinking. Consciousness-based approaches are congruent with some currents in economics (such as those that highlight the limitations of traditional approaches to economics like supply and demand, market equilibrium, and rationality by arguing that these frameworks fail to take into account psychological, social, and ecological realities).

To begin SL is to appreciate the disruptive and transformative changes that occur within the context of modern business and society, which sets it apart from other leadership strategies that start with the perspective of the leaders or the status quo of their firm. Therefore, future leaders will need to adopt strategies that allow them to discover and modify new mind-sets, beliefs, and attitudes, as well as develop the relevant skill set, in order to prepare for the incredible transformative sustainable journey ahead.

6 Conclusion, Limitations, and Future Scope

In summary, the key to achieving long-term success in corporate transformation is in the interplay between leadership awareness and specifics of the given situation, both in the present and the past. SL gives a new context and purpose for the connected, creative, and collective leadership qualities because it acknowledges the relationship between context, consciousness, and continuity as the basis for sustained leadership development. Additional study is required to confirm the SL model in real-world corporate settings and to define each SL leadership quality. The current research collects data from SMEs present in Mumbai. This study can be extended to other regions of the country.

References

Burawat, P. (2019). The relationships among transformational leadership, sustainable leadership, lean manufacturing and sustainability performance in Thai SMEs manufacturing industry. *International Journal of Quality & Reliability Management, 36*(6), 1014–1036.

Chen, M.-H. (2007). Entrepreneurial leadership and new ventures: Creativity in entrepreneurial teams. *Creativity and Innovation Management, 16*(3), 239–249. https://doi.org/10.1111/j.1467-8691.2007.00439.x

Cohen, Y., & Hetsroni, A. (2018). When the most popular format reaches the most atypical country. In *Religion and reality TV*. Faith in Late Capitalism.

Crosby, B. C., & Bryson, J. M. (2005). *Leadership for the common good: Tackling public problems in a sharedpower world* (Vol. 264). John Wiley & Sons.

Donohue-Porter, P., Eckardt, P., Prottas, D., Rondello, K. C., & Silberstang, J. (2019). A bridge to leadership communication success: Impact of leader-member exchange on nursing administrative relationships. *Nurse Leader, 17*, 546–551.

Duan, C., Grover, V., Roberts, N., & Balakrishnan, N. (Raju). (2014). Firm valuation effects of the decision to adopt relationally governed business process outsourcing arrangements. *International Journal of Production Research, 52*(15), 4673–4694. https://doi.org/10.1080/00207543.2014.884289

Gill, M., & Stott, R. (2009). Leadership: How to influence national and international policy. In *The health practitioner's guide to climate change. Diagnosis and cure*. Earthscan.

Green, D. D., & Roberts, G. E. (2012). Impact of postmodernism on public sector leadership practices: Federal government human capital development implications. *Public Personnel Management, 41*(1), 79–96. https://doi.org/10.1177/009102601204100105

Guinot, J., Miralles, S., Rodríguez-Sánchez, A., & Chiva, R. (2020). Do compassionate firms outperform? The role of organizational learning. *Employee Relations, 42*(3), 717–734. https://doi.org/10.1108/er-07-2019-0275

Harris, C. M., & Mcmahan, G. C. (2015). The influence of compensation on leader human capital and unit performance. *SAM Advanced Management Journal, 80*(1).

Hart, A. W. (1995). Reconceiving school leadership: Emergent views. *The Elementary School Journal, 96*(1), 9–28. https://doi.org/10.1086/461812

Hart, S. L., & Dowell, G. (2011). Invited editorial: A natural-resource-based view of the firm: Fifteen years after. *Journal of Management, 37*(5), 1464–1479.

Horwitz, F., & Grayson, D. (2014). Putting PRME into practice in a business school: Cranfield school of management. In *EFMD Insights into Business Education: case studies from business schools world* (pp. 55–58). European Foundation for Management Development in association with GSE Research.

Iqbal, Q., & Piwowar-Sulej, K. (2021). Sustainable leadership in higher education institutions: Social innovation as a mechanism. *International Journal of Sustainability in Higher Education, 23*, 1.

Iqbal, Z. A., Abid, G., Contreras, F., Hassan, Q., & Zafar, R. (2020). Ethical leadership and innovative work behavior: The mediating role of individual attributes. *Journal of Open Innovation: Technology, Market, and Complexity, 6*(3).

Kantabutra, S., & Rungruang, P. (2013). Perceived vision-based leadership effects on staff satisfaction and commitment at a Thai energy provider. *Asia-Pacific Journal of Business Administration, 5*(2), 157–178. https://doi.org/10.1108/17574321311321621

Khan, M. A. S., Jianguo, D., Ali, M., Saleem, S., & Usman, M. (2019). Interrelations between ethical leadership, green psychological climate, and organizational environmental citizenship behavior: A moderated mediation model. *Frontiers in Psychology, 10*, 1977. https://doi.org/10.3389/fpsyg.2019.01977

Kochan, F. K., Reed, C. J., Twale, D. J., & Jones, V. C. (1999). Restructuring an educational leadership program: A journey from organization to community.

Lenka, R. K., Rath, A. K., & Sharma, S. (2019). Routing protocols in WSN assisted IoT infrastructure-A review. In *In 2019 International Conference on Intelligent Computing and Remote Sensing (ICICRS)* (pp. 1–6). IEEE.

Leroy, H., Palanski, M. E., & Simons, T. (2012). Authentic leadership and behavioral integrity as drivers of follower commitment and performance. *Journal of Business Ethics, 107*(3), 255–264. https://doi.org/10.1007/s10551-011-1036-1

Lubin, D. A., & Esty, D. C. (2010). The sustainability imperative. *Harvard Business Review, 88*(5), 42–50.

Lueneburger, C., & Goleman, D. (2010). *The change leadership sustainability demands*. MIT Sloan Management Review.

Mayo, M., Gomez-Mejia, L., Firfiray, S., Berrone, P., & Villena, V. H. (2016). Leader beliefs and CSR for employees: The case of telework provision. *Leadership & Organization Development Journal, 37*(5), 609–634. https://doi.org/10.1108/lodj-09-2014-0177

Park, S., & Kim, E.-J. (2018). Fostering organizational learning through leadership and knowledge sharing. *Journal of Knowledge Management, 22*(6), 1408–1423. https://doi.org/10.1108/jkm-10-2017-0467

Peng, A. C., & Kim, D. (2020). A meta-analytic test of the differential pathways linking ethical leadership to normative conduct. *Journal of Organizational Behavior, 41*(4), 348–368. https://doi.org/10.1002/job.2427

Saleem, M., Qadeer, F., Mahmood, F., Ariza-Montes, A., & Han, H. (2020). Ethical leadership and employee green behavior: A multilevel moderated mediation analysis. *Sustainability, 12*(8), 3314.

Senge, P. (2008). The necessary revolution: How individuals and organisations are working together to create a sustainable world. *Management Today, 24*(10), 54–57.

Suriyankietkaew, S., & Avery, G. (2016). Sustainable leadership practices driving financial performance: Empirical evidence from Thai SMEs. *Sustainability, 8*(4), 327.

Tsai, W. H., Hwang, E. T. Y., Chang, J. C., Lai, C. W., & Lin, S. J. (2012). Turning around troubled projects in an ERP implementation project from consultancy project leaders' perspectives. *International Journal of Business and Systems Research, 6*(2), 123. https://doi.org/10.1504/ijbsr.2012.046352

Uddin, M. A. (2021). Nexus between psychological empowerment and creative process engagement in A moderated mediation mechanism. *Journal of Innovation in Business Studies, 1*(1), 189–210.

Verona, G. S. (2001). The influence of principal transformational leadership style on high school proficiency test results in New Jersey comprehensive and vocational-technical high schools.

Big Data's Sustainable Impact on the Future Responsibilities of Accountants

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Abstract The purpose of this chapter is to examine big data under the United Nations Global Sustainable Development Goals (UNSDGs) in order to pinpoint probable difficulties and potential effects on how accountants and the accounting profession could change.

In order to accomplish this goal, a qualitative study based on structured interviews with experts in the accounting field is used in conjunction with prior studies and related research. The study came to the conclusion that big data will have an influence on accountants' future responsibilities and the accounting field. Big data is one of the most recent innovations in the accounting industry, and this chapter's main contribution is an empirical investigation of the phenomena and how vital it is given how it affects accountants' roles and offers incredible opportunities in the realm of accounting measurements.

Big data analytics enables to have a sustainable robust platform for the decision-making process by providing the technology and qualified accountants needed to develop a world of big data with both structured and unstructured data sources.

Keywords Big data · Accounting profession · Accountants' responsibilities · UNSDGs · Jordan

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1 Introduction and Theoretical Background

Over the last few decades, technology and systems have transformed a variety of occupations, where digital languages have superseded conventional business languages (Weshah, 2021) and also concluded that adopting contemporary IT systems has an impact on the hiring procedure for the accounting department and the largest impact on the hiring of accountants came from the development of contemporary information systems. Thottoli (2022) emphasizes the increasing necessity for students' hands-on experience with computerized accounting.

Moreover, Huang et al. (2020) and Lamboglia et al. (Lamboglia et al., 2020a, 2020b) revealed that due to the Internet's rapid expansion, new systems and applications for the present and future generations, including big data, blockchain, business intelligence, and Internet of Things, have modified and transformed the majority of commercial disciplines.

The function of the accounting profession has evolved dramatically throughout time. Therefore, accountants and the accounting profession focus on four areas in order to assist and participate in management decision-making: planning for internal cost activity, putting into practice management and operational control for corporate performance indicators, taking part in strategic cost management to reach long-term objectives, and creating financial statements (Brands & Holtzblatt, 2015).

For example, new issues arising from the integration of smart technologies with auditing, accounting (Lamboglia et al., 2020a, 2020b), and accountability seem to focus on the restoration of professional and practitioner activities as well as data transmission and production, and information governance, including risks, transparency, and trust in digital procedures (Marrone & Hazelton, 2019).

O'Leary (O'Leary, 2018) addressed a number of accounting and auditing problems where developing knowledge management by using big data analysis helped firms to go through these problems. ERP systems for example affected the role of management accountants' requirements, tasks, and interactions with other departments or employees (Gartnerk & Krichbaum, 2014). Competence is an essential attribute that underlies a distinguished person who has a causal relationship with effective performance or features on the job and helps identify differences between different competencies to distinguish between high performers and those with an average or appropriate performance, which is called competence that meets the requirements or basis (Boyatzis, 2008). Furthermore, these days, there is a surplus of data that is rapidly gathered by using the right technologies, which results in more time being allocated to analyze and report duties. Additionally, accountants must acquire technical and analytical skills relevant to fields of study like statistics and usage of analytical software (Tiron-Tudor & Deliu, 2021).

The process of obtaining, combining, and analyzing big data to uncover and visualize hidden patterns, facts, and information within it (Sun et al., 2018). Three types of big data exist: semi-structured, unstructured, and structured data (Rashwan, 2018).

The following reasons explain why big data analysis is important: It gives businesses a significant competitive edge, helps to rationalize faster and better decision-making, contributes to providing a thorough understanding of the business, helps to establish a corporate plan, improves risk management, helps to find possibilities for cost savings, and supports integrated reporting more efficiently by integrating both financial and nonfinancial information to communicate the company's performance (Janssen et al., 2017; Pence, 2014; Salijeni et al., 2019; Smaya, 2022).

The United Nations (UN) has released new Global Sustainable Development Goals (UNSDGs). The UNSDGs are ambitious, yet achievable, targets that aim to improve the quality of life for all people by 2030. To achieve these goals, the UN urges governments, businesses, and individuals worldwide to pledge their support.

The Chartered Global Management Accountant (CGMA) report "The role of the accountant in implementing the Sustainable Development Goals" states that business has a crucial part to play in meeting the SDGs' needs. Working with stakeholders, providing jobs, enabling access to healthcare, developing new technology, driving resource development, and responsible resource use are just a few ways that contributions will be made. The UNSDGs are positioned to support companies in the years to come as they tackle a number of significant challenges, including managing reputational risk, adapting to "megatrends" like globalization and digitization, mitigating the effects of policy change, and satisfying investor demand for greater reporting transparency. All of these are wide areas where management accountants, at all levels, have a crucial role to play, from establishing the business case for pursuing the right UNSDGs through board-level integration of sustainability programs with company operations.

The fundamentals of accounting and financial reporting remain the same, but conventional approaches to collecting, recording, and analyzing accounting data vary (Kaya & Akbulut, 2018). According to Richins et al., (2021), the accounting profession is at risk in the big data age since 94% of accounting and auditing operations will be automated. Moreover, the future of accounting will be impacted by big data because it gives accountants a chance to transition into strategic roles inside businesses and because business partners now play a more important role in decision-making (Younis, 2020). Many accounting duties are presently automated, but because of accountants' competence in managing and analyzing massive volumes of data, they will play a crucial role in the future as a point of contact between senior management and data analysts, as well as a supervisor of data privacy and ethical usage.

Through the literature review, it appears that with the help of big data, organizations can easily collect, store, analyze, and visualize large volumes of data in real time, allowing them to identify areas to reduce energy consumption and decrease emissions. Businesses need to start leveraging the power of big data to make their sustainability goals a reality.

Organizations are increasingly looking for ways to make their operations more sustainable and cost-efficient. Big data in accounting can be used to accurately

capture and measure the environmental impact of an organization's activities and empower decision-makers with relevant insights to drive meaningful change.

Accounting experts have been sluggish to conduct UNSDG-inspired research despite the SDGs' importance in the policy arena and the universal acceptance of its value for defining corporate responsibility understandings. Two problems result from this gap. First, there is less accounting scholarship accessible in the growing body of knowledge about how to carry out the UNSDGs' goals. Second, the issues organizations are encountering in relation to the UNSDGs are not being taken into consideration by accounting scholars as it is emerging (Bebbington & Unerman, 2020).

2 Methodology

The goal of the current study is to ascertain how big data analysis will impact the accounting industry going forward and how it will raise the caliber of accounting data in the Jordanian context. It is a qualitative research based on structured interviews with senior and executive-level specialists in the domains of accounting, auditing, and financial analysts, categorically those who have at least 10 years of experience (Table 1).

This study's in-depth interviews and analysis with professionals are designed to give a real impact in the practical field to help decision-makers.

3 Findings

- Big data analysis increases the bar for accounting information and reduces information asymmetry by giving appropriate, helpful information that aids stakeholders in making decisions.
- Protection of data: Due to their complexity, large data systems present particular security problems.
- Accountants' obligations in the future of the profession of accounting field are affected. Big data will alter the work of accountants and have an impact on accounting and accounting measurements through data collection and

Table 1 Descriptive statistics of study's interviewee sample

Job occupation	Number	Impact of BD on the accounting profession		
		High	Medium	Rare
Accountants	50	14	10	26
Auditors	36	20	12	4
Financial analysts	48	28	20	0
Total	**134**	**62**	**42**	**30**

management as well as financial statement preparation and review. Traditional accounting records are impacted by big data.

- One skill that accountants need to develop is the capacity to produce, manage, change, store, analyze, report on, and safeguard data. They must comprehend the changes brought on by big data.
- Big data analysis will reduce the amount of uncollectable debt, which leads to decreased bad debts.
- To turn huge data into added value, a competent accountant needs analytical abilities and information management.
- Through real-time data access, accountants are better equipped to see problems before they arise, which helps accounting companies make better decisions.
- Auditors may now do their work more quickly and properly due to the capacity to review more accounting data concurrently in various forms.
- Big data analysis helps auditors and financial analysts avoid biases in the analysis of data.
- Analysis of big data offers in-depth analyses of what is effective and ineffective in all facets of corporate operations.
- Big data analysis creates new opportunities for several commercial domains or business fields.
- Organizations confront a number of difficulties when analyzing big data:
- A shortage of skilled employees ranked as the worst problem
- The huge flow of big data
- The high cost of hiring professional experts
- Storage of big data
- Inadequate comprehension of big data
- Big data selection confusion
- Determining data quality

The study concludes with how big data may affect accountants' future jobs, responsibilities, and the accounting profession, and more reliance is being placed on data science by the business world. Therefore, perhaps best-paid employees in organizations are accountants, who need to gain the technological and statistical expertise necessary to manage and analyze massive volumes of data.

A study revealed that for entities that advance rigorous evaluation approaches, big data may assist the organizations in analyzing their data assets. Big data analysis is not only valuable for predicting required budgets but is also highly regarded for delivering accurate forecasts about various inputs, as data has become indispensable for the efficient functioning of any organization.

Data analytics provides the technology and experienced, skilled, and qualified accountants required to create a world of big data with both structured and unstructured data sources. These technologies may help organizations make smarter decisions, which will boost productivity and cut down on resource and time waste.

Big data sustainability is a growing concern for many organizations, and it is the responsibility of accountants to ensure that the data collected and stored is managed in an efficient, secure, and ethical manner. Accountants must pay attention to how

data is collected, stored, used, and shared as well as any privacy or security implications associated with these activities. Additionally, accountants must ensure that the organization's data management processes are in line with current regulations and industry standards.

The UNSDGs must be accomplished via corporate collaboration. Cross-sector cooperation is essential in securing the backing and funding required to realize these objectives. The unique mission of the accounting profession is to keep both the government and businesses accountable. With a strong accounting profession, we can contribute to bringing about the reforms required to improve the world and rid it of fraud, corruption, and poor governance.

References

Bebbington, J., & Unerman, J. (2020). Advancing research into accounting and the UN sustainable development goals. *Accounting, Auditing and Accountability Journal, 33*(7), 1657–1670. https://doi.org/10.1108/AAAJ-05-2020-4556

Boyatzis, R. E. (2008). Competencies in the 21st century. *Journal of Management Development, 27*(1), 5–12. https://doi.org/10.1108/02621710810840730

Brands, K., & Holtzblatt, M. (2015). Business analytics: Transforming the role of management accountants. *Management Accounting Quarterly, spring, 16*(3), 1–12.

Gartnerk, B, Krichbaum, A. (2014), The role of management accountants in the use of ERP system in large companies, Österreichische Controller-Studie, May 2014, Bernhard Gärtner, https://doi.org/10.18374/EJM-14-2.9.

Huang, L. Y., Cai, J. F., Lee, T. C., & Weng, M. H. (2020). A study on the development trends of the energy system with blockchain technology using patent analysis. *Sustainability, 12*(5), 1–19. https://doi.org/10.3390/su12052005

Janssen, M., Voort, H., & Wahyudi, A. (2017). Factors influencing big data decision-making quality. *Journal of Business Research., 70*, 338–345. https://doi.org/10.1016/j.jbusres.2016.08.007

Kaya, I., & Akbulut, D. H. (2018). Big data analytics in financial reporting and accounting. *PressAcademia Procedia (PAP), 7*, 256–259.

Lamboglia, R., Lavorato, D., Scornavacca, E., & Za, S. (2020a). *Exploring the relationship between audit and technology. A bibliometric analysis*. Meditari accountancy research (ahead-of-print). https://doi.org/10.1108/medar-03-2020-0836

Lamboglia, R., Lavorato, D., Scornavacca, E., & Za, S. (2020b). *Exploring the relationship between audit and technology. A bibliometric analysis*. Meditari Accountancy Research (ahead-of-print). https://doi.org/10.1108/medar-03-2020-0836

Marrone, M., & Hazelton, J. (2019). The disruptive and transformative potential of new technologies for accounting, accountants and accountability: A review of current literature and call for further research. *Meditari Accountancy Research, 27*(5), 677–694. https://doi.org/10.1108/MEDAR-06-2019-0508

DE O'Leary. (2018). Big Data and Knowledge Management with Applications in Accounting and Auditing: The Case of Watson (June 27, 2018). Available at SSRN: https://ssrn.com/abstract=3203842 or https://doi.org/10.2139/ssrn.3203842.

Pence, H. E. (2014). What is big data and why is it important? *Journal of Educational Technology Systems, 43*(2), 159–171. https://doi.org/10.2190/ET.43.2.d

Rashwan, A. (2018). The role of analysis of big data in the rationalization of financial and administrative decisions in the Palestinian universities – A field study. *Journal of Economic*

and Financial Studies. Faculty of Economic and Commercial Sciences and Management Sciences. Algeria, 11(1), 22–41.

Richins G, Stapleton A, Stratopoulos T, Wong C (2021). Big Data analytics: opportunity or threat for the accounting profession. https://ssrn.com/abstract=2813817. Date accessed 15 Dec 2021.

Salijeni, G., Samsonova, A., & Turley, S. (2019). Big data and changes in audit technology: Contemplating a research agenda. *Accounting and Business Research., 49*(1), 1–26. https://doi.org/10.1080/00014788.2018.1459458

Smaya, H. (2022). The influence of big data analytics in the industry. *Open Access Library Journal, 9*, e8383. https://doi.org/10.4236/oalib.1108383

Sun, Z., Sun, L., & Strang, K. (2018). Big data analytics services for enhancing business intelligence. *Journal of Computer Information Systems, 58*(2), 162–169.

Thottoli, M. M. (2022). *The hunt for computerized accounting education in the GCC: A structured literature review*. Higher Education Evaluation and Development, (ahead-of-print). https://doi.org/10.1108/HEED-11-2021-0077

Tiron-Tudor, A., & Deliu, D. (2021). Big Data's disruptive effect on job profiles: Management accountants' case study. *Journal of Risk and Financial Management, 14*, 376. https://doi.org/10.3390/jrfm14080376

Weshah, S. (2021). Adopting modern it systems is vital in employing accountants and internal auditors (educational perspective): A case study in Jordan cement company–Lafarge. *Jordan Journal of Business Administration, 17*(4), 555–565.

Younis, N. (2020). Big data and sustainability of higher education. In *Global approaches to sustainability through learning and education.* (Vol. 23, pp. 46–68). https://doi.org/10.4018/978-1-7998-0062-0.ch004

Sustainability and Gender Equality: SDG5—Gender Differences in Bargaining in the Housing Market

Smriti Easwar, Saloni Walimbe, Kedar Vishnu, and R. M. Pramila

1 Introduction

Behavioural economics studies the effect of psychological factors on economic decisions. Most dimensions of economic thought which have been functioning up until this decade focus heavily on theory and lay undue emphasis on idealistic scenarios. A great example of this is the consumer theory which assumes that all consumers are rational. Such assumptions do not hold because there are numerous factors which impact consumer behaviour and their decision-making ability. For firms and the government to make effective policies, they must seek to understand such a phenomenon. Thaler, who is one of the founders of behavioural economics, suggested that this domain differs from ordinary economic theory on the level that it describes aspects of consumer behaviour which seem irrational but dictate most of their decisions. Our passion for understanding and predicting consumer behaviour in a manner which could empower business entities to make better decisions became the driving force which led us to choose this topic. It is intriguing to understand how men and women shop differently. In the marketplace, it seems that women—either consumers or sellers—tend to negotiate or 'bargain' more often. A primary analysis is done to test the validity of this statement.

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1.1 Bargaining Behaviour

Traditional economic thought suggests that consumers behave in a rational manner. In reality, guided by their subjective preferences, they act irrationally. Studies in the domain of behavioural economics have shown how cultural predispositions cause members of different nations to demonstrate unique buying patterns. Indian buyers are more competitive than Americans because their 'view of the world' is based on scarcity (Druckman et al., 1976). Individuals resort to negotiations when their self-interest is endangered, and such behaviour is influenced by a predilection for fairness only when one's fair belief aligns with their self-interest. For example, if the fair belief of those in Japan is for the buyer to provide a larger offer price when she is in a position of power, the buyer might be motivated to make a lower offer, because the self-interest of a buyer would be to maximize utility, thus acting in the direction of her self-interest and not her fair belief (Buchan et al., 2004). Variations in bargaining behaviour across age and sex occur due to cultural dispositions, which are acquired during one's childhood (Harbaugh et al., 2003).

1.2 Gender and Bargaining

A wide body of literature supports the claim that women dislike negotiation and are less likely to initiate negotiation in comparison to their male counterparts. Fear of backlash and gender-specific consumer preferences shaped by cultural and evolutionary forces cause this discrepancy. Women from matriarchal societies demonstrate superior bargaining skills in comparison to men, showing that culture plays a crucial role in an individual's ability to negotiate (Andersen et al., 2018). Both men and women are sensitive to price changes (Kuruvilla et al., 2009), but women also consider factors like feature, size, and colour while buying a product (Tanguma et al., 2009). Fitzpatrick (2017) observed the healthcare market in Uganda and noticed that female consumers are priced higher, suggesting the conventional usage of Pink Tax (upcharge on the same products for women), but end up paying the same amount as males due to effective employment of bargaining strategies. Sustainable Development Goal 5 or SDG5, which focuses on achieving gender equality across all areas of the world, lags behind in their target of providing equal rights to women. The target to ensure ownership or control over property (UN Women, 2022) is not accomplished, and one of the reasons is the difference between the bargaining power of the genders.

1.3 The Real Estate Market and Bargaining

The real estate market impacts the economy since it constitutes a significant proportion of individual and business wealth. Scarce availability of land and rising demand for customized homes drive consumers, agents, and sellers to bargain to secure the best possible deal. Negotiations during rental agreements generally cause departure from the equilibrium solution. Characteristics like substitutability of the property and landlord's risk preference affect negotiation outcomes (McAllister & Tarbert, 1999). Bargaining power of investors changes depending on the size and location of the property (Biagi et al., 2021) and increases with the increase in income when the housing market is a seller's market (Wilhelmsson, 2008).

Until some point, empirical research on housing transactions did not contain any information on the buyer's side of the bargain, and more heed was paid to property characteristics like sale price and time to sale. Only about 40% of sales were made at the first offer price. In the pursuit of price reductions, two-thirds of buyers negotiated with the seller, making consecutive increasing offers. Listing prices were only reduced if few or no offers were made (Merlo & Ortalo-Magne, 2004).

In recent times, the role of brokers in real estate transactions has risen because they help increase the sale price and are instrumental in the matching of buyers and sellers (Yavaş et al., 2001). Sellers get a higher price if a broker is involved in the exchange, but the increase in price is lesser than the commission fee paid (Yavaş, 1992). Hayunga and Munneke (2021) found that agents lose bargaining power, while individuals gain more confidence to bargain as the time a particular house has been listed in the market increases. Empirical evidence shows that there is a gender difference in a real estate agent's ability to bargain. Therefore, when the agent is a male, sellers set higher listing prices, consistent with the belief that male agents enjoy stronger bargaining power (Pham et al., 2022). Existing literature fails to capture whether there exist gender differences in bargaining behaviour in the rental housing market. The purpose of this chapter is to fill that gap by analysing primary data collected from 131 tenants in India.

2 Conceptual Framework

In the housing market, lessee (person renting the property) and lessor (agent or the owner) usually have opposite interests. Both parties attempt to maximize their gains from the transaction by employing bargaining strategies. The lessee's willingness to bargain is determined by subjective preferences, which have developed over time and which are present at the time of the transaction. Effective employment of bargaining strategies allows the lessee to gain through a reduction in the rent amount, one which in their accordance would be a fair price.

2.1 Motivational Investment

Consumers' motivational investment may be reflected in the value they place on the final target they want to achieve after bargaining. The final value is determined by their liking for the product and the urgency with which they wish to acquire the product. A consumer who is in urgent need of renting a house may not bargain, opposed to one who does not face such an urgency. Lessees are likely to have less influence on the lessors, in the case that the lessor realizes that the consumer's motivation towards renting the property is high. A short time span in finalizing the deal will reflect on higher bargaining power (Fong, 2013).

H1 Consumers' motivational investment is indirectly related to their bargaining behaviour.

2.2 Bargaining Disposition

Individuals differ in their willingness to bargain even when the situation might be feasible for a bargain or negotiation. Some customers who are inherently stingy might not choose to bargain. Others, who would want to save as much money as possible, would look for an opportunity to negotiate at any price they are offered for renting. Bargaining disposition focuses on personality factors and behavioural traits, which predispose some individuals to demonstrate bargaining behaviour (Fong, 2013). In cases where a consumer is generous or spendthrift, they may not persuade the opposite party towards negotiating the contract.

H2 Consumers' bargaining behaviour is positively related to their bargaining disposition.

2.3 Reference Price

A fair price suggests the amount a lessee is willing to pay for rent. Actual price is the amount a lessor quotes to make a deal. The fair price gap is the reference price, the difference between actual and fair price (Fong, 2013). A tenant will bargain more if the opposite party is open to negotiation. A bargain is said to take place successfully when the deal is finalized at a price lower than the initial quote. A lessee will only agree to renting a property when they find the amount to be a fair price. Consumers' bargaining behaviour is seen when the fair price (they are willing to pay) is lower than the quoted actual price. In order to settle the rental agreement at a fair price, the lessee will negotiate the preliminary terms.

H3 Consumers' bargaining behaviour is positively related to the positive difference in reference price paid by the consumer.

2.4 Location and Size of Property

Location and size of the property are factors based on the lessor's satisfaction regarding where the property is located and whether there is ample amount of space available in the prospective rental property (Biagi et al., 2021). The location of the property determines the price a lessee is willing to pay for the house. Location comprises the physical placing of the property and its accessibility to the tenant. Satisfaction of the tenant's wants and needs will impact their bargaining behaviour. Considering that the lessee's wants with regard to the property are fulfilled, they will be inclined towards paying a higher price and would not express bargaining behaviour. Space indicates the physical area available for rent in the property. Area of bedrooms and bathrooms (in square feet) in the house should suffice the lessee's demands. Higher satisfaction of the consumers' requirements prompts them to finalize the deal and not engage in bargaining behaviour.

H4 Satisfaction of location and space requirements negatively impact bargaining behaviour.

The conceptual framework consists of the key variables (see Fig. 1).

2.5 Role of Agent

The presence or absence of a mediator or intermediary in real estate transactions affects the consumers' bargaining behaviour. An agent, on behalf of the owner, engages in transactions with the consumers. The presence of an agent drives the consumers to negotiate the prices of rent (Yavaş et al., 2001). The agent or broker quotes an initial price for the rental transaction, which is countered by the lessee in

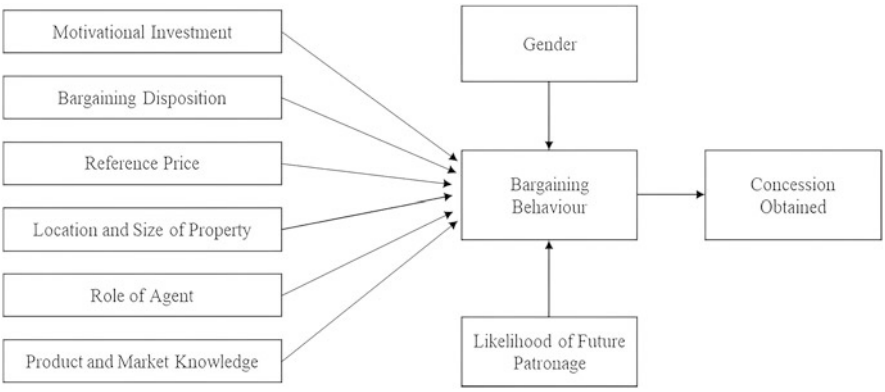

Fig. 1 The conceptual framework shows the relationship between key variables. The arrows suggest the direction of the relationship

hopes of negotiating the amount further to the extent of the lessee's willingness to pay. In the event that the intermediary is absent, a consumer withdraws from communicating bargaining behaviour with the owner directly.

H5 Presence of an agent positively impacts bargaining behaviour of a consumer.

2.6 Product and Market Knowledge

Product knowledge refers to the lessee's previous experiences in the rental housing markets. A consumer who has rented properties in the past will have relevant knowledge, which can guide her in making a logical bargain (Wilhelmsson, 2008). Earlier encounters with similar properties will give the consumer an edge over the opposition and will drive them to bargain.

H6 Product and market knowledge positively impacts bargaining behaviour.

2.7 Gender

Research on gender disparities focuses on variations in bargaining ability between the two distinct sexes. Men and women bargain differently, and the former tend to outperform the latter in negotiations (Pham et al., 2022). Moss (1999) was one of the first few authors to emphasize on gender as a factor affecting human behaviour.

H7 Gender impacts bargaining behaviour.

2.8 Concession Obtained

Fong (2013) explored the concessions received by the consumers after bargaining. Concession obtained is the discount gained by the consumer. A consumer who has a tendency to bargain is more likely to obtain a concession out of the final transaction (Fong, 2013). The concession obtained is measured in terms of monetary benefits. A lessee who showcases bargaining behaviour would obtain a higher discount or concession, in the event that the bargaining deal was successful.

H8 Bargaining behaviour positively impacts concession obtained.

2.9 Likelihood of Future Patronage

Future patronage means whether a tenant would want to maintain a relationship with their lessor in the future. If the owner or agent is a colleague, friend or family of the consumer, they will refrain from bargaining since finalizing the deal will be beneficial to both parties (Fong, 2013). A lessee will also abstain from bargaining if they want to rent the property for a longer period and are more likely to contact the lessor in the future (Table 1).

Table 1 Description of variables

Variable	Abbreviation	Description
Concession obtained	CO	Concession obtained on final rent paid post-bargaining
Bargaining behaviour	BB	Whether the tenant/lessee bargained or did not bargain
Gender	GEN	Whether the tenant/lessee is male or female. The views of the population on gender differences in negotiation in the housing market
Motivational investment	MI	Factors which motivated the individual to rent the property
Bargaining disposition	BD	Personality factors and behavioural traits, which predispose some individuals to demonstrate bargaining behaviour
Reference price	RP	Difference between actual price and fair price, where fair price is the ideal price which a consumer would like to pay while renting a property
Location and size of property	LSP	Where the property is located and how much space is/was available in the house
Role of agent	ROA	Impact of the presence of an agent in the rental transaction
Product knowledge	PK	Knowledge/past experience of rental markets and housing properties
Likelihood of future patronage	FP	Consumers (lessee) desire to maintain a cordial relationship with the opposing party (lessor)

All variables are measured using a 5-point Likert scale

H9 Likelihood of future patronage negatively impacts bargaining behaviour.

3 Research Methodology

3.1 Data Collection

The data was of primary nature collected from the western part of India. The samples had an average age of 23 years and were renting properties for one or more of the following reasons—job relocation, education, family needs, accessibility to basic amenities and privacy.

Data was acquired through a questionnaire, and tenants were asked indirect questions related to their preferences and behaviours during rental negotiations. The respondent's personal information was collected to gain knowledge about their income and age.

A total of 42 questions were posed to the respondents to understand whether the proposed factors significantly impact bargaining behaviour and whether bargaining behaviour significantly impacts magnitude of concession obtained. Questions marked on a Likert scale were incorporated. For positive items, 5 would indicate greater and 1 would indicate lesser probability of bargaining. Negative items were scored in the opposite direction.

Scores were averaged for each respondent and factor variable. The mean of the averages was taken, and dichotomous values were assigned based on threshold criteria. If the mean of the averages was greater than the particular average data point, it was assigned a one. A final data set was created with each variable being of binary nature. For the gender variable, male is assigned one and female is assigned zero.

A total of 131 samples were successfully collected. Any cases which had insufficient information to score the responses were dropped. Of these 131 samples, 76 (58.02%) were male.

4 Findings and Analysis

See Tables 2 and 3

The null hypothesis for bargaining disposition (H2) is rejected at 5% level of significance, null hypothesis for reference price (H3) and role of agent (H5 supported) is rejected at 10% level of significance and null hypothesis for gender (H7) and product and market knowledge (H6) is rejected at 1% level of significance, therefore concluding that product and market knowledge, bargaining disposition, role of agent and reference price positively impact bargaining behaviour. Motivational investment and location and size of property are statistically insignificant; hence, we fail to reject the null hypothesis and conclude that H1 and H4 are not

Table 2 Regression results of bargaining behaviour on other factors

Variables	$P > \|z\|$	Hypothesis testing outcome
MI	0.765	H1 not supported
BD	0.012**	H2 supported
RP	0.094*	H3 supported
LSP	0.906	H4 not supported
ROA	0.084*	H5 supported
PK	0.000***	H6 supported
GEN	0.005***	H7 supported

Significant at ***$p \leq 0.01$, **$p \leq 0.05$ and *$p \leq 0.10$; $n = 131$

Table 3 Average marginal effects

Variables	dy/dx	Delta method std. error	z
MI	0.0208842	0.0699776	0.30
BD	0.1766123	0.0705817	2.50
RP	0.1340929	0.0799748	1.68
LSP	0.0089129	0.0752131	0.12
ROA	0.1362091	0.0787109	1.73
PK	0.2522902	0.0689287	3.66
GEN	0.1927372	0.0689121	2.80

Regression results of bargaining behaviour on other factors

Table 4 Regression results of concession obtained on bargaining behaviour

Variables	$P > \|z\|$	Hypothesis testing outcome
BB	0.020**	H8 supported

Significant at ***$p \leq 0.01$, **$p \leq 0.05$ and *$p \leq 0.10$; $n = 131$

Table 5 Average marginal effects

Variable	dy/dx	Delta method std. error	z
BB	0.2074307	0.0890765	2.33

Regression results of concession obtained on bargaining behaviour

Table 6 Average marginal effects

Variable	dy/dx	Delta method std. error	z	$P > \|z\|$
FP	0.3486936	0.0680559	5.12	0.000

Regression results of bargaining behaviour on likelihood of future patronage

supported. Additionally, gender is significant, which means that if the subject is male, the probability that he will bargain increases by 0.2 or 20% (Table 3)

The null hypothesis is rejected at 5% level of significance (Table 4) and concludes that if bargaining behaviour increases by 1 unit, the probability of obtaining a concession rises by 0.20 or 20% (Table 5).

Although likelihood for future patronage and bargaining behaviour have a statistically significant relationship (Table 6), FP was dropped as it demonstrated collinearity with PK (Table 7).

Table 7 Collinearity test between likelihood of future patronage and product and market knowledge

	FP		
PK	0	1	Total
0	57	0	57
1	0	74	74
Total	57	74	131

Pearson chi-square (1) = 131.00 Pr = 0.000

Table 8 Marginal (probability) effects of bargaining behaviour on gender (male)

	Margin	Delta method std. error	z	$P > \|z\|$
_cons	0.3929217	0.0469682	8.37	0.000

At: GEN = 1

Table 9 Marginal (probability) effects of bargaining behaviour on gender (female)

	Margin	Delta method std. error	z	$P > \|z\|$
_cons	0.1976803	0.0528631	3.74	0.000

At: GEN = 0

Null hypothesis of no collinearity is rejected at 1% level; therefore, we draw the inference that PK and FP are collinear.

Male tenants bargain more than female tenants in the rental housing market. The probability (marginal effects) of male on bargaining behaviour is 0.393 as opposed to female probability being 0.198. Women's decreasing participation in the rental housing market can be appropriated to the lesser bargaining power they hold in transactions (Tables 8 and 9).

5 Conclusion

Based on the above analysis, it can be concluded that product knowledge, bargaining disposition, role of agent and reference price positively impact bargaining behaviour, allowing tenants to obtain a concession due to successful employment of bargaining strategies. Additionally, male tenants bargain more than female tenants in the rental housing market; these findings can be attributed to cultural factors, which promote differences based on gender on the individual's ability and willingness to bargain. Properties are priced the same for single men and women when unobserved heterogeneities are controlled (Andersen et al., 2021), thus implying that inclusion of additional variables nullifies the gender effect. The real estate market significantly impacts the economy; tapping on such implicit tendencies will prove to be beneficial for both the consumer and the producer. Inequalities are deep rooted, and thus gender equality can only be achieved when the minority believes that their voices are powerful and will be heard. Policies should be implemented to encourage women to proactively engage in negotiations to secure their preferences. The research can be

extended by conducting a similar study in a different cultural set-up and by incorporating additional variables like income and age as factors impacting bargaining behaviour.

References

Andersen, S., Ertac, S., Gneezy, U., List, J. A., & Maximiano, S. (2018). On the cultural basis of gender differences in negotiation. *Experimental Economics, 21*(4), 757–778.

Andersen, S., Marx, J., Nielsen, K. M., & Vesterlund, L. (2021). Gender differences in negotiation: Evidence from real estate transactions. *The Economic Journal, 131*(638), 2304–2332.

Biagi, B., Caudill, S. B., Ciucci, L., Detotto, C., & Mixon, F., Jr. (2021). Relative bargaining power of residential home traders and real estate investors. *Applied Economics, 53*(34), 3962–3971.

Buchan, N. R., Croson, R. T., & Johnson, E. J. (2004). When do fair beliefs influence bargaining behavior? Experimental bargaining in Japan and the United States. *Journal of Consumer Research, 31*(1), 181–190.

Druckman, D., Benton, A. A., Ali, F., & Bagur, J. S. (1976). Cultural differences in bargaining behavior: India, Argentina, and the United States. *Journal of Conflict Resolution, 20*(3), 413–452.

Fitzpatrick, A. (2017). Shopping while female: Who pays higher prices and why? *The American Economic Review, 107*(5), 146–149.

Fong, C. P. (2013). Retail bargaining in China. *Asia Pacific Journal of Marketing and Logistics, 25*(4), 674–694.

Harbaugh, W. T., Krause, K., & Liday, S. J. (2003). Bargaining by children. In *University of Oregon Economics Working Paper, No. 2002–4*. University of Oregon.

Hayunga, D. K., & Munneke, H. J. (2021). Examining both sides of the transaction: Bargaining in the housing market. *Real Estate Economics, 49*, 663–691.

Kuruvilla, S. J., Joshi, N., & Shah, N. (2009). Do men and women really shop differently? An exploration of gender differences in mall shopping in India. *International Journal of Consumer Studies, 33*(6), 715–723.

Larsen, J. E., & Coleman, J. W. (2014). Senior citizen's bargaining power in residential real estate markets. *International Journal of Housing Markets and Analysis, 7*(1), 5–17.

McAllister, P., & Tarbert, H. (1999). Bargaining, utility and rents: Analysing the effect of potential lease termination on rent negotiation outcomes. *Journal of Property Investment & Finance, 17*(4), 353–364.

Merlo, A., & Ortalo-Magne, F. (2004). Bargaining over residential real estate: Evidence from England. *Journal of Urban Economics, 56*(2), 192–216.

Moss, G. (1999). Gender and consumer behaviour: Further explorations. *Journal of Brand Management, 7*, 88–100.

Pham, D. T., Turnbull, G. K., & Waller, B. D. (2022). Sex and selling: Agent gender and bargaining power in the resale housing market. *The Journal of Real Estate Finance and Economics, 64*(4), 473–499.

Tanguma, J., Munoz, L., & Simpson, C. L. (2009). Shopping and bargaining in Mexico: The role of women. *Journal of Applied Business and Economics, 9*(1), 34–40.

UN Women. (2022). *Progress on the sustainable development goals: The gender snapshot 2022*. UN Women.

Wilhelmsson, M. (2008). Evidence of buyer bargaining power in the Stockholm residential real estate market. *Journal of Real Estate Research, 30*(4), 475–500.

Yavaş, A. (1992). A simple search and bargaining model of real estate markets. *Real Estate Economics, 20*(4), 533–548.

Yavaş, A., Miceli, T. J., & Sirmans, C. F. (2001). An experimental analysis of the impact of intermediaries on the outcome of bargaining games. *Real Estate Economics, 29*(2), 251–276.

Female Empowerment in Business: Clustering EU Member States and Candidate Countries

Oksana Vinska, Volodymyr Tokar, and Nataliia Novak

1 Introduction

Gender equality largely determines how well a country adapts to modern social, economic, and political challenges. Examples of successful female professionals, business owners, and experts motivate women and young girls to work hard and choose careers in IT sector, finance, science, and business. A number of benefits can be derived from female empowerment in the abovementioned spheres, including creating new businesses and jobs, reducing prices on goods and services due to expanded competition, and supply of talented innovators. The progress in gender equality is facilitated by governmental and societal support for gradual changes overcoming stereotypes and legal and psychological hazards to trigger the establishment of the new framework for the Union of Equality in Europe.

Gender equality in business can be measured by share of females among business owners and top managers. Examining these two indicators provides statistical evidence of a country's successes and failures in fostering female social and economic empowerment. Therefore, this chapter shines a light on the abovementioned constituents of gender equality in the European Union (hereafter, EU) member states and candidate countries illuminating differences and similarities between them.

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2 Literature Review

An extensive body of literature exists on different aspects of gender equality. The research papers mostly suggest that female empowerment is often associated with social and economic development and innovations. For instance, Song (2022) provides the evidence that reduced gender gaps among full-time employee level increase firm values in South Korea. The results of this researcher show that increasing the proportion of females at a senior level in companies leads to enhanced gender equality environment inside a company, as well as reduced wage gap between females and males; finally, it increases the employment rate among female full-time employees.

Nguyen (2021) proves that there is a positive impact of better health conditions for females, gender equality in education, and female socioeconomic-political empowerment on economic complexity. The author has disclosed the effects of employment, health, education, and rights as four key aspects of gender equality employing 20 variables in an economic complexity index. To eliminate the potential indigeneity, Nguyen used the two-step system-generalized method of moments approach to the unbalanced panel of information on 119 economies in 1991–2017. The labor participation in industry or service sectors as well as wage and salaried employment by females proved to enhance the economic complexity, while female employment in agriculture, as well as contributions to family workers, self-employment, and vulnerable employment, had the reverse, namely, negative impact.

Despite enormous efforts to eradicate gender equality in different sectors of economy and social life, there are a lot of problems in achieving the true equity. For instance, Ojwala et al. (2022) argue that even though public universities in Kenya have gender policies, they have not guaranteed better gender balance as there is still the underrepresentation of female students, faculty, and decision-makers. The authors have gathered sufficient data to determine that gender equality in ocean science and higher education in Kenya remains problematic.

Yakovleva et al. (2022) point out that in spite of the growing role of females in artisanal and small-scale mining, this sector is still full of gender inequality. The researchers investigate whether artisanal and small-scale mining sector policies integrate gender equality principles, and in particular, the authors shed light on the implications of formalization policy and a ban on informal mining for the attainment of gender equality as the UN Sustainable Development Goal employing a qualitative case study of Ghana. The researchers highlight policy shortcomings considering internationally agreed targets on gender equality in the artisanal and small-scale mining sector.

In spite of the absence of interplay between coal reliance index and gender equality at macro-level, Pasaribu and Lahiri-Dutt (2022) stress the importance of verifying the hypothesis that such interconnection exists at the regional and/or community/household scales. The authors emphasize that reliance on coal is crucial in energy transition considering coal production in terms of employment, economic output, export revenues, and consumption. The researchers aimed at elaborating a

Coal Reliance Index (CRI) to correlate it with Gender Development Index (GDI) at a national level. The authors found a lack of gender-disaggregated data on coal employment. Jackman (2022) states that there is a positive correlation between tourism and gender equality at labor markets of developed countries; in contrast, sub-Saharan Africa demonstrates the inverse relationship, while no impact is determined in the Middle East and North Africa. The author estimated the impact of tourism on labor market gender equality, analyzing a panel dataset covering 143 countries in 2006–2017.

Njuki et al. (2022) recommend investing in maternal education and programs aiming at improving female influence on decision-making and leadership and supporting interventions promoting equal gender norms at households and communities to foster gender equality in food systems all over the world.

Mangubhai et al. (2022) put forward the idea to focus on shifting values, gender mainstreaming, adopting best practices, and investing in gender networks and coalitions to foster gender equality in the fisheries sector. There were three points of divergence between fisheries and development practitioners and/or their organizations in including gender equality in their work: (1) fundamental differences in organizational motivations, namely fisheries, understand gender equality as the means for achieving objectives (instrumental approach), while development organizations advocate it as the principal or the core value (inherent approach); (2) "fisheries practitioners had comparatively little to no access to qualified gender focal points and training, and limited networks with gender experts"; and (3) discrepancies in understanding of failures and successes of gender integration.

Fang et al. (2022) argue that differences between women-led and male-led companies in productivity are mostly explained by levels of gender equality and burdens of household chores and domestic care for women. The authors used the global firm-level data to determine how female-led companies differ from male-led ones in productivity and to elaborate potential explanations for these discrepancies. The researchers found that female-led companies prevail in countries with better rule of law, gender equality, and stronger individualistic culture, as well as in small companies and service industries. Compared with male-led companies, female-led ones have lower levels of labor productivity and its growth, but similar levels of total factor productivity. The disadvantage concentrated mostly in manufacturing companies (only in small ones), and at the same time was nonexistent in service companies.

Nguyen and Tarp (2022) have demonstrated that writing stories on gender-related laws reduces bias towards women, while just commenting has no effect among Vietnamese males in rural provinces, but increasing men's participation in household chores requires more sustained interventions. Barreiro-Gen et al. (2021) have shown that European ports implement gender equality measures to foster sustainability via overcoming gender segregation, ensuring the compliance with national legislature, guaranteeing gender equity and equality, and, eventually, achieving enhanced levels of sustainability.

Applying analysis of cross-country data on financial inclusion and stability of banks, Perrin and Weill (2022) have proved that enhancing the level of gender

equality in access to credit fosters financial stability. The authors have provided the evidence that females outperform males in loan repayment. Using the perform regressions at the bank level to verify the existence of the interplay between the female-to-male ratio of access to credit and financial stability, the researchers proved that there is the negative relation between the gender gap in access to credit and financial stability at the country level.

Lawless et al. (2022) have discovered that progress in promoting gender equality within ecological, social, and socioecological narratives has had a modest positive impact on inclusion of women and consideration of their needs and interests in small-scale fisheries.

Taking into account research papers on gender equality, it is undoubtedly true that there should be more articles devoted to female empowerment in business with focus on elaborating measures to ensure gender equality depending on the status quo. Therefore, our article aims at clustering EU member states and candidate countries.

3 Methodology

Considering findings presented in (Tokar et al., 2021; Vinska & Tokar, 2017, 2021; Vinska et al., 2023) disclosing gender gaps in different dimensions of EU female empowerment, clustering EU member states by levels of economic development and gender equality, this chapter focuses on analyzing classes and clusters of EU member states and countries applying indicators of share of companies with female top managers and majority ownership (World Economic Forum, 2021).

Our methodology embraces adapting EU nomenclature of territorial units for statistics (hereafter, NUTS) (Eurostat, 2022) methodology to distinguish gender equality laggards, adopters, and leaders between EU member states and candidate countries, applying k-means cluster analysis and elbow method to determine the minimum amount of clusters.

The NUTS is the form of regional statistics employed to allocate funds. The NUTS classification is useful to determine regional borders and define geographic eligibility for investment and structural funding. The eligibility of EU regions for the European Regional Development Fund (ERDF) and the European Social Fund (ESF) within the 2014–2020 programming period was assessed using regional GDP per capita (in PPS and averaged in 2007–2009). The regions were ranked and divided into three key groups:

Less developed regions with the GDP per capita less than 75% of the EU average among all regions

Transition regions with the GDP per capita between 75 and 90% of the EU average among all regions

More developed regions with the GDP per capita exceeding 90% of the EU average among all regions

The European Commission envisages continuous use of the NUTS classification to determine the eligibility of regions for support from the ERDF and the ESF within the 2021–2027 programming period.

To elaborate recommendations aiming at bridging gender gaps in European countries, we modify the EU NUTS classification to define groups of EU member states and candidate countries taking into account the level of gender equality determined by the Global Gender Gap Index, namely:

Gender equality leaders—regions that have the level of gender equality exceeding 90% of the average value of gender equality among EU member states

Gender equality adopters—regions that have the level of gender equality ranging from 75 to 90% of the average value of gender equality among EU member states

Gender equality laggards—regions that have the level of gender equality less than 75% of the average value of gender equality among EU member states

We also apply the k-means clustering, that is, a method of vector quantization aiming at partitioning n observations into k clusters, where each observation belongs to the cluster with the nearest mean value, namely cluster centers or cluster centroid being a prototype of the cluster.

To divide observations into groups, we employ the Euclidean distance to compute the distance or the (dis)similarity between each pair of observations, which is determined as follows:

$$d_{\text{euc}}(x, y) = \sqrt{\sum_{i=1}^{n} (x_i - y_i)^2}, \tag{1}$$

where x and y are two vectors having the length n.

The elbow method helps us to determine the number of clusters in our dataset. We plot the explained variation seen as the function of number of clusters. We will choose the minimum number of clusters with the explained variation over 90%. The variation will be quantified by variation, and the ratio will be the ratio of between-group variance to the total variance of the dataset.

The abovementioned approach enhances the ability of EU supranational authorities to determine the level of gender equality among EU member states and candidate countries and choose the best suited tools to foster female empowerment in business, as well as improve the risk management strategy in corporations stated in research literature [for instance, in Hutsaliuk et al. (2020)].

4 Results

Table 1 shows there was no data available for 12 EU member states. The average for candidate countries concerning female ownership equaled 27.5% and 16.1% regarding top management, while the average values for EU member states were 39.0 and 18.9, respectively. Taking into consideration female ownership, the leaders were Ireland, Hungary, and Latvia, and, in turn, the best results in ensuring female empowerment in top management were shown by Latvia, Lithuania, and Bulgaria.

Table 1 Percentage of firms with female majority ownership and top managers in EU member states and candidate countries, 2018–2020

Country	Firms with female majority ownership, %	Ratio of firms with female majority ownership to male majority ones	Rank	Firms with female top managers, %	Ratio of firms with female top managers to firms with male ones	Rank
Austria	n/a	n/a	n/a	n/a	n/a	n/a
Belgium	44.2	0.79	6	17.9	0.22	14
Bulgaria	41.7	0.72	9	28.8	0.40	3
Croatia	31.7	0.46	20	27.0	0.37	5
Cyprus	45.1	0.82	5	8.2	0.09	26
Czech Republic	29.9	0.43	21	16.1	0.19	18
Denmark	31.8	0.47	19	8.3	0.09	25
Estonia	35.5	0.55	16	22.5	0.29	7
Finland	44.0	0.79	7	12.9	0.15	24
France	n/a	n/a	n/a	n/a	n/a	n/a
Germany	n/a	n/a	n/a	n/a	n/a	n/a
Greece	45.9	0.85	4	17.2	0.21	16
Hungary	51.9	1.08	2	22.1	0.28	8
Ireland	54.9	1.22	1	15.1	0.18	20
Italy	24.0	0.32	25	15.3	0.18	19
Latvia	46.6	0.87	3	32.6	0.48	1
Lithuania	43.1	0.76	8	30.7	0.44	2
Luxembourg	40.5	0.68	10	7.4	0.08	27
Malta	n/a	n/a	n/a	n/a	n/a	n/a
The Netherlands	n/a	n/a	n/a	n/a	n/a	n/a
Poland	37.0	0.59	15	27.8	0.39	4
Portugal	37.8	0.61	13	14.0	0.16	22
Romania	32.4	0.48	18	17.2	0.21	17
Slovakia	28.9	0.41	23	22.9	0.30	6
Slovenia	34.1	0.52	17	18.8	0.23	10
Spain	n/a	n/a	n/a	n/a	n/a	n/a
Sweden	37.3	0.59	14	14.0	0.16	23
Average among EU member states	***39.0***	***0.67***	***X***	***18.9***	***0.24***	***X***
Albania	20.7	0.26	27	18.1	0.22	13
Moldova	39.9	0.66	11	18.6	0.23	11
Montenegro	24.0	0.32	26	15.0	0.18	21
North Macedonia	29.3	0.41	22	21.3	0.27	9

(continued)

Table 1 (continued)

Country	Firms with female majority ownership, %	Ratio of firms with female majority ownership to male majority ones	Rank	Firms with female top managers, %	Ratio of firms with female top managers to firms with male ones	Rank
Serbia	28.5	0.40	24	18.2	0.22	12
Turkey	11.3	0.13	28	3.9	0.04	28
Ukraine	38.6	0.63	12	17.7	0.22	15
Average among EU candidates	***27.5***	***0.40***	***X***	***16.1***	***0.20***	***X***

[Own calculations based on source: (World Economic Forum, 2021)]

Table 2 Classes of EU member states considering the percentage of firms with female majority ownership and top managers (own elaboration)

Class number	Percentage of firms with female majority ownership	Percentage of firms with female top managers	Amount of countries
1	Gender equality leaders (over 90% of the EU average)	Gender equality leaders (over 90% of the EU average)	10
2		Gender equality adopters (from 75 to 90% of the EU average)	1
3		Gender equality laggards (less than 75% of the EU average)	5
4	Gender equality adopters (from 75 to 90% of the EU average)	Gender equality leaders (over 90% of the EU average)	4
5		Gender equality adopters (from 75 to 90% of the EU average)	1
6		Gender equality laggards (less than 75% of the EU average)	1
7	Gender equality laggards (less than 75% of the EU average)	Gender equality leaders (over 90% of the EU average)	3
8		Gender equality adopters (from 75 to 90% of the EU average)	2
9		Gender equality laggards (less than 75% of the EU average)	1

Adapting the abovementioned EU approach to classification (Eurostat, 2022), we have distinguished nine classes of EU member states and candidate countries depending on female empowerment in business (Table 2).

Table 3 demonstrates that there were 16 gender equality leaders, 6 adopters, and 6 laggards (Italy, Slovakia, Albania, Montenegro, Serbia, and Turkey) regarding female majority ownership. In turn, considering females in top management, there were 17 gender equality leaders, 4 adopters, and 7 laggards (Cyprus, Denmark, Finland, Luxembourg, Portugal, Sweden, and Turkey).

Table 3 Typology of EU member states and candidate countries depending on female empowerment in business

Country	Ratio of percentage of firms with female majority ownership to the EU average one, %	Type	Ratio of percentage of firms with female top managers to the EU average one, %	Type	Class
Belgium	113	Gender equality leader	95	Gender equality leader	1
Bulgaria	107	Gender equality leader	152	Gender equality leader	1
Croatia	81	Gender equality adopter	143	Gender equality leader	4
Cyprus	116	Gender equality leader	43	Gender equality laggard	3
Czech Republic	77	Gender equality adopter	85	Gender equality adopter	5
Denmark	82	Gender equality adopter	44	Gender equality laggard	6
Estonia	91	Gender equality leader	119	Gender equality leader	1
Finland	113	Gender equality leader	68	Gender equality laggard	3
Greece	118	Gender equality leader	91	Gender equality leader	1
Hungary	133	Gender equality leader	117	Gender equality leader	1
Ireland	141	Gender equality leader	80	Gender equality adopter	2
Italy	62	Gender equality laggard	81	Gender equality adopter	8
Latvia	120	Gender equality leader	173	Gender equality leader	1
Lithuania	111	Gender equality leader	162	Gender equality leader	1
Luxembourg	104	Gender equality leader	39	Gender equality laggard	3

(continued)

Table 3 (continued)

Country	Ratio of percentage of firms with female majority ownership to the EU average one, %	Type	Ratio of percentage of firms with female top managers to the EU average one, %	Type	Class
Poland	95	Gender equality leader	147	Gender equality leader	1
Portugal	97	Gender equality leader	74	Gender equality laggard	3
Romania	83	Gender equality adopter	91	Gender equality leader	4
Slovakia	74	Gender equality laggard	121	Gender equality leader	7
Slovenia	88	Gender equality adopter	99	Gender equality leader	4
Sweden	96	Gender equality leader	74	Gender equality laggard	3
Albania	53	Gender equality laggard	96	Gender equality leader	7
Moldova	102	Gender equality leader	98	Gender equality leader	1
Montenegro	62	Gender equality laggard	79	Gender equality adopter	8
North Macedonia	75	Gender equality adopter	113	Gender equality leader	4
Serbia	73	Gender equality laggard	96	Gender equality leader	7
Turkey	29	Gender equality laggard	21	Gender equality laggard	9
Ukraine	99	Gender equality leader	94	Gender equality leader	1

[Own calculations based on source: (Eurostat, 2022)]

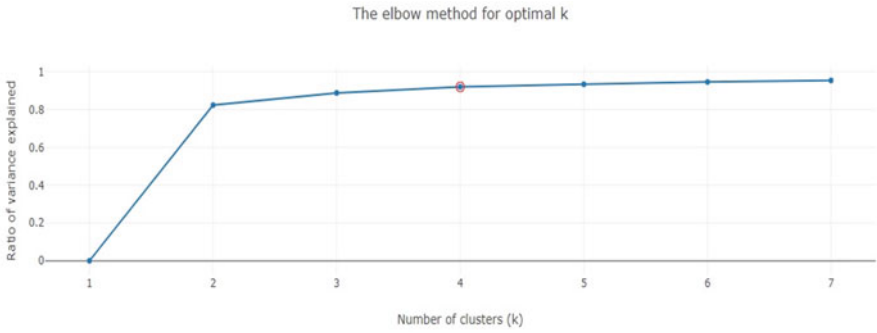

Fig. 1 The results of elbow method for cluster analysis

Figure 1 illustrates the results of applying the elbow method calculations showing that there should be four clusters explaining 91.9364% of variance in our case.

We have got the following results:

Explained variance ratio (the smallest explaining at least 90% of the variance)—91.9364%

SSE (the sum of square distances within groups from the points to the centers)—1632.7184

SSG (the sum of square distances between groups from the centers to the average vector)—18,615.1923

SST (the total sum of square distances from the points to the average vector)—20,247.9107

SSE by groups: 628.5517, 381, 168, 455.1667

Centers: [5.069, 4.1034], [42.3, 13.9], [43.6, 27.8], [28.75, 18.0833]

Table 4 shows the distribution of EU member states and candidate countries after 11 iterations.

Table 5 shows that cluster 0 embraces 14 countries (Albania, Bulgaria, Cyprus, Denmark, Finland, Hungary, Italy, Lithuania, Montenegro, Poland, Romania, Serbia, Slovenia, Ukraine), cluster 1 has 5 countries (Belgium, Estonia, Luxembourg, Portugal, and Sweden), and cluster 2 has 4 countries (Croatia, North Macedonia, Slovakia, and Turkey).

Taking into consideration the results of our cluster analysis and grouping of EU member states and candidate countries, we need to admit that there are some visible discrepancies between European values promoted by the EU and actual status quo. Our calculations show that a lot of candidate countries demonstrate better results concerning female empowerment in business compared with EU member states.

Table 4 Distribution of EU member states and candidate countries considering female empowerment in business by clusters

Country	Ratio of percentage of firms with female majority ownership to the EU average one, %	Ratio of percentage of firms with female top managers to the EU average one, %	Clusters
Belgium	44.2	17.9	1
Bulgaria	41.7	28.8	0
Croatia	31.7	27.0	2
Cyprus	45.1	8.2	0
Czech Republic	29.9	16.1	3
Denmark	31.8	8.3	0
Estonia	35.5	22.5	1
Finland	44.0	12.9	0
Greece	45.9	17.2	3
Hungary	51.9	22.1	0
Ireland	54.9	15.1	3
Italy	24.0	15.3	0
Latvia	46.6	32.6	3
Lithuania	43.1	30.7	0
Luxembourg	40.5	7.4	1
Poland	37.0	27.8	0
Portugal	37.8	14.0	1
Romania	32.4	17.2	0
Slovakia	28.9	22.9	2
Slovenia	34.1	18.8	0
Sweden	37.3	14.0	1
Albania	20.7	18.1	0
Moldova	39.9	18.6	3
Montenegro	24.0	15.0	0
North Macedonia	29.3	21.3	2
Serbia	28.5	18.2	0
Turkey	11.3	3.9	2
Ukraine	38.6	17.7	0

[Own calculations based on source: (Eurostat, 2022)]

5 Conclusions

The results of our research support the findings of other investigations stating that there is still a serious gender gap in different dimensions of economic and social spheres, for instance, Ojwala et al. (2022), Yakovleva et al. (2022), Pasaribu and Lahiri-Dutt (2022), Nguyen and Tarp (2022); and Lawless et al. (2022). Adapting the EU approach to classification of regions, we have introduced nine potential classes of EU member states and candidate countries concerning female

Table 5 The descriptive statistics for four clusters of EU member states and candidate countries considering female empowerment in business

#	Cluster	Number of countries	Sum of square distances to the center	Centers
0	Albania, Bulgaria, Cyprus, Denmark, Finland, Hungary, Italy, Lithuania, Montenegro, Poland, Romania, Serbia, Slovenia, Ukraine	14	628.5517	[5.069, 4.1034]
1	Belgium, Estonia, Luxembourg, Portugal, Sweden	5	381	[42.3, 13.9]
2	Croatia, North Macedonia, Slovakia, Turkey	4	168	[43.6, 27.8]
3	Czech Republic, Greece, Ireland, Latvia, Moldova	5	455.1667	[28.75, 18.0833]

empowerment in business represented by two indicators, namely percentage of firms with female majority ownership and top managers. For example, the first class embraces ten gender equality leaders in both dimensions (Belgium, Bulgaria, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, Moldova, and Ukraine). Based on our calculations, we have received five clusters. The cluster analysis showed similar results with five groups of countries, namely the cluster 0 embracing 14 countries (Albania, Bulgaria, Cyprus, Denmark, Finland, Hungary, Italy, Lithuania, Montenegro, Poland, Romania, Serbia, Slovenia, Ukraine), cluster 1 with 5 countries (Belgium, Estonia, Luxembourg, Portugal, and Sweden), and cluster 2 with 4 countries (Croatia, North Macedonia, Slovakia, and Turkey).

Our two limitations of the research are the lack of available data for 12 EU member states and elimination of candidate countries while calculating the average values for percentage of companies with female top managers and majority ownership. Our calculations have proved our hypothesis that the majority of candidate countries are adherent to gender equality. In contrast to the widespread belief that the EU member states are the leaders in female empowerment, we have found out that some of them belong to laggards considering gender equality in business, especially compared with some of candidate countries. The future pieces of research cover the analysis of efficiency of measures to enhance female empowerment in business in EU member states and candidate countries.

References

Barreiro-Gen, M., Lozano, R., Temel, M., & Carpenter, A. (2021). Gender equality for sustainability in ports: Developing a framework. *Marine Policy, 131*, 104593. https://doi.org/10.1016/j.marpol.2021.104593

Eurostat. (2022). *Overview "regions and cities"*. Retrieved September 20, 2022, from https://ec.europa.eu/eurostat/web/regions/background

Fang, S., Goh, C., Roberts, M., Xu, L. C., & Zeufack, A. (2022). Female entrepreneurs and productivity around the world: Rule of law, network, culture, and gender equality. *World Development, 154*, 105846. https://doi.org/10.1016/j.worlddev.2022.105846

Hutsaliuk, O., Koval, V., Tsimoshynska, O., Koval, M., & Skyba, H. (2020). Risk management of forming enterprises integration corporate strategy. *TEM Journal, 9*(4), 1514–1523. https://doi.org/10.18421/TEM94-26

Jackman, M. (2022). The effect of tourism on gender equality in the labour market: Help or hindrance? *Women's Studies International Forum, 90*, 102554. https://doi.org/10.1016/j.wsif.2021.102554

Lawless, S., Cohen, P. J., McDougall, C., Mangubhai, S., Song, A. M., & Morrison, T. H. (2022). Tinker, tailor or transform: Gender equality amidst social-ecological change. *Global Environmental Change, 72*, 102434. https://doi.org/10.1016/j.gloenvcha.2021.102434

Mangubhai, S., Lawless, S., Cowley, A., Mangubhai, J. P., & Williams, M. J. (2022). Progressing gender equality in fisheries by building strategic partnerships with development organisations. *World Development, 158*, 105975. https://doi.org/10.1016/j.worlddev.2022.105975

Nguyen, C. P. (2021). Gender equality and economic complexity. *Economic Systems, 45*(4), 100921. https://doi.org/10.1016/j.ecosys.2021.100921

Nguyen, C. V., & Tarp, F. (2022). Changing male perceptions of gender equality: Evidence from a randomised controlled trial study. *World Development, 158*, 106019. https://doi.org/10.1016/j.worlddev.2022.106019

Njuki, J., Eissler, S., Malapit, H., Meinzen-Dick, R., Bryan, E., & Quisumbing, A. (2022). A review of evidence on gender equality, women's empowerment, and food systems. *Global Food Security, 33*, 100622. https://doi.org/10.1016/j.gfs.2022.100622

Ojwala, R. A., Kitada, M., Neat, F., & Buckingham, S. (2022). Effectiveness of gender policies in achieving gender equality in ocean science programmes in Public Universities in Kenya. *Marine Policy, 144*, 105237. https://doi.org/10.1016/j.marpol.2022.105237

Pasaribu, D., & Lahiri-Dutt, K. (2022). Coal reliance, human development, and gender equality: At what scale should we look for a relationship? *Energy Research & Social Science, 90*, 102612. https://doi.org/10.1016/j.erss.2022.102612

Perrin, C., & Weill, L. (2022). No man, no cry? Gender equality in access to credit and financial stability. *Finance Research Letters, 47*(Part B), 102694. https://doi.org/10.1016/j.frl.2022.102694

Song, J. M. (2022). Female senior managers and the gender equality environment: Evidence from South Korean Firms. *Pacific-Basin Finance Journal, 75*, 101838. https://doi.org/10.1016/j.pacfin.2022.101838

Tokar, V., Molchanova, E., Honcharova, Y., Zhyrova, T., & Ilikchiieva, K. (2021). Fostering gender equality to stimulate economic growth: Legal and institutional measures to enhance economic security of EU member-states and Ukraine. *CEUR Workshop Proceedings, 3187*, 38–48.

Vinska, O., Harbuza, T., Teslenko, T., & Tokar, V. (2023). Gender dimension of the European Union's communication ecology problems in high-technology sectors. In B. Alareeni & A. Hamdan (Eds.), *Explore business, technology opportunities and challenges after the Covid-19 pandemic. ICBT 2022* (Lecture notes in networks and systems) (Vol. 495, pp. 1303–1315). Springer. https://doi.org/10.1007/978-3-031-08954-1_113

Vinska, O., & Tokar, V. (2017). Economic opportunity and participation gender gap in EU member-states. *Economic Space, 118*, 16–24. http://srd.pgasa.dp.ua:8080/xmlui/bitstream/handle/123456789/540/Vinska.pdf?sequence=1

Vinska, O., & Tokar, V. (2021). Cluster analysis of the European Union gender equality and economic development. *Business, Management and Economics Engineering, 19*(2), 373–388. https://doi.org/10.3846/bmee.2021.15382

World Economic Forum. (2021). *Global Gender Gap Report 2021*. Retrieved September 20, 2022, from https://www3.weforum.org/docs/WEF_GGGR_2021.pdf

Yakovleva, N., Vazquez-Brust, D. A., Arthur-Holmes, F., & Busia, K. A. (2022). Gender equality in artisanal and small-scale mining in Ghana: assessing progress towards SDG 5 using salience and institutional analysis and design. *Environmental Science & Policy, 136*, 92–102. https://doi.org/10.1016/j.envsci.2022.06.003

Economic Empowerment of Women Through Household Dairy Farming in Rural India

K. Sivasubramanian, Roopa Adarsh, and Anu Krishnamurthy

1 Introduction

1.1 Background of the Study

Women play a key role in generating income through the household dairy business for financial sustainability. Dairy farming plays a vital role in the economic development of rural areas. Milk production has become an important source of employment and income generation for the rural population. Similarly, the consumption of milk is also crucial for the health conditions of the people. Many of these dairy producers are small-scale and tiny livestock keepers (Vekariya et al., 2021). In India, milk production continues to be a tiny activity at the household level. Many of the rural milk producers are tiny, small, marginal level, and relatively landless women farmers. India plays a vital role in contributing 15% of the world's milk production. Buffalo milk contributes to 66% of the world's overall milk production (Selvaraj & Balajikumar, 2015; Deka et al., 2012). Dairy development in India is recognized to have a vital place in economic activities in both rural and semi-urban areas. It helps to promote the economic status of poor people through self-employment generation. Livestock contributes about 4% to the gross domestic product of India. In this, the

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share of the dairy sector is the maximum among the overall livestock sector. In a developing country like India, the small size of the family dairy farming business model would potentially support local feed manufacturers and also influence economic empowerment (Devaprakash, 2020). The precision farming strategies provide an innovation and invention challenge based on unique farming practices to create a new and dynamic role (Eastwood et al., 2017).

1.2 Objectives

To compare the production capacity of milk for selected countries. To identify the production and consumption of milk in India. To analyze the economic and livelihood status of household women dairy farmers in the study area before and after the start-up of the household dairy farm business. To reveal the role and significance of small business of household dairy farming in generating income for the rural poor. To recommend appropriate policy implications for the promotion and protection of household business for women dairy farmers in rural areas.

1.3 Hypothesis

Small-scale household business through dairying is creating self-employment and income generation tools for the rural people of the study area.

Business through dairy farming activity promotes the economic empowerment of poor people in rural India.

The economic status of the rural people has been improved after starting a household business through dairy farming activity.

1.4 Purpose of this Study

Indian economy has been evidencing a stable and firm expansion of dairy development in the past few decades. Milk production is not just an economic activity; it provides livelihood to a large chunk of people in Indian villages. Simultaneously, supporting dairy farming businesses could support other rural economic activities such as agriculture and allied activities. India contributes 21% of the global milk production with 176.3 million tonnes during 2017 as against the global production of 827.88 million tonnes. Further, it enhanced to 187.8 million tonnes during 2018–2019 (Department of Animal Husbandry, Dairying and Fisheries, and various years).

2 Literature Review

The dairy business farmer can come out of poverty and improve their livelihood with small-scale dairy farming operations (Shivagangavva et al., 2019). The small-scale dairy business farmers contribute enormously to the livelihood than to the income generation in the rural areas. The dairy farmer's pattern of allocation was quite interesting. The women dairy farmers plan more land for food crop cultivation, whereas the nondairy farmers allocate more land for commercial crop cultivation. Women dairy farmers are more resilient to food uncertainty than other farmers (Banda et al., 2021). Modernized dairy farms are technically advanced in the production processes as compared to the traditional way. These large-size commercial farming activities are integrated with value chains. These dairy producers sell milk to all sizes of distributors such as formal suppliers and local suppliers as well (Burkitbayeva et al., 2021).

2.1 Production of Dairy

Originally, Indian small-scale farmers retained bovines, mainly livestock, for scarcity purposes in agriculture (Kishore et al., 2016). The genomic selection resulted in the rapid growth of genetic gains particularly in dairy cattle farming in developed and developing nations resulting in a greater proportion of genomic-proven young bulls used for the breed (Mrode et al., 2019). India is the leader in the production of milk, contributing 15% of global output (Saha et al., 2004; Chand et al., 2022). Small-scale dairy production in India is a livelihood profession of marginalized sections of rural India (Thirunavukkarasu et al., 2019).

2.2 Consumption of Dairy

India is one of the largest dairy producers and consumers and also has the largest dairy herd, which comprises buffalo and crossbreed cattle. The future production prospects purely depend on gains from productivity through breeding and feeding practices. Moreover, dairy cooperatives play a major role in expanding dairy and dairy-based commodities (Landes, 2017). An increase in the intake of milk and milk-based products has made the dairy business so important for the nutritional benefit for the consumer and as income generator for the rural poor.

2.3 Dairy Farming and Employment Generation

The livestock segment, especially dairy business farming, clenches a great place in providing employment and income generating for drought-prone areas (Rangnekar, 2006). Household dairy farming is a livelihood occupation for the poor people in rural and semi-urban areas. Dairying means not just producing milk; it has become an important livelihood-generating agent for poverty alleviation.

2.4 Household Dairy Business Farming and Poverty Alleviation

Small-scale household dairy farming can reduce poverty and provide economic support for the household, and it must be a significant segment of the poverty reduction program (Singh & Datta, 2013).

2.5 Marketing

The small and microlevel milk producers market their milk to the local consumers directly or to the middlemen. The small producers would also approach the local tea shops, bakeries, and hotels to sell the milk (Morgan, 2009).

2.6 Challenges of Small-Scale Women Dairy Farmers

The small-scale dairy business farming operators are facing numerous challenges regarding milk production such as high feeding costs, cattle diseases, and nonavailability of formal credits. The single-farm use of commercial support systems represents learning and variation challenges for agriculturalists and their social networks (Eastwood et al., 2012).

3 Research Methods and Materials

This research work adopted the quantitative research method to measure the impact of smallholding dairy business farming on the economic status of women dairy farmers.

Sampling method: A sample of 25 villages has been selected randomly, and a total of 250 women sample respondents engaged in small-scale household dairy farming were surveyed by using the convenience sampling method.

Data collection: This study is based on both secondary and primary data. The secondary data has been collected from various published sources such as the Department of Animal Husbandry and Dairying, the Government of India, and Stata (online sources). The primary data was gathered from a total sample of 250 household women dairy business farmers for the study purpose. The information was collected through a well-structured questionnaire. The data is collected in line with respondent demographic characteristics, current status of income, previous status of income, details of assets, borrowings, pattern of consumption, level of savings, working condition, challenges faced, and economic transformation after the dairy business. The field survey has been conducted from December 2021 to March 2022.

Study area: Tamil Nadu state of India has been selected for the field survey. Based on the contribution of dairy production, villages have been identified from the respective districts for sample selection.

Tools applied: Collected primary data were tabulated and analyzed by applying various statistical tools such as correlation, regression, and paired *t*-test to infer the relationship among variables.

4 Data Analysis and Interpretation

India has emerged as the main player in milk production compared to many other countries in the world. While looking into the milk production data from 2005 to 2017, India contributed a total output of 95.62 million tonnes in 2005. This number was the highest among other countries. The momentum consistently grew for the next consecutive 15 years with 121.85 million tonnes in 2010, 155.69 million tonnes in 2015, and 176.27 in 2017. China stands next to India with 32.02 million tonnes in the year 2005. But China's milk production did not have consistency over some time. In the year 2010, the production increased to 41.16 million tonnes and started declining to 36.28 and 34.87 million tonnes, respectively. The other Asian country is Pakistan, which was having a production of 29.44 million tonnes in 2005 and continued positive growth of 35.49, 41.59, and 44.29 million tonnes from 2010 to 2017, respectively. All other countries' output was relatively lesser. So, it is evident from the data that India is contributing a major portion of milk production among many Asian and other countries (Table 1).

It becomes essential to further study the state-wise milk production of India from various periods to evolve the capacity of each state in the country. Dairy farming became an integral part of meeting an ever-increasing requirement for milk (Purwantini et al., 2021). It is also evident that India remains the largest milk producer compared with other leading nations in the world (Ohlan, 2016). Uttar Pradesh is playing a key role in the production of milk in India with an average

Table 1 Milk production of various countries (million tonnes)

Country	2005	2010	2015	2017
India	95.6	122	156	176
Afghanistan	1.73	1.72	2.2	2.12
Argentina	9.91	10.6	12.0	10.1
Australia	10.13	9.02	9.49	8.8
Bangladesh	2.62	2.02	2.1	2.01
Brazil	25.5	30.9	34.8	33.7
Canada	7.81	8.24	8.14	8.1
Chile	2.31	2.54	2.04	2
China	32	41.1	36.2	34.8
Denmark	4.58	4.91	5.36	5.56
Finland	2.43	2.34	2.44	2.41
France	25.7	24.2	25.9	25.2
Germany	28.4	29.6	32.7	32.6
Indonesia	0.85	1.48	1.46	1.54
Ireland	5.38	5.33	6.59	7.48
Mauritania	0.37	0.69	0.78	0.77
Mexico	10	10.9	11.6	11.9
Nepal	1.35	1.62	1.86	2.05
The Netherlands	10.8	11.8	13.5	14.5
New Zealand	14.6	17	22	21.3
Norway	1.59	1.58	1.61	1.57
Pakistan	29.4	35.4	41.5	44.2

Source: FAOSTAT (2019)

production of 25,559.667 during 2010–2011 to 2018–2019 period. The mean daily production of Rajasthan was 17,516 million tonnes, and Andhra Pradesh was recorded with 12,275.556 million tonnes. Gujarat is also consistently growing and contributing a considerable amount of milk production to the nation with an average of 11,707.112 million tonnes. Madhya Pradesh, Bihar, Haryana, Maharashtra, Punjab, and Tamil Nadu are also contributing a sufficient number with more than 6000 million tonnes.

As shown in Table 2, Uttar Pradesh state has the highest production of 25,559.7 tonnes with a minimum of 21,031 tonnes. Rajasthan state comes next with a mean production of 17,516 tonnes, and Andhra Pradesh state records the third place with 12,275.6 tonnes of milk production with a minimum of 9656 and a maximum of 15,044 throughout 2010–2011 to 2018–2019 (Table 3).

The given table figures out the comparative study of sample respondent income before and after dairy business farming activity. It reveals that the mean income of the respondent was Rs. 6250 before dairy farming, and it has significantly increased to Rs. 7608 after dairy business farming economic activity (Table 4).

The correlation between income and dairy farming activity is positive with a value of 0.141. The calculated p-value is lesser than 0.05, and the null hypothesis is rejected. It shows that dairy farming activity has increased the income of poor people

Table 2 Descriptive statistics of state-wise milk production (in thousand tonnes) 2010–2011 to 2018–2019

States	Minimum	Maximum	Mean
Uttar Pradesh	21,031	30,519	25,559.7
Rajasthan	13,234	23,668	17,516
Andhra Pradesh	9656	15,044	12,275.6
Gujarat	9321	14,493	11,707.1
Madhya Pradesh	7514	15,911	11,232.9
Punjab	9423	12,599	10,618.9
Maharashtra	8044	11,655	9687.78
Haryana	6267	10,726	8133.56
Bihar	6517	9818	7892.89
Tamil Nadu	6831	8362	7321
Karnataka	5114	7901	6260.11
West Bengal	4471	5607	5009.56
Telangana	4207	5416	4742.2
Kerala	2520	2791	2645.78
Jammu and Kashmir	1609	2540	2007.67
Orissa	1671	2311	1912.44
Jharkhand	1555	2183	1813.11
Uttarakhand	1383	1792	1586.11
Chhattisgarh	1029	1567	1271.11
Himachal Pradesh	1102	1460	1238.67
Assam	790	882	832
Delhi	279	502	334
Tripura	104	185	141.667
Meghalaya	79	87	82.778
Manipur	78	86	80.778
Nagaland	73	81	77
Goa	51	68	59.222
Sikkim	42	67	51.889
Puducherry	45	49	47.556
Chandigarh	36	45	43.111
Arunachal Pradesh	22	55	41.556
Mizoram	11	26	19
Andaman and Nicobar Islands	14	26	18.667
Dadra and Nagar Haveli	8	11	9.75
Lakshadweep	2	6	3.222
Daman and Diu	1	1	1

Source: Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture and Farmers Welfare, Government of India

in the study area (Table 5). Table 6 shows the test of the hypothesis by applying paired *t*-test method. The calculated standard deviation among the variables was 1852.1766 with 249 as degrees of freedom. The calculated *t*-value was −11.593 with

Table 3 Paired sample statistics

		Mean	*N*	Std. deviation	Std. error mean
Pair 1	Income before	6250	250	1527	96
	Income after	7608	250	1284	81.2

Source: Primary data, author's computation

Table 4 Paired sample correlations

		N	Correlation	Sig.
Pair 1	Income before and income after	250	0.141	0.000

Source: Primary data, author's computation

Table 5 Paired sample test

Paired differences—income before − income after							
			95% Confidence interval of the difference				
Mean	Std. deviation	Std. error mean	Lower	Upper	*t*	*df*	Sig. (2-tailed)
−1358	1852	117	−1588	−1127	−11	249	0.000

Source: Primary data, author's computation

Table 6 Paired sample correlations

		N	Correlation	Sig.
Pair 1	HH asset value before and HH asset value after	250	0.978	0.000

Source: Primary data, author's computation

Table 7 Paired sample test

		Paired differences							
					95% Confidence interval of the difference				
		Mean	Std. deviation	Std. error mean	Lower	Upper	*t*	*df*	Sig. (2-tailed)
Pair 1	HH asset value before − HH asset value after	−1830	2413	152	−2130	−1529	−12	249	0.000

Source: Primary data, author's computation

a 0.000 level of significance. The test result shows that dairy farming activity has increased the income of poor people in the study area.

Household asset value and dairy business farming activity have also positively correlated at 0.978 with a 0.000 level of significance (Table 7).

Table 8 Model summary

Model	R	R^2	Adjusted R^2	Std. error of the estimate
1	0.803[a]	0.645	0.641	769

[a]Predictors: (constant), challenges in storage, challenges in marketing, challenges in credit
Source: Primary data, author's computation

It is proven that there is an association between household asset value before and after the dairy business farming activity of the respondent. The calculated t-value was −11.988 with a 0.000 level of significance.

The regression model has also been applied to estimate the relationship between the economic and noneconomic variables (Table 8).

The dependent variable taken for this analysis was the income of the respondent after the small-scale dairy business activity. The independent variables include challenges of storage, marketing, and credit availability. The availability of credit facilities to the respondent was associated with the level of income. It has been proved through statistical analysis that the t-value was 14.599 with a 0.000 significance level. The marketing challenges and storage challenges did not have an association with the income level since the p-value for these two independent variables is much higher than the accepted value of 0.005.

5 Concluding Remarks

Animal husbandry is playing a very significant role in the economic growth of India. The rural livestock segment is the strength of agriculture in India, and it contributes significantly towards rural development (Kumar et al., 2022). However, women household milk producers are living in vulnerable economic conditions (Jatwani & Swain, 2020). The household dairy business farming activities in the rural areas of India are contributing positively with a great significance of self-employment and income-generating occupation.

This household dairying business supports equitable income distribution and also reduces the disparities among rural people (Ramesh et al., 2018). It supports enhancing the nutritional condition and acts as a food security measure for the socially and economically less privileged people in rural India. Even small-scale and marginal farmers also engage in dairy business farming due to monsoon failure (Sivasubramanian, et al., 2020).

The boon for the smallholders in milk production to increase their revenue increasingly purely depends on the capacity to compete with the market. But they have many obstacles to reaching this milestone in rural India. Through the continuous efforts in establishing household farming activity, their income has increased considerably (Markelova et al., 2009). It is found that expenditure made on small-scale household milk production yielded a significant income for rural women (Ganeshkumar et al., 2000). The momentum consistently grew for the next

consecutive 15 years with 121.85 million tonnes in 2010, 155.69 million tonnes in 2015, and 176.27 tonnes in 2017. China stands next to India with 32.02 million tonnes in the year 2007. But China's milk production did not have consistency over some time. In the year 2010, the production increased to 41.16 million tonnes and started declining to 36.28 and 34.87 million tonnes, respectively. The other Asian country is Pakistan, which was having a production of 29.44 million tonnes and continued positive growth of 35.49, 41.59, and 44.29 million tonnes from 2015 to 2017, respectively. It reveals that the mean income of the respondent was Rs. 6250 before the dairy business farming, and it has significantly increased to Rs. 7608 after dairy farming economic activity. It is proven that there is an association between household asset value before and after the dairy business farming activity of the respondent. The calculated *t*-value was −11.988 with a 0.000 level of significance. On the whole, the household dairy business has become an instrument for poverty alleviation among women in rural areas. So, economic development and income generation have been achieved through household business operations in rural India.

References

Banda, L. J., Chiumia, D., Gondwe, T. N., & Gondwe, S. R. (2021). Small dairy farming contributes to household resilience, food, and nutrition, security besides income in rural households. *Animal Frontiers, 11*(2), 41–46.

Burkitbayeva, S., Janssen, E., & Swinnen, J. (2021). Hiding in plain sight: The emergence of modern dairy farms in India. *Journal of Agribusiness in Developing and Emerging Economies, 13*, 194–210.

Chand, P., Kumar, D. M., Singh, A. K., Deshwal, G. K., Rao, P. S., & Sharma, H. (2022). Influence of processing and packaging conditions on probiotic survivability rate, physico-chemical and sensory characteristics of low calorie synbiotic milk beverage. *Journal of Dairy Research, 89*(1), 94–99.

Deka, R. P., Lindahl, J. F., Randolph, T. F., & Grace, D. (2012). *The White Revolution in India: The end or a new beginning?* International Livestock Research Institute.

Devaprakash, R. (2020). Quality, the new mantra for small scale milk producers. *CARE*. Retrieved from https://www.careindia.org/blog/quality-the-new-mantra-for-small-scale-milk-producers/

Eastwood, C., Klerkx, L., & Nettle, R. (2017). Dynamics and distribution of public and private research and extension roles for technological innovation and diffusion: Case studies of the implementation and adaptation of precision farming technologies. *Journal of Rural Studies, 49*, 1–12.

Eastwood, C. R., Chapman, D. F., & Paine, M. S. (2012). Networks of practice for co-construction of agriculture decision support systems: Case studies of precision dairy farms in Australia. *Agricultural Systems, 108*(1), 10–18.

Ganeshkumar, B., Kumaravel, K. S., & Verma, N. K. (2000). Resource productivity in dairy farming in Tamil Nadu. *Journal of Dairying, Foods & Home Science, 19*(2), 105–109.

Jatwani, M., & Swain, S. (2020). Is small scale dairy farming dying out? An in-depth study. *Indian Journal of Community Medicine, 45*(1), 47–51.

Kishore, A., Birthal, P. S., Joshi, P. K., Shah, T., & Saini, A. (2016). Patterns and drivers of dairy development in India: Insights from analysis of household and district-level data. *Agricultural Economics Research Review, 29*(1), 1–14.

Kumar, N. T., Das, S., & Gulati, A. (2022). Dairy value chain. In A. Gulati & H. Wardhan (Eds.), *Agricultural value chains in India. India studies in business and economics*. Springer.

Landes, M. (2017). *India's dairy sector: Structure, performance, and prospects. Indian Agricultural Policies and Trade. Report No. LDPM 272-001*. US Department of Agriculture, Economic Research Service.

Markelova, H., Meinzen-Dick, R., Hellin, J., & Dohrn, S. (2009). Collective action for smallholder market access. *Food Policy, 34*(2), 1–7.

Morgan, N. (2009). Smallholder dairy development. Lessons learned in Asia. In *Animal Production and Health Commotion for Asia and the Pacific: Bangkok, Thailand*. FAO.

Mrode, R., Ojango, J. M. K., Okeyo, A. M., & Mwacharo, J. M. (2019). Genomic selection and use of molecular tools in breeding programs for indigenous and crossbred cattle in developing countries: Current status and future prospects. *Frontiers in Genetics, 9*, 694.

Ohlan, R. (2016). Dairy economy of India: Structural changes in consumption and production. *South Asia Research, 36*(2), 241–260.

Purwantini, T. B., Saliem, H. P., Ariningsih, E., Anugrah, I. S., Suryani, E., Irawan, A. R., & Hetherington, J. B. (2021). The performance of smallholder dairy farms in West Java. In *IOP conference series: Earth and environmental science 892*. IOP Publishing.

Ramesh, N., Kannadhasan, M. S., Srinivas, J., Karthikeyan, A., Parthasarathi, B. C., & Rajendraprasad, A. (2018). Women entrepreneurship: A successful case study of Mulkanoor Women's Cooperative Dairy (Swakrushi Dairy). *International Journal of Pure and Applied Bio-Science, 9*(1), 556–561.

Rangnekar, D. V. (2006). *Livestock and livelihoods of underprivileged communities in India: A review*. International Livestock Research Institute.

Saha, A., Garcia, O., & Hemme. (2004). *The economics of milk production in Orissa, India, with particular emphasis on small-scale producers. Pro-poor livestock policy initiative*. International Farm Comparison Network.

Selvaraj, N., & Balajikumar, P. (2015). A study on socio-economic conditions of members and their attitude towards the performance of dairy co-operatives in Tamil Nadu, India. *Journal of Bioengineering & Biomedical Science, 5*(1), 140.

Shivagangavva, P. D., Mahadevaiah, G. S., & Gaddi, G. M. (2019). Small scale dairy production helps in reduction of poverty: Anecdotal evidence. *International Journal of Current Microbiology and Applied Sciences, 8*(8), 707–712.

Singh, S. R., & Datta, K. K. (2013). Future of smallholders in the Indian Dairy Sector—Some anecdotal evidence. *Indian Journal of Agricultural Economics, 68*(2), 182–194.

Sivasubramanian, K., Pushpa, A., Raju, V., & Kumar, M. D. (2020). Women and informal employment: An analysis of socio-economic and health conditions of women home-based workers in Chennai, India. *Journal of International Women Studies, 21*(5), 97–106. https://vc.bridgew.edu/cgi/viewcontent.cgi?article=2288&context=jiws

Thirunavukkarasu, D., Narmatha, N., Doraisamy, K. A., Saravanakumar, V. R., & Sakthivel, K. M. (2019). Future prospects of small-holder dairy production: Pragmatic evidence from crop-livestock farming systems of an economically transforming state in India. *Cuadernos de Desarrollo Rural, 16*(84), 1.

Vekariya, S. J., Rajput, M. B., & Vataliya, P. H. (2021). Prospects of dairy farming in India: A review. *International Journal of Current Microbiology and Applied Sciences, 10*(1), 1127–1134.

Work from Home: Promote Gender Equality and Maintain Work-Life Balance Among IT Professionals

Aasha Sujit and B. Harani

1 Introduction

"Work is what we do, not where we are" (Mobile Worker Toolkit: A National Guide). In today's society, working remotely is becoming a more viable alternative. The concept of working from home takes its roots to the twentieth century when the entrepreneurs established theirs at home. Numerous, somewhat overlapping names, including telecommuting, telework, virtual offices, remote work, and location-independent working from home, have been used to study the issue.

The flexible work arrangement or work from home has been a common feature witnessed among all the sectors of the world. The pandemic Covid-19 has further increased the remote working or even hybrid work culture. Autonomy and flexibility over work schedule have brought a drift in the traditional work-life boundary for most professionals.

The recent pandemic has led to a change not only in the focus of professional understanding but also on different levels of personal experiences. As the world moves towards this new normal, there is a shift seen in the approach of employees, both male and female, towards work and family life.

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2 Review of Literature

According to Shaw (2018), telework can significantly improve the quality of life for working women in the article titled The Struggle for Life Balance: Work, Family, and Leisure in the Lives of Women Teleworkers, which was co-authored by Jean Andrey and Laura C. Johnson. To determine how this form of work arrangement affects life balance, this study looked into the daily activities of women teleworkers. 15 female teleworkers, almost half of whom had children at home, took part in in-depth interviews where they talked about their professional life, household and family activities, leisure activities, and how they felt telework affected their lives. The results show that telework can enhance employed people's ability to maintain a healthy work-life balance.

Crosbie (2019) **along with Jeanne Moore in their paper titled Work–Life Balance and Working from Home** examined the experience of homeworking. The objectives also included to understand whether working (or not) from home improves people's capacity to balance their work and life commitments. Using the data from 45 interviews and 3 focus groups with homeworkers from different socio-economic backgrounds, conclusions were drawn. The homeworkers in the sample reported mixed feelings about working from home. The writers critically examined that the experience of working from home improves people's capacity to balance their work and life commitments. Homeworking is one of the initiatives that has been encouraged to improve the work-life balance.

Opportunities to work from home in the context of work-life balance was the title of Felstead (2015) paper, which she co-wrote with Nick Jewson, Annie Phizacklea, and Sally Walters. The purpose of this essay was to evaluate and study working from home in the context of theories and available data pertaining to policies and programmes intended to address work-life balance, as well as to pinpoint the major concerns important in comprehending and analysing working from home. Workplace Employee Relation Survey, along with managerial interviews and labour force surveys, served as the methodology for this paper. Bi-variate and multi-variate analyses were used to analyse the results. Two ideas, institutional theory and organisational adaptation theory, were also employed. The authors concluded that work-life balance and family-friendly employment are concepts that are not just feminised but are common to both. These options are available in the public sector, large establishments, and work environments, where accountability exists. Tirupur, in Tamil Nadu in South India, is the base of a textile and garment industry which exports to many international companies. The industry manufactures garments such as T-shirts, nightwear, children's clothes, and sportswear. The area of Tirupur is known for growing cotton, and there are hundreds of spinning mills producing yarn in the nearby parts of Tamil Nadu, which has made Tirupur the centre for textiles. In the financial year 2021–2022, exports from Tirupur totalled ₹33,525 crores, while in the previous year, it was around ₹25,000.

3 Objectives

1. To discover and analyse the factors that encourage work-life balance through the possibility of working from home.
2. To evaluate the gender variations among employees that affect how they manage work and family obligations and business crisis of garment exporters in Tirupur city, Tamil Nadu

4 Statement of the Problem

With the development of information technology, there is a profound change taking place on a global scale. Since they also work for global clients, the information technology business is renowned for its long working hours and odd work schedules. This causes health risks, stress, culture shock, and change that are harmful to family life. Employees are provided other work options, such as flexible scheduling and work from home, to help them overcome this. As a result, the availability of numerous possibilities liberates the workers from the daily grind of work and allows them to spend meaningful time with their families. In light of the examination above, one of the factors supporting work-life balance for both male and female employees has been identified as flexible work from home. Hence, research on work from home, the new normal to culminate gender gap in work-family balance, was conducted.

5 Theoretical Background

5.1 Work from Home

Our working surroundings, workplace interactions, and colleagues have changed as a result of the digital age. The rapid advancement of technology has resulted in other developments. More workers are able to operate remotely both within their organisations and independently on other networks (Larson & DeChurch, 2020). To help employees overcome this, various work options are offered to them, such as flexible scheduling and work from home. Because there are so many options available, workers are freed from the monotony of their regular jobs and are able to spend quality time with their family.

The encouragement of working from home has been one effort to enhance work-life balance.

5.2 Personal and Professional Life

The work-family balance is one of the largest issues in the workplace today, particularly given the difficulties in juggling childrearing and job/career prospects brought on by the development and normalisation of dual-income households over the past two decades (Duxbury & Halinski, 2014). Although working from home has many advantages, other research emphasises the potential for increased stress brought on by the inability to distinguish and maintain the boundaries between work and family domains. Some studies concentrate on the opportunity that work from home jobs present to better perform both work and home roles.

5.3 Gender and Work Family Spillover

Work and family life were formerly viewed as "different realms", but they are today more intertwined than ever. Adults' work-family experiences have been affected by a number of demographic trends, including the rise in women's and mothers' labour force participation, families' growing financial need for two incomes, and fathers' increased involvement in home life and childrearing. As a result, more men and women must now manage their obligations as both parents and employers at the same time.

Numerous studies reveal that mothers continue to concern and care for their children's welfare, including their physical and mental development, even though men now spend more time with children than they did in the past. Anton-Erxleben et al. (2011) shows that mothers spend more hours a week multitasking than fathers, a fact mainly attributable to time spent on housework and childcare. Furthermore, mothers tend to be more involved than fathers in labour-intensive chores.

6 Methodology

This study is an empirical investigation using both primary and secondary sources of information. 50 IT professionals comprised the respondents for the primary data, which was gathered via a structured questionnaire. Only IT professionals from Bengaluru in the Indian state of Karnataka were included in the study. The newspaper and websites were used to get the secondary data.

7 Tools for Analysis

The analysis of variance was used in this investigation as a statistical method. Using analysis of variance in regard to factors influencing work-life balance with the possibility of working from home, gender-based data are compared.

8 Data Analysis and Interpretation

8.1 Analysis of Variance (ANOVA)

When comparing at least two groups, the mean values of the groups should be used as the foundation. The technique of analysis of variance (ANOVA) is used. The respondents to this study are also divided into two or more groups based on their gender and the variables impacting work-life balance when working from home.

8.2 Gender of the Respondents and Constructs

Null Hypothesis:

H0 There are no gender-specific differences that are statistically significant in the parameters affecting work-life balance when working from home.

Alternate Hypothesis:

H1 There are gender-specific differences that are statistically significant in the parameters affecting work-life balance when working from home.

8.3 Analysis

See Table 1.

According to the ANOVA table, the null hypothesis is accepted because the level of significance for the constructs flexible time/effective time management, flexibility to handle domestic emergencies, job effectiveness, quality family relationship, and physical and mental well-being is greater than 0.05. The aforementioned five parameters so demonstrate that there is no appreciable gender difference with regard to work-life balance.

Table 1 Table of means for constructs—classification based on gender

Constructs	Size	Mean	Standard deviation	*F*	Significance	Remark
Flexible time/effective time management	Male	58.8000	5.49343	0.875	0.456	Not significant (accept)
	Female	60.9767	3.53546			
	Others	0	0			
Availability of childcare facility	Male	27.0000	4.85341	7.541	0.000	**Significant (reject)**
	Female	28.5116	4.31151			
	Others	0	0			
Multitasking ability	Male	30.2000	4.68568	8.317	0.004	**Significant (reject)**
	Female	31.3953	5.34585			
	Others	0	0			
Fewer burnouts	Male	43.2000	6.17882	7.138	0.003	**Significant (reject)**
	Female	44.1163	9.06119			
	Others	0	0			
More mindfulness	Male	2.3000	1.15950	6.688	0.000	**Significant (reject)**
	Female	2.0465	0.72222			
	Others	0	0			
Flexibility to meet emergencies at home	Male	2.4000	0.51640	0.065	0.978	Not significant (accept)
	Female	2.4884	0.90953			
	Others	0	0			
Job effectiveness	Male	2.5000	0.52705	1.095	0.354	Not significant (accept)
	Female	2.3953	0.87667			
	Others	0	0			
Quality family relationship	Male	2.2000	0.91894	1.367	0.257	Not significant (accept)
	Female	2.1628	0.87097			
	Others	0	0			
Physical and mental well-being	Male	2.4000	0.51640	1.125	0.342	Not significant (accept)
	Female	2.0233	0.77116			
	Others	0	0			
Career growth	Male	1.9000	0.73786	6.514	0.001	**Significant (reject)**
	Female	1.4884	0.55085			
	Others	0	0			

Male and female respondents do not share the same levels of opinion regarding factors including the availability of childcare facilities, ability to multitask, reduction of burnout, increase in mindfulness, and career advancement, which is not significant at a threshold of 0.05. This shows that the opinions of men and women on the aforementioned variables are very different.

9 Summary of Findings

1. According to the research, there is no difference of opinion in relation to the five factors such as flexible time/effective time management, flexibility to handle domestic emergencies, job effectiveness, quality family relationship, and physical and mental well-being among the genders.
2. According to the study, male and female respondents do not share the same levels of opinion regarding factors including the availability of childcare facilities, ability to multitask, reduction of burnout, increase in mindfulness, and career advancement.

10 Conclusions

In conclusion, work-life balance gives a wider spectrum of employees the possibility of greater flexibility and choice. Work from home is one option that firms give their employees as a way to support this. It has recently become the new norm across many industries, but it is especially common in the IT sectors. If both genders are given the same kind of flexi time and remote working options, this could help to bridge the gender gap in family responsibility management and help many people achieve a better work-family balance.

11 Suggestions

1. Businesses should embrace the current emphasis on work-life balance since it offers the possibility of greater flexibility and a wider range of employee options. Hence, providing the facilities to support work-family balance should be extended to the genders equally.
2. As the study reveals that both males and females agree upon the common factors in relation to work-life balance through work from home option, both the genders should manage the family responsibilities mutually as both enjoy the work from home option.

12 Future Research

This research study has made an attempt to bring out the factors that could culminate the gender differences in balancing personal and professional life among the IT professionals in Bengaluru, India. A study on the different sectors that provide the option of work from home could be conducted to get more depth in understanding work-life balance through the option of remote working or working from home.

References

Anton-Erxleben, K., Abrams, J., & Carrasco, M. (2011). Equality judgments cannot distinguish between attention effects on appearance and criterion: A reply to Schneider (2011). *Journal of Vision, 11*(13), 8–8.

Crosbie, M. (2019). Work-life balance and working from home. *Social Policy and Society, 3*, 223–233.

Duxbury, L., & Halinski, M. (2014). When more is less: An examination of the relationship between hours in telework and role overload. *Work, 48*(1), 91–103.

Felstead, A. (2015). Opportunities to work from home in the context of work-life balance. *Human Resource Management Journal, 12*, 54–76.

Larson, L., & DeChurch, L. A. (2020). Leading teams in the digital age: Four perspectives on technology and what they mean for leading teams. *The Leadership Quarterly, 31*(1), 101377.

Mills, R. S. L., Duncan, K. A., & Amyot, J. J. (2000). *Home-based employment and work-family conflict: A Canadian study* (pp. 220–232). Auburn House.

Shaw, S. M. (2018). The struggle for life balance: Work, family, and leisure in the lives of women teleworkers. *World Leisure Journal, 45*, 15–29.

Multicultural and Monocultural Innovative Team Benefits, Success, and Implementation

Ahmad Yousef Areiqat, Ahmad Alheet, and Yacoub Hamdan

Abstract In the twenty-first-century work environment, staff can emerge from all around the world; as the world becomes more associated, people progressively connect and team up with individuals of various social foundations and hold different social characters.

Fruitful organisations have dynamic capacities that are lined up with their cut-throat environments. As chiefs with multicultural foundations drive aggressive conditions to globalise, the unique accommodations are progressively applicable. These directors are bound to jump over intellectually far-off chances than monocultural administrators. Variety alone needs to lay out a comprehensive functional worldwide hierarchical culture.

Under the umbrella of innovation, entrepreneurship, variety, and individual inclinations, for example, implanted ethnic predisposition, orientation inclination, absence of value balance, estrangement, negligible hostilities, social disparities, and work distance among high- and low-status labourers, proliferate. Moreover, authoritative fundamental primary levels like progressive systems, arrangements, methods, practices, and absence of moral responsibility have remained the same under the umbrella of variety.

This chapter reviews the development of culture, innovation, and entrepreneurship. It continues with conversations about globalisation, variety and incorporation, information on the condition of worldwide hierarchical culture, and change in outlook to worker authority.

Keywords Innovation · Work environment · Team benefits · Team success

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1 Introduction

As globalisation has expanded over the past years, work environments have felt the effect of working inside multicultural groups. The last segment in group variety framed a portion of the features and advantages of dealing with different groups, and a multicultural gathering positively qualifies as diverse. Be that as it may, a few basic practices are prescribed to those driving multicultural groups so they can parlay the variety into a benefit and not be wrecked by it.

Individuals might expect that correspondence is essential to crash multicultural groups, as members might have various dialects and correspondence styles. The Harvard Business Review article "Overseeing Multicultural Teams" brings up four key social contrasts that can cause offensive struggles in a group.

The main distinction is immediate versus roundabout correspondence. A few societies are incredibly close and express their contact, while others are more roundabout and pose inquiries instead of bringing up our concerns. This distinction can cause struggle because, at the limit, some might think about the immediate style as hostile. Conversely, the backhanded fashion might be considered useless and forceful in group communications.

The second contrast that multicultural groups might confront is the issue of a unique sound and familiarity. When colleagues do not communicate in a similar language, one language might overwhelm the gathering collaboration—and the people who do not say it might understand left. The essential language speakers might figure out that those individuals do not contribute such a lot or are less capable. The following test is when there are contrasting perspectives toward the progressive system. A few societies regard the scale and treat colleagues because of that ordered progression. Different cultures are more libertarian and do not notice advanced contrasts similarly.

This might prompt conflicts assuming that specific individuals feel they are being affronted and not treated by their status. The last contrast that might challenge multicultural groups is clashing dynamic standards. Various societies unexpectedly pursue choices; some will apply a lot of examination and readiness ahead of time. Those societies that settle on choices rapidly (and need barely sufficient data to pursue an option) might be disappointed with the sluggish reaction and generally longer point of view.

These social distinctions are genuine instances of how regular group exercises (independent direction, correspondence, collaboration among colleagues) may become disputed matters for a multicultural group if there is not a satisfactory comprehension of everybody's way of life. The creators propose a few possible intercessions to attempt if these struggles emerge. A *particular appeal* is a variation which works with or around contrasts. This is best utilised when colleagues will recognise the social distinctions and figure out how to function with them. The accompanying intercession method is primary mediation or revamping to diminish grinding in the group. This method is best utilised, assuming that inefficient sub-groups or clubs inside the gathering should be moved around.

Administrative intercession is the procedure of pursuing choices by executives without group inclusion. This procedure should be utilised sparingly, showing that the group needs direction and can only push ahead with administration. At last, exit is an intercession after all other options have run out and are the intentional or compulsory evacuation of a colleague. Assuming that the distinctions and difficulties have demonstrated so extraordinarily that a person in the group can never again work with the group gainfully, eliminating the colleague in question might be vital.

Specific individuals appear to be naturally mindful of and ready to work with group social contrasts and their associations. These people may be said to have social knowledge. *Social knowledge* is a capability and expertise that empower people to work in multifaceted conditions. It makes individuals more mindful of the impact of culture and more equipped to adjust their behaviour to the standards of different societies. In the IESE Insight article entitled "Cultural Competence: Why It Matters, and How You Can Acquire It", that is what the writers attest that multicultural pioneers might relate better to colleagues from various societies and resolve clashes all the more without any problem.

2 Discussion and Questions

- What are a few multicultural encounters you have had in which you feel a massive hole between you and someone from another culture? How could you deal with it?
- Has financial globalisation assisted individuals with connecting these social holes? Why or what difference would it make?

When you feel about the various societies and have begun to chip away at fostering your diverse abilities, another great practice is to "help your social metacognition" and screen your conduct in multicultural circumstances. When you are in a situation wherein you are connecting with multicultural people, you ought to test yourself and know how you act and feel.

Notice your optimistic and pessimistic connections with individuals and gain from them. Creating "mental intricacy" is the last best practice for helping multicultural abilities. This is the most developed, and seeing circumstances from more than one social framework requires being capable. To see things from a different point of view, you want to have severe areas of strength and the capacity to understand people at their core, compassion, and participation in fair correspondences (Taha & Taha, 2023).

As public legislative issues and talk appear to develop all the more internally looking and disruptive across America and Europe, fruitful organisations should keep thinking comprehensively and worldwide. Embracing social variety in the work environment is a fundamental initial step for organisations that must be cut-throat universally.

Associations across ventures, from the Virgin Group to Disney and PricewaterhouseCoopers, embrace the advantages of a different labour force. Nevertheless, with benefits come difficulties working across lines, societies, and dialects. Diverse cultural perspectives can motivate inventiveness and drive development.

Our way of life impacts how we see the world. Various perspectives and a global group's far-reaching individual and expert experience can offer new viewpoints that rouse associates to visit the work environment—and the world—in an unexpected way. Various thoughts have been displayed to raise imagination and drive advancement, assisting with tackling and addressing client issues in previously unheard-of ways.

For instance, restorative goliath L'Oréal credits many meaningful outcomes in developing business sectors to its multicultural item improvement groups.

Numerous voices, viewpoints, and characters bobbing off each other can lead to out-of-the-container thinking. By offering a stage for the open trade of thoughts, organisations can receive the primary rewards of variety in the work environment.

A multicultural labour force can give an association a critical advantage while venturing into new business sectors. Frequently, an item or administration should be adjusted to succeed abroad. Grasping nearby regulations, guidelines, customs, and the brutal scene can assist a business in flourishing. Besides, neighbourhood associations, local language abilities, and social comprehension can help worldwide enterprises to improve dramatically.

Furthermore, being more severe at last means being more productive. Variety Inc. perceives the prominent 50 most different organisations yearly and measures their prosperity against the more extensive market.

According to a Glassdoor survey, 66% of occupation trackers showed that variety was fundamental when assessing organisations and employment bids. In a severe worldwide work market, indicating that your business is putting resources into encouraging a multicultural and comprehensive climate can make you stand apart from the promising up-and-comers. Making variety a fundamental piece of the enlisting system will widen your ability pool of imminent workers.

Not in the least does employing from a more different ability pool makes your business alluring to aggressive, universally disapproved of competitors. Nevertheless, it likewise assists you with keeping them ready. Variety, including various orientations, religions, and identities, has been displayed to develop maintenance further and lessen worker turnover expenses.

In a different working environment, representatives are bound to stay steadfast when they feel regarded and esteemed for their one-of-a-kind commitments. This way cultivates common regard among partners who likewise admire their colleagues' different societies, viewpoints, and encounters. A comprehensive climate of multifaceted participation is a fantastic method for holding with partners and groups across the business.

By drawing from a socially different ability pool, organisations benefit from employing experts with an expansive scope of abilities often closed while recruiting locally. All around the world, situated organisations can add to their administration

range by utilising their global workers' skills and experience of real value (Das & Chanda, 2023).

A more extensive abilities base and an all more possibly different contribution of items and administrations can assist your business with enjoying the severe benefit of flexibility. In the present unpredictable and dubious worldwide business climate, deft and versatile associations are the ones that flourish.

Versatility implies quicker and more compelling preparation, advancement, and execution. An organisation with social and mental variety can be speedier in detecting a hole on the lookout. It will likewise have the worldwide (or market-explicit) knowledge and experience to assist a new or adjusted item with changing purchaser conduct—and succeed.

Regardless of the practical advantages, employing ability from abroad can introduce an HR challenge. The confounded course exploring business regulations and visa prerequisites for worldwide labourers is not the least among these. Conditions and guidelines vary in every nation and among nations and can change regularly.

Past visas and additional facilities for enlisting and holding a socially different labour force should be considered. For example, giving a peaceful space to petitioning heaven can make a work environment inviting and comprehensive for representatives with different convictions, considering other social or strict occasions (Alshater et al., 2022). These contemplations and facilities can, once in a while, be an additional business cost and a calculated test.

While quality interpretations are fundamental for viable showcasing, there can likewise be a real gamble of correspondence, losing all sense of direction in understanding among multicultural partners. Language boundaries are only one test. Indeed, even in an office where everybody communicates in English, fathoming a scope of accents, or figuring out a local speaker's utilisation of colloquialisms, can be troublesome.

The diverse correspondence also boils down to more than simply words expressed. Non-verbal correspondence is a fragile and nuanced part of social collaboration that can prompt errors or even offence between colleagues from various nations. Things like agreeable degrees of actual space, visually connecting, and signalling can be boundlessly unique across societies.

Indeed, even something as straightforward as a hello or handshake has social ramifications that should be viewed in the workplace. Business Insider set up this supportive infographic to feature the distinctions in handshakes and expert good tidings worldwide.

3 Conclusion

Different groups are better at critical thinking and independent direction. To begin with, they offer a wide range of viewpoints that would be useful. Second, they depend more on realities and utilise them to prove their positions. Just "being around

individuals who are not quite the same as we make more innovative, tenacious, and harder-working".

Individuals from various societies see the world in multiple ways. They are raised to have different needs and various convictions about what is conceivable and proper, and they learn other techniques for handling business (Anitha Kumari et al., 2023). That is a huge benefit when you want out-of-the-container thinking for your most recent task.

Your workers will all benefit if you deal with your multicultural group well. They will learn about different societies and how to collaborate across social hindrances. That can be a resource in their vocations. They may likewise get an opportunity to rehearse any unknown dialects they know, which is vital for staying familiar.

Multicultural personnel can help your company broaden into geographic and demographic areas that might otherwise be unaccustomed to your firm. Workers from other cultures, for instance, have a bosom knowledge of the foods people enjoy, the music they listen to, and even the styles and colours of clothing they find most acceptable. This is the knowledge that will be used in marketing your brand to new groups of consumers.

Multicultural supervisors contribute emphatically to group execution when they work in an exceptionally different climate; their impact could be more measurably huge in homogeneous conditions. In other states, the multilingual supervisor can further develop group execution through more professional correspondence and more tremendous consequences of authority in the group.

4 Recommendations

- Rather than zeroing in on a particular area of variety, making groups with various areas of variety has more worth.
- Utilising a different labour force with nearby marketing is shrewd.

Administrators' attributes, for example, their multicultural foundation and multilingual capacities, influence group execution. Specifically, these impacts become the most critical factor in different and global settings. Miniature establishment writing is encouraged to zero in on supervisors' internationalisation and multicultural foundations as a forerunner for global hierarchical execution.

References

Alshater, M. M., Khan, A., Hassan, M. K., & Paltrinieri, A. (2022). Islamic banking: Past, present and future. *Journal of College of Sharia & Islamic Studies, 41*(1), 351. https://doi.org/10.29117/jcsis.2023.0351

Anitha Kumari, S., Dost, A. B., & Bhadani, S. (2023). Design and automation of hybrid quadruped mobile robot for industry 4.0 implementation. In A. Nayyar, M. Naved, & R. Rameshwar (Eds.),

New horizons for industry 4.0 in modern business. Contributions to environmental sciences and innovative business technology. Springer. https://doi.org/10.1007/978-3-031-20443-2_8

Das, A., & Chanda, D. (2023). To trust or not to trust cybots: Ethical dilemmas in the posthuman organization. In A. Nayyar, M. Naved, & R. Rameshwar (Eds.), *New horizons for industry 4.0 in modern business. Contributions to environmental sciences and innovative business technology*. Springer. https://doi.org/10.1007/978-3-031-20443-2_9

Taha, R., & Taha, N. (2023). The role of human resources management in enhancing the economic sustainability of Jordanian banks. *Journal of Business and Socio-economic Development, 3*(2), 180–193.

Self-Efficacy in Career Decisions for Sustainable Decent Work and Economic Growth (UNSDG8) in Small Business: Effect of Firm Leadership and Management Factors

Vinod Joseph, T. Lavanya Kumari, and A. John William

1 Introduction

Small businesses are a critical element of a country's economy. In India, they are called as micro, small and medium enterprises [MSMEs]. They contribute 30% to the GDP employing 111 million people. The self-efficacy to their employment is an important element to the health of the sector. The firm environment of the sector plays one of the most critical roles in developing this among the employees. Self-efficacy in career decisions highly contributes to the UNSDG of decent work and economic growth. Leadership provided by the entrepreneur, supervisor and other managers plays a vital role in the learnings which the employees get regarding his career decisions. Enterprise orientation and culture are key determinants of firm success in small business. It is not only a societal or cultural concept, but also an individual characteristic. Therefore, the learnings of the employee in this element also play an important dimension in the efficacy of his career decisions. There are other characteristics of the work environment which also contribute to the understanding of a good career, and lastly, we have considered HRM practices also as a learning element (Fig. 1).

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Fig. 1 Factors effecting career decisions in the firm—by authors

2 Leadership at MSME

Subroto and Amalia understand leadership as the process of (a) relationships between employees and superiors under certain conditions, (b) enabling influence on the activities of people and groups to attain goals in different situations and (c) influencing the activities of people or groups to realise goals in a situation. They say that leadership plays a crucial role at both managing the MSME and its development. It is also the responsibility of the leader to manage various functions of the organisation, to ensure its survival and prosperity. Also, the responsibility maintains a positive and strategic bond between him and the employees to achieve employee performance and organisational goals. Covin and Slevin analyse the process of entrepreneurial leadership and stress upon the fact that it is (a) social process intended to facilitate discovery, (b) evaluation and exploitation of the entrepreneurial opportunities and (c) entrepreneurial leadership is a specific type of leadership and not merely a context in which leadership is undertaken; therefore, this type of leadership can be found even in big companies (Fig. 2).

Parthan has studied the leadership style in MSME and makes the following observation and suggestion for effective leadership in MSME. She says that leadership is essential for effective work of the employees and organisational effectiveness. The immediate supervisor has to be well trained and is expected to do the following activities: (a) hold one-to-one meetings with each employee once/twice a year to know his/her extent of satisfaction in the present job; (b) encourage two-way communication between the leader and employee to overcome any misunderstanding; (c) provide regular feedback to employees based on their performance; (d) be expressive and thank the employees when the job is completed and tough deadlines have been met; (e) ensure a healthy team and solve their problems; and (f) identify the weaknesses of the employees and help them overcome their weakness.

Fig. 2 Influence of leadership on career decisions—by authors

Renko et al. try to understand and also measure the entrepreneurial leadership style; in the process, they discuss inspirational leadership and transformational leadership in comparison to entrepreneurial leadership, develop a tool to measure entrepreneurial leadership and using the tool come to a conclusion that founder leaders exhibit more entrepreneurial leadership than non-founder leaders. The main points of the measurement scale are in the area of development of new products, radical improvements, risk taking, creative solutions to problems, passion for work, vision of the future, high expectations of the employees and challenges in the current ways of doing the business. Simba and Thai in their detailed analysis of the nature of entrepreneurship and leadership in the MSME sector are able to develop a model of leadership for the small-scale sector, with its main ingredients being macro-environmental analysis, business management of MSME, leaders' functional and self-competencies, entrepreneurship leadership practice, enhanced functional and self-competencies and the output being entrepreneurial thinking and behaviour, and a practical effective business model. Melawar and Nair are impressed with the leadership of the MSME sector in the state of Chhattisgarh and also compliment the government for sustainable development and progressive policies. Worker retention and satisfaction are also high. They studied the leadership role of four successful MSMEs and came to the conclusion that technical mastery and people management were the key attributes of their success. In the area of technical mastery, they were forward looking adopting the latest technologies and training their employees with it, they had a plan for the future and they were synchronous with the employees. From the people perspective, they gave importance to their customers and employees, they were aware of their strength areas and they had a plan of action.

Donald F. Kuratko, in analysing entrepreneurial leadership for the twenty-first century, says that innovation is the essence of entrepreneurial leadership and is very vital as we are presently experiencing an entrepreneurial revolution. In this revolution, entrepreneurship is more than creation of a business. He however calls for being aware of the dark side of entrepreneurial leadership with respect to (a) confrontation with risk, financial, career, family, social and psychic risks, and (b) entrepreneurial

ego, which he defines as an overbearing need for control, a sense of distrust, an overriding desire for success or unrealistic optimism. Claire M. Leitch and Thierry Volery, in their article on entrepreneurial leadership insights and direction, analyse various leadership definitions and come to the conclusion that the concept lacks clarity and gives it an emergent status. He says that entrepreneurial leadership is the role performed by the leader in entrepreneurial ventures, rather than a more general sense of an entrepreneurial style of leadership. Glenn, in his thesis on the study of leadership in small business, found transformational and transactional leadership to be more effective than laissez-faire leadership style.

3 Enterprise Orientation

Salaman and Storey, in the paper of understanding enterprise, say that the enterprise is not just a firm free from bureaucracy and try and develop an empirically based understanding of it. The political level consists of various notions, calculations, strategies and tactics. The organisational level consists of arrangements that orchestrate, maximise and constrain the actions and capacities of individuals. The individual level consists of how the individuals seek to achieve a desired state. Carr and Beaver, in understanding the enterprise, have identified the enterprising traits and activities of an individual as risk taking, initiative, creativity, flexibility, independence, strong work ethic, leadership, daring spirit and responsibility. They say that government intervention schemes and programmes have a strong impact on the evolution of the enterprise culture (Fig. 3).

Enterprise culture is the institutionally embedded relations of the government, which influences and transforms the mindset and conduct of the population.

Burrows and Curran say that enterprise culture is an entity that exists outside the government and is used by government as a means to counteract the dependency culture as well as provide a range of government policies. Leaders like Margaret Thatcher emphasised the need for a moral revolution along with the economic one. Economic challenges are routed in human nature; therefore, enterprise culture can be

Fig. 3 Influence of enterprise orientation on career decisions—by authors

said to be residing in individuals and institutional activities. Gibb has studied the enterprise culture and formulated a model to understand the enterprise culture better. In the model, the enterprising behaviours, skills and attributes identified by him are (a) enterprising skills: problem-solving, creativity, planning, negotiating, persuasiveness and decision-making; (b) enterprising attributes: self-confident, versatile, autonomous, achievement oriented, dynamic and resourceful; and (c) enterprising behaviours: acting independently on own initiative, coping with and enjoying uncertainty, actively seeking to achieve goals, flexibility in responding to challenges, taking risky actions in uncertain environments, opportunity seeking, solving problems/conflicts creatively, commitment to make things happen and persuading others.

Gray, in his article on enterprise and culture, says that enterprise which was figuratively used to describe the energy, application and ingenuity of people who successfully work in businesses and companies, or generally show skill at overcoming problems, is now mere noun and adjective. The author says that small business policy has failed mainly due to psychological and social factors and not merely economic factors. He says that the individualism-oriented policy has contributed to its failure. He contends that it is not required to give such high importance to the amorphous figure of the 'entrepreneur' in economic development policy. The author argues for a collective approach and a model based on progressive capitalism to form the right enterprise culture.

Mascarenhas, in his article building an enterprise culture in the public sector, talking of the initiatives of different countries, says that (a) Britain, the pioneer in many respects, did not look at efficiency but rather altered the power relationship between the two sectors, giving more importance to the private sector; (b) in New Zealand, privatisation and restructuring were adopted as a device to reduce the role of the public sector; and (c) Australia adopted the opposite position from that of Britain by seeking a consensus wherein the government and the public service with the cooperation of the unions sought to achieve a process of modernisation to improve public sector efficiency. Williams and Nadin argue that there is a lot of hidden enterprise culture in the informal sector of small business; therefore, they should be encouraged and motivated to come into the formal sector. Paul and Xiao attribute the success of Chinese township and village enterprises (TVEs) to their collective ownership, which creates a favourable enterprise culture resulting from better organisational behaviour, more enterprise commitment, better worker attitudes and better organisational structure.

4 Work Environment at MSME

Taiwo, in the article on the influence of work environment on the productivity of workers, says that 86% of the problems in productivity lie in the work environment of the firm. He urges the central and state governments to take measures to improve the infrastructural facilities to improve worker productivity. Sutisna et al. in their study on employee engagement at MSME, Bandung city, West Java, found that

there were four areas that influenced employee engagement: enjoyability of the work, full support by the family regarding the work or business, a sense of attachment to the work or business and the support of the government towards the work or business. These 4 accounted for nearly 70% of the engagement factors out of the total 13. It found that the voluntary turnover of key employees has an adverse effect on productivity and profitability of the firm.

Rose et al. in the study of the paper on work environment and bottom line, say that there is no sufficient knowledge to understand the economic impact of working environment; he says that this is the cause of poor managerial decision-making. In a work environment improvement study, it was found that only 2% of the financial benefits were attributed to sick leave cost savings, but 98% of the benefits were due to productivity and quality improvements. Subroto and Amalia, in their analysis of leadership and work environment, understand work environment as all of the things around the employee that influence their way of working. He identified the following, comprising the physical environment, such as lighting, temperature, humidity, air circulation, noise, mechanical vibration, odour, colour of layout and facilities, decorations, music, and safety and security measures (Fig. 4).

Yeboah and Abdulai, studying a three-star hotel using Herzberg's motivation hygiene theory, found that the theory was highly relevant with high levels of motivators and hygiene factors in their departments, and monetary compensation had a very significant influence on the performance of employees. Jeff and Bob, in their study on training in small business, came to the conclusion that the fundamental challenge of trainers and key to their effectiveness in the small business are to transform themselves and their knowledge into forms that can be associated with the small business. Advice that conflicts with the culture, learning styles and communication modes is destined to be ineffective. So, the trainers should be willing to immerse themselves in the small business context in order to understand it from inside out. Else it leads to confrontation with the owner/proprietor. Peter and Graham, in their study of small businesses failure, say that only rarely is the root cause problem of a small business failure analysed. He attributes most of the failures to lack of management attention to strategic issues, pursuing personal objectives which inhibit the probability of success, and not appreciating the fact that management of small business is unique and not a miniature of big business management,

Fig. 4 Influence of work environment on career decisions—by authors

and the multiplicity of the role played by the owner/manager enhances the probability of poor decision-making. Successful small firms practise strategic management either consciously and visibly or unconsciously and invisibly.

Chandrasekhar, in his article on workplace environment and performance, identifies poorly designed workstations, unsuitable furniture, lack of ventilation, inappropriate lighting, excessive noise, insufficient safety measures in fire emergencies and lack of personal protective equipment as some of the drawbacks of the physical environment. Jeffrey and Dennis, in their article on strategic management of small business, compare the approaches the firm takes in hostile and benign environments and say that they are very different in many ways. The high-performance characteristics in hostile environments are an organic structure in a long-term goal, high product/service prices and a conformance to industry trends. The high-performance characteristics in benign environments include a mechanistic structure, a conservative financial management without risks, immediate profitability, upgradation of products and services and a maintenance of strong customers.

5 HRM Practices at MSME

Savitha, in her paper on HR practices of human resources in MSME in Chennai, notes the importance of HR practices for improvement in organisational efficiency and effectiveness, employee satisfaction and contribution of the MSME sector. Her research was divided into critical HR functional areas of research and found that a good appreciation exists among the employees of the positive steps taken in those areas. Singh et al. in their paper on the mediating effect of HR practices and innovative work behaviour, found that there is a positive correlation between good HR practices and innovative work behaviour. They however also found that performance-based evaluation and reward are not positively related to innovative work behaviour in MSMEs. Gakhar and Kour, in their article, consider MSME as a nursery of entrepreneurship, driven by individual creativity and innovation. They compare the employment data between the large and small industries and conclude that employability and satisfaction in large enterprises have been better. They suggest more formalisation of HR practices and establishment of an HR department. For increasing the efficiency, a group of firms can have a common HR department. They acknowledge the existence of many innovative HR practices in Indian MSMEs.

Shah and Tewari, in the case analysis at Gaglani Metals, conclude about the ad hoc and informal structures of the HR department with a lack of professionalism. Also schemes like MNREGA have effectively blocked the availability of skilled and unskilled workers in the manufacturing activity in MSMEs. The firm suffers from labour absenteeism and turnover. The HR problems in the firm have become more pressing to handle than even the financial issues. The firm requires a professional as well as a customised solution to its HR activities. Bajpai et al. in their paper on HR practices in Indian SMEs, came to the conclusion that HR practices affect the

Fig. 5 Influence of HR practices on career decisions—by authors

performance of MSMEs and a socially responsible and ethical HR creates a family-like atmosphere in the firm. The study confirms the use of indigenous HR practices in the firms but advocates more formal HR practices. As a transition mechanism, it may use a mix of both indigenous and formal HR practices (Fig. 5).

Jan et al. in the article on professional HR practices in family-managed enterprises, confirm the previous research premise that there exists a negative relationship between family ownership and professional HRM practices. Susan and Rowena, in the science and practice of HRM in small firms, try to identify the reasons for informality of HR in small firms and conclude that the following factors need to be taken into account: (a) connection of small firms in their environment; (b) conditions of the product and labour markets; (c) lack of recognition of the owner/manager for the need to delegate; (d) desire for 'fit', which requires the employee to be part of a small work group; (e) reliance on the human capital vested in the owner/entrepreneur's experience; and (f) confidence on the unique or idiosyncratic nature of employees' skills and knowledge, management structure and leadership style of the owner/manager. Jean, in the article on 'quest for the best', says that high-performance organisations outperform their competitors on a number of HR factors. These include level of teamwork, openness among co-workers, training and development opportunities, and degree of pro-activity in HR planning. To develop this capability, there needs to be a realisation that effective human resource management is the basis for the competitiveness of organisations.

6 Conclusion

The UNSDG of decent work and economic growth is a goal to be strived for in the Indian economy, and one of the best places to strive for it is the MSME sector, as it is the second largest employer after agriculture in India. MSME has a turbulent and dynamic nature, and employees have less education.

One of the prerequisites of good functioning of this sector is not only confident entrepreneurs but also confident employees with the right attitudes, skills and competencies. Self-efficacy in career decisions needs to be present. The chapter

has tried to analyse the learning of the employees that enhances their self-efficacy from the dimensions of leadership, enterprise orientation, work environment and HR practices.

The chapter comes to the conclusion that all four play a critical role in developing learning, regarding improving self-efficacy in career decisions. The employees should have the capability to learn from the experiences of leadership in the firm. Learning from enterprise culture, even though comes from within the firm, can be enabled also at the societal and individual levels. Work environment and HR practices also provide learning to the employee regarding self-efficacy in his career decisions.

7 Recommendations

(a) The government should seriously consider compulsory registration of all businesses to have a better connection with them for grooming, announcements, training and general documentation purposes. In the emerging dynamic business environment, it is essential to have more continuous detailed analysis.
(b) An online training programme, consisting of diffident levels of complexity, should be made available to all small businesses. It should have various areas such as leadership, enterprise culture, work environment, effective HR practices and others.
(c) The training programmes should be not only for the entrepreneurs, managers and supervisors but also for the employees. It should be made available in different languages. Efforts should be made to make it available to the entry-level workers of all departments.
(d) Building an enterprise-oriented culture at the individual level should be a strong consideration in infrastructure development, support and policies. The new education policy, which already strongly considers this, should not dilute it in the implementation phase.

Not Just for Investment and Job Search: The Role of Earnings Announcement as a Driver of Cyber Risks

Fadhila Hamza

1 Introduction

Earnings announcement is one of the accounting and corporate finance topics that has long attracted the attention of scholars and practitioners. However, as the problem of information asymmetry became an area of research, theoretical and empirical research began to reveal the complexity of information disclosure in principal-agent organizational frameworks. The idea that increased disclosure reduces the undiversifiable risk premium applied to discounting companies' future cash flows remains valid, but the research is inconclusive. Several studies, dating back to the 1920s and 1930s, have found that greater disclosure is beneficial to both the company and its stakeholders such as investors, debtors, and job seekers; however, others revealed the negative consequences of higher disclosures for them.

As earnings announcement is mainly interesting for investors, Diamond and Verrecchia (1991) were the first to model the beneficial effect of disclosure on the cost of capital. Later, several papers offered additional empirical evidence on the consequences of different disclosure characteristics, with different methods and mixed results. Yet, earlier contributions have not lost their cogency: Landsman and Maydew (2002) state how the information content of quarterly earnings disclosures increases over time, which also supports Beaver's (1968) relevance to specific measures. Voluntary disclosure reduces information asymmetry and improves stock market liquidity (Welker, 1995), returns, perceptions of corporate and institutional ownership (Healy et al., 1999), and stock trading volume (Leuz & Verrecchia, 2000). Market responses to volume can also be interpreted as a measure of

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divergence (Garfinkel & Sokobin, 2006). Increased reporting frequency diminishes information asymmetries and equity costs, and there is no evidence of a difference between mandatory and voluntary disclosures (Fu et al., 2012), but in Australia, Chan and Watson (2011) found a positive correlation between corporate diversifications and voluntary disclosure. On the other hand, lack of transparency in reporting is empirically related with higher capital costs and fewer stock transactions (Bhattacharya et al., 2003; Francis et al., 2005; Barth et al., 2013).

Furthermore, earnings announcement is interesting for debtors. Sengupta (1998) and Francis et al. (2005) highlighted the positive role of earnings announcements in debt capital. Debtors are interested in raising their debt capital cost in exchange for greater accounting flexibility to avoid the costs of default and double reporting (Beatty et al., 2002).

Recently, Choi et al. (2019, 2022) studied the interesting role of earnings announcement for job seekers. The authors found that the announcement of a company's earnings stimulates the search for job for that company. They paid particular attention to job search activity in the 9 weeks subsequent to the announcement. The results show that job searches were invariant during the preannouncement period (from the week −4 to week −1). During the week of the event (week of the announcement), they saw an increase in job seekers. This order of magnitude was 6% of the average proportional search, which is equal to 19 additional searches per week for the company. From the company's point of view, earnings announcements attract the attention of job seekers equivalent to 2% of the company's workforce. According to Choi et al. (2019), this 2% increase is economically important compared to the 9% average trimestral employee's turnover rate. The authors saw that this abnormal volume of job searches stays for more than 1 week following the earnings announcement. They also found that the growth of job searches at earnings announcements is proportional to the yearly earnings growth. Consequently, the previous analysis confirms the information content of the earnings announcements for job seekers who are directed in their job search by the firm's financial performance.

Contrary results are attained by other researchers and showed the negative effect of earnings announcement on the company. Bushee and Noe (2000) believe that more disclosure attracts investors interested in short-term performance, which raises the stocks' volatility and engenders long-term negative performance (Lang & Lundholm, 2000). Similarly, other studies stated that quarterly reporting causes an increase in stocks' volatility (Botosan & Plumlee, 2002), increases managers' short-termism (Gigler et al., 2014), and produces high indirect costs by accentuating agency problems and raising manager's compensation without increasing the firm's value (Hermalin & Weisbach, 2012). More recently, responses to earnings announcements have been found to be largely influenced by market uncertainty, risks, and emotions (Bird et al., 2014) and earnings quality (Ecker et al., 2006), but behavioral effects have not yet been investigated.

In addition to these negative effects of earnings announcement as a driver of short-term investors and managers, agency costs, and stocks' volatility, we aim in this study to highlight the role of the earnings announcement as a driver of the cyber

incidents and its associated costs. This study will contribute, theoretically, to deepening the understanding of the increasing effect of cyber threats and the "cost" companies may incur by cyber breaches, and, empirically, to investigating the information content of the earnings announcement for cyberattackers by testing the impact of earnings announcement on the size and the type of cyber incidents.

This chapter is structured as follows: in section two, the related literature on earnings disclosure and cyber incidents is emphasized; section three defines the study data and the methodology used; in section four, the empirical findings are presented and discussed; and finally, section five presents conclusions, implications, and future research suggestions.

2 Literature Review and Hypothesis Development

Cyber risks have become a significant risk source for enterprises. Recently, risk consultants concluded that the most central operational risks were cyber risk and data breaches. PwC's survey of global CEOs has found that the majority of them estimate cybersecurity and data security to threaten partners' trust in their firms within the following 5 years. Cyberattacks are costly to an organization as they may cause system costs, remediation and mitigation costs, litigation costs, potential fines, and potential reputational damage as stakeholders may not be willing to participate in organizational transactions on the same conditions.

Regardless of the extensive recognition of the cyber risk's hazard and its importance as an emergent type of risk, there are few evidences of predictors, specifically characteristics of organizations targeting cyber risk. Kamiya et al. (2021) pioneered the study of the characteristics of firms expected to be more affected by cyber breaches. Therefore, the authors compared the characteristics of successfully attacked companies (which they marked as targets) and unsuccessfully attacked companies (which they marked as nontargets). As they focused only on cyber incidents that cause the damage of personal information and were subject to cyberattack reporting laws, the sample they employed in their study was representative of the population of successful attacks in which targets complied with current disclosure requirements. Focusing on enterprise-level characteristics, Kamiya et al. (2021) found that companies that had experienced a cyberattack were larger, older, and more influential among Fortune 500 firms than those that had not. These results suggest that the target companies in the used sample are more well known than the nontarget companies, more financially performant, and less risky with high future growth prospects and have less investment in innovation, high debt level, and high intangible assets. Additionally, Kamiya et al. (2021) also found that among target companies, the proportion of companies with a risk committee in the board of directors is higher than that of nontarget companies.

Regarding industry-specific characteristics, Kamiya et al. (2021) found that cyberattacks were more common among firms operating in industries with less competitive product markets. In addition, the authors add corporate governance

characteristics, such as CEO-chairman duality, board independence, and board size, to scrutinize whether the corporate governance effectiveness can predict the probability of cyber incidents. They are definite that none of these variables mattered. This finding appears to be specific to cyber risk, as Chernobai et al. (2011) found that effective corporate governance has a significant effect in decreasing operational risk for American financial institutions. Furthermore, Kamiya et al. (2021) pointed out that among the main industries, the more vulnerable to cyberattacks are services, wholesale, retail, transportation, and communications. Yet, the likelihood for the financial sector is not significant. Generally, the outcomes in the study of Kamiya et al. (2021) propose that cyberattacks are more probable to happen in well-known companies with higher valuations and higher intangible assets, with no risk committee in the board and which act in less competitive industries.

Accordingly, we hypothesize the following:

H1 Earnings announcement affects the number of cyber incidents that a company may suffer.

H1′ Earnings announcement affects the size of data breach that a company may suffer.

H2 The type of data breach affects the number of cyber incidents that a company may suffer.

H2′ The type of data breach affects the size of data breach that a company may suffer.

3 Methodology

Given the previous premises, the purpose of this study is to scrutinize the effect of earnings announcement as a driver of cyberattack. Specifically, we consider the variability in the number of cyber incidents and the size of data breaches with two groups of companies: companies that published an earnings announcement within 10 days prior to the breach and companies that did not publish. Similarly, we specifically consider the variability in the number of cyber incidents and the size of data breaches with two types of cyberattacks: intentional attack (fraudulent incident) and unintentional attack (non-fraudulent incident). To assess the differential impact of the two categorical explanatory variables on the two metrics-dependent variable, multivariate analysis of variance (MANOVA) is employed. At the best of our knowledge, this is the first research that considers the impact of earnings disclosure on the firm's cybersecurity.

3.1 Sample and Data

The aim of this study is to test empirically the impact of earnings announcement and the type of attacks the firm suffered each year on both the size and number of attacks. To test the above hypothesis, we use data published by Rosati and Lynn (2021) in Mendeley Data repository under the ID number: 10.17632/w33nhh3282.1.

The original dataset used by authors included all 4552 cybersecurity incidents disclosed by all organizations in the USA as published in https://privacyrights.org/data-breaches. From this dataset, they selected only incidents that affected firms listed on the New York Stock Exchange (NYSE) or NASDAQ during the period 2005–2015. To this list, authors added (1) the firms' ticker symbol, gvkey, and CUSIP code and (2) information about the announcements made (they searched on LexisNexis 1 whether the infected firm has made any announcement prior to the incident).

As shown in Table 1, this study's original sample includes 506 incidents, from which we excluded 234 incidents because of missing data concerning breaches' size. Thus, the final sample includes 272 incidents repartitioned by 243 affected companies.

3.2 Variables and Method

The aim of this study is to investigate the informational content of the earnings announcement for cyberattackers. We hypothesize that the earnings announcement done by the company attracts the perpetrators (breaches' number) and influences the breaches' size.

Table 1 Sample's profile distributed by year

Year	Initial number of incidents	Missing data (breach size)	Final number of incidents	Number of affected companies
2005	28	8	20	18
2006	76	11	65	58
2007	66	29	37	31
2008	36	13	23	22
2009	20	6	14	13
2010	65	40	25	23
2011	60	26	34	29
2012	48	23	25	25
2013	61	40	21	16
2014	43	36	7	7
2015	3	2	1	1
Total	506	234	272	243

Table 2 Dependent and independent variable measures

Variable label	Variable	Measure
Dependent variables		
Breach size	The size of the breach	Equals the number of records affected by the breach
Breach number	The number of breaches by company yearly	Equals the number of breaches by company yearly
Independent variables		
Earnings	Earnings announcement	This field is equal to 1 if the affected company published any earnings announcement in the 10 days prior to the incident, and 0 if not
Breach type	"Type of data breach as classified by the privacy rights clearinghouse: • CARD: Fraud involving credit/debit cards not via hacking • HACK: Hacked by a malicious outside party or infected by a malware • INSD: Incident due to a malicious insider • PHYS: Incident due to lost, discarded, or stolen physical device or documents • PORT: Incident due to lost, discarded, or stolen laptop, smartphone, memory stick, CDs, hard drive, etc. • STAT: Incident due to lost, inappropriately accessed, discarded, or stolen computer or server not designed for mobility • DISC: Unintended disclosure of sensitive information not involving hacking, intentional breach, or physical loss"	This field is equal to 1 if the breach is intentional (CARD/HACK/INSD/PHYS/PORT/STAT), and 0 if the breach is unintentional (DISC)

The multivariate analysis of variance (MANOVA) is used to test the relationship between two dependent variables (breach size, breach number) and two independent variables (earning, breach type)

The measures of the dependent and independent variables discussed earlier in the literature review are shortly defined and presented in Table 2.

Table 3 Summary of descriptive statistics and correlations

	Variable	*N*	Mean	Standard deviation	Correlations	
					1	2
Dependent variables	1. Breach size	272	8.8673	3.77277	1	0.00329 (0.834)
	2. Breach number	272	1.363970	0.72633	0.00329 (0.834)	1
Independent variables	1. Earning	272	0.22	0.415	1	−0.05* (0.029)
	2. Breach type	272	0.83	0.372	−0.05* (0.029)	1

*Correlation is significant at 0.05 level (two-tailed)

Table 4 Detailed descriptive statistics by group

	Earning	Breach type	Mean	Std. deviation	*N*
Breach size	No	Unintentional	8.822045	3.83531	33
		Intentional	9.016208	3.69373	179
		Total	8.9860	3.70751	212
	Yes	Unintentional	8.587432	4.371667	12
		Intentional	8.413079	3.949108	48
		Total	8.447949	3.99895	60
	Total	Unintentional	8.759482	3.935322	45
		Intentional	8.888674	3.748346	227
		Total	8.867301	3.772774	272
Breach number	No	Unintentional	1.606060	0.78817	33
		Intentional	1.379888	0.7723	179
		Total	1.415094	0.777259	212
	Yes	Unintentional	1.25	0.452267	12
		Intentional	1.166666	0.476393	48
		Total	1.183333	0.469102	60
	Total	Unintentional	1.511111	0.726831	45
		Intentional	1.334801	0.724279	227
		Total	1.363970	0.72633	272

4 Results and Discussion

4.1 Descriptive Statistics and Correlations

The summary of mean, standard deviation, and correlations is presented in Table 3. Analysis shows a positive and nonsignificant correlation between the dependent variables, breach size and breach number ($r = 0.00329$, $p > 10\%$), and a negative and significant correlation between the independent variables, earning and breach type ($r = -0.05$, $p < 5\%$). Results indicate that the model's variables fit well.

Table 4 presents details about the overall and group means and standard deviations for each dependent variable in turn. It shows that the group of firms that realized earnings announcement are slightly fewer than the group of firms that did not realize for both breach size ($M = 8.4479$; SD $= 3.99895$/$M = 8.9860$; SD $= 3.70751$) and breach type ($M = 1.1833$; SD $= 0.4691$/$M = 1.4151$; SD $= 0.7772$).

4.2 Results of MANOVA Analysis

4.2.1 Equality of Covariance Matrices

Table 5 shows the box tests for the assumption of equality of the covariance matrices. The statistic is not significant, $p = 0.185$ (greater than 0.05), so the covariance matrix is about the same as assumed.

4.2.2 Multivariate Tests

As presented in Table 6, the MANOVA test results show that earnings announcement made by companies is significant to cyberattack perpetrators' behavior expressed by the breaches' size and number (Wilks' $\lambda = 0.9823$; $F = 2.40$; $p < 0.1$). Thus, we may confirm that after disclosing earnings information, the number of cyberattacks rises and the size of data breaches becomes larger. These findings confirm the important evidenced role of earnings disclosures in the behavior of market participants, which may be positive or negative depending on the intention of the participant. Contrary to our results, the positive effect was earlier highlighted by the pioneer research of Beaver (1968), which measured the abnormal volume and abnormal return volatility resulted by the earnings announcement, and the research of Ball and Brown (1968), which measured the earnings response coefficient; in addition, a large literature, later, has examined the impact of earnings disclosures on share prices and highlighted the information content of firms' financial performance for investors, media, and job seekers. Following these studies, Beaver et al. (2018) used a distribution-free test to examine if information disclosed on earnings

Table 5 Box's test

Box's test of equality of covariance matrices[a]	
Box's *M*	17.102
F	1.347
*df*1	12
*df*2	4620.865
Sig.	0.185

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups

[a]Design: Intercept + earning + breach type + earning × breach type

Table 6 Multivariate test results

Effect		Value	*F*	Hypothesis df	Error df	Sig.
Intercept	Wilks' lambda	0.9682	1.45[b]	6.000	534.000	0.1944
	Pillai's trace	0.0318	1.44	6.000	536.000	0.1956
	Hotelling's trace	0.0327	1.45	6.000	532.000	0.1932
	Roy's largest root	0.0304	2.72	3.000	268.000	0.0449
Earning	Wilks' lambda	0.9823	2.40[b]	2.000	267.000	0.0926
	Pillai's trace	0.0177	2.40[b]	2.000	267.000	0.0926
	Hotelling's trace	0.0180	2.40[b]	2.000	267.000	0.0926
	Roy's largest root	0.0180	2.40[b]	2.000	267.000	0.0926
Breach type	Wilks' lambda	0.9951	0.66[b]	2.000	267.000	0.5192
	Pillai's trace	0.0049	0.66[b]	2.000	267.000	0.5192
	Hotelling's trace	0.0049	0.66[b]	2.000	267.000	0.5192
	Roy's largest root	0.0049	0.66[b]	2.000	267.000	0.5192
Earning[a] breach type	Wilks' lambda	0.9987	0.17[b]	2.000	267.000	0.8411
	Pillai's trace	0.0013	0.17[b]	2.000	267.000	0.8411
	Hotelling's trace	0.0013	0.17[b]	2.000	267.000	0.8411
	Roy's largest root	0.0013	0.17[b]	2.000	267.000	0.8411

[a]Design: Intercept + Earning + Breach_Number + Earning × Breach_Number
[b]Exact statistic

announcement time drives higher price review than information disclosed at other periods. The authors found that the relative price review equals 2.54 in earnings disclosure periods from 1971 to 2011, compared to an average of 1.18 in nondisclosure times. They concluded a convincing evidence that earnings announcements cause greater price revision than occurs in non-earnings announcement periods. Therefore, firms intentionally choose to disclose essentially good performance news while considering the costs associated with participants' reaction and process (Verrecchia, 1983), information diffusion plans concerning media and investors' attention (Doyle & Magilke, 2009), and job search volume (Choi et al., 2022; Kothari et al., 2009).

However, similar to our results, the negative effect of earnings announcement was evidenced by Kamiya et al. (2021) who found that firms are more affected by cyberattacks when they are "larger, included in the list of Fortune 500 companies, financially less constrained, and more highly valued and have more intangible assets." Accordingly, profitable firms are targets to cyberattack perpetrators who pay high attention to the firms' earnings announcement. This finding is contrary to some previous studies which found that small and medium companies are more vulnerable to be affected by cyber risks (Alahmari & Duncan, 2020).

Concerning the effect of the type of cyberattack (intentional or unintentional) on cyberattack perpetrators' behavior expressed by the breaches' size and number, results presented in Table 6 show that there is a nonsignificant effect (Wilks' $\lambda = 0.9951$; $F = 0.66$; $p > 0.1$) and confirm that the occurrence of fraudulent attacks does not increase the number and size of cyber incidents. Our findings are contrary to

the previous literature on fraud (e.g., Tak, 2011), which showed that the fraud occurrence influences the firm's risk management perception by different stakeholders. Authors considered that fraud occurrence is a sign of internal control weakness, so an effective internal control system is the main tool of prevention, detection, and correction of fraud and security risks in general. Furthermore, Barra (2010) found that internal control only is not enough to completely prevent fraudulent attacks; however, it is imperative for companies to have strategic and efficient anti-fraud means.

5 Conclusion

This study enlarges the research on the information content of earnings disclosure and emphasizes the association between earnings announcement and cyber incidents' characteristics by providing an academic and practical contribution. Originally, from a theoretical viewpoint, this study contributes to the few researches studying the negative effect of earnings announcement on market participants' behavior by providing an analysis of the influence of such disclosure on cyberattack perpetrators' behavior. The study contributes theoretically, also, to the governance theory literature by shedding light on the importance of giving more attention to cyber risks' management as one of the more contemporary risks. Empirically, the study provides an evidence concerning the relationship between earnings announcement and cyber incidents' size and number per year.

From a practical viewpoint, the findings of this study help managers, internal auditors, and corporate governance bodies to focus more on cyber risks as a real threat of the company's assets and information security and to understand the main predictors of those risks. Furthermore, it extends the awareness about the key consequences of earnings disclosure.

However, the reported findings have some limitations. Mainly, it is important to consider other predictors of cyber risks, particularly, the inclusion of some firms' characteristics (profitability, size, leverage, . . .). Furthermore, as a future research suggestion, we invite scholars to focus on the governance system effectiveness' indicators, the risk management strategies, and the audit features, when studying the companies' strategies to prevent, detect, and correct cyber risks.

References

Alahmari, A., & Duncan, B. (2020). Cybersecurity risk management in small and medium-sized enterprises: A systematic review of recent evidence. In *International conference on cyber situational awareness, data analytics and assessment (CyberSA)* (pp. 1–5). IEEE. https://doi.org/10.1109/CyberSA49311.2020.9139638

Ball, R., & Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research, 6*, 159–178.

Barra, R. A. (2010). The impact of internal controls and penalties on fraud. *Journal of Information Systems, 24*(1), 1–21. https://doi.org/10.2308/jis.2010.24.1.1

Barth, M. E., Konchitchki, Y., & Landsman, W. R. (2013). Cost of capital and earnings transparency. *Journal of Accounting & Economics, 55*(2–3), 206–224. https://doi.org/10.2139/ssrn.1348245

Beatty, A., Ke, B., & Petroni, K. R. (2002). Earnings management to avoid earnings declines across public and privately held banks. *Accounting Review, 77*, 47–70.

Beaver, W. H. (1968). The information content of annual earnings announcements. *Journal of Accounting Research, 6*, 67–92.

Beaver, W. H., McNichols, M. F., & Wang, Z. Z. (2018). The information content of earnings announcements: New insights from intertemporal and cross-sectional behavior. *Review of Accounting Studies, 23*(1), 95–135.

Bhattacharya, U., Daouk, H., & Welker, M. (2003). The world price of earnings opacity. *The Accounting Review, 78*(3), 641–678.

Bird, V., Leamy, M., Tew, J., Le Boutillier, C., Williams, J., & Slade, M. (2014). Fit for purpose? Validation of a conceptual framework for personal recovery with current mental health consumers. *Australian and New Zealand Journal of Psychiatry, 48*(7), 644–653.

Botosan, C., & Plumlee, M. (2002). A re-examination of disclosure level and the expected cost of equity capital. *Journal of Accounting Research, 40*, 21–40.

Bushee, B. J., & Noe, C. F. (2000). Corporate disclosure practices, institutional investors, and stock return volatility. *Journal of Accounting Research, 38*, 171–202. https://doi.org/10.2307/2672914

Chan, M. C., & Watson, J. (2011). Voluntary disclosure of segment information in a regulated environment: Australian evidence. *Eurasian Business Review, 1*(1), 37–53.

Chernobai, A., Jorion, P., & Yu, F. (2011). The determinants of operational risk in US financial institutions. *Journal of Financial and Quantitative Analysis, 46*(6), 1683–1725.

Choi, B.-G., Choi, J. H., & Malik, S. (2022). Not just for investors: The role of earnings announcements in guiding job seekers. *Journal of Accounting and Economics, 76*, 101588. https://doi.org/10.2139/ssrn.3744498

Choi, J. H., Gipper, B., & Malik, S. (2019). Financial reporting quality, turnover risk, and wage differentials: Evidence from worker-level data. *SSRN Electronic Journal*, 1–57.

Diamond, D. W., & Verrecchia, R. E. (1991). Disclosure, liquidity, and the cost of capital. *The Journal of Finance, 46*(4), 1325–1359.

Doyle, J. T., & Magilke, M. J. (2009). The timing of earnings announcements: An examination of the strategic disclosure hypothesis. *The Accounting Review, 84*(1), 157–182. https://ssrn.com/abstract=995580

Ecker, F., Francis, J., Kim, I., Olsson, P. M., & Schipper, K. (2006). A returns-based representation of earnings quality. *The Accounting Review, 81*(4), 749–780. https://doi.org/10.2308/accr.2006.81.4.749

Francis, J., LaFond, R., Olsson, P. M., & Schipper, K. (2005). The market pricing of accruals quality. *Journal of Accounting and Economics, 39*(2), 295–327.

Fu, R., Kraft, A., & Zhang, H. (2012). Financial reporting frequency, information asymmetry, and the cost of equity. *Journal of Accounting and Economics, 54*(2–3), 132–149. https://doi.org/10.1016/j.jacceco.2012.07.003

Garfinkel, J. A., & Sokobin, J. (2006). Volume, opinion divergence, and returns: A study of post-earnings announcement drift. *Journal of Accounting Research, 44*(1), 85–112. https://doi.org/10.1111/j.1475-679X.2006.00193.x

Gigler, F., Kanodia, C., Sapra, H., & Venugopalan, R. (2014). How frequent financial reporting can cause managerial short-termism: An analysis of the costs and benefits of increasing reporting frequency. *Journal of Accounting Research, 52*(2), 357–387. https://doi.org/10.1111/1475-679X.12043

Healy, P. M., Hutton, A. P., & Palepu, K. G. (1999). Stock performance and intermediation changes surrounding sustained increase in disclosure. *Contemporary Accounting Research, 16*(3), 485–520.

Hermalin, B. E., & Weisbach, M. S. (2012). Information disclosure and corporate governance. *Journal of Finance, 67*(1), 195–233. https://doi.org/10.1111/j.1540-6261.2011.01710.x

Kamiya, S., Kang, J. K., Kim, J., Milidonis, A., & Stulz, R. M. (2021). Risk management, firm reputation, and the impact of successful cyberattacks on target firms. *Journal of Financial Economics, 139*(3), 719–749. https://doi.org/10.1016/j.jfineco.2019.05.019

Kothari, S. P., Shu, S., & Wysocki, P. D. (2009). Do managers withhold bad news? *Journal of Accounting Research, 47*, 241–276. https://doi.org/10.1111/j.1475-679X.2008.00318.x

Landsman, W. R., & Maydew, E. L. (2002). Has the information content of quarterly earnings announcements declined in the past three decades? *Journal of Accounting Research, 40*(3), 797–808.

Lang, M. H., & Lundholm, R. J. (2000). Voluntary disclosure and equity offerings: Reducing information asymmetry or hyping the stock? *Contemporary Accounting Research, 17*(4), 623–662.

Leuz, C., & Verrecchia, R. (2000). The economic consequences of increased disclosure. *Journal of Accounting Research, 38*(1), 91–124.

Rosati, P., & Lynn, T. (2021). A dataset for accounting, finance and economics research on US data breaches. *Data in Brief, 35*, 106924. https://doi.org/10.1016/j.dib.2021.106924

Sengupta, P. (1998). Corporate disclosure quality and the cost of debt. *The Accounting Review, 73*(4), 459–474.

Tak, I. (2011). Impacts and losses caused by the fraudulent and manipulated financial information on economic decisions. *Revista de Management Comparat International, 12*(5), 929–939.

Verrecchia, R. (1983). Discretionary disclosure. *Journal of Accounting & Economics, 5*, 179–194. https://doi.org/10.1016/0165-4101(83)90011-3

Welker, M. (1995). Disclosure policy, information asymmetry, and liquidity in equity markets. *Contemporary Accounting Research, 11*(2), 801–827.

Self-Employment Out of Choice or Necessity? A Comparative Analysis of South African and Immigrant Informal Shopkeepers

Sikhumbuzo Maisela

1 Introduction

A direct consequence of South Africa's segregated past is the pervasive economic lack that plagues South Africa's black population. Accounting for over 80% of the country's population, blacks are the poorest and least educated, have the least access to housing and quality health care, and are the most unemployed (STATSSA, 2017, 2019a, 2019b, 2019c). High entry barriers to formal economic participation have seen blacks attempt to counter their undesirable state of economic affairs by self-employing in the informal sector where they are now pitched against immigrants from other developing countries (Khosa & Kalitanyi, 2015; Muchineripi et al., 2022). South Africa is home to a substantial population of South-to-South immigrants whose superior informal self-employment abilities have resulted in the displacement of South Africans in the space (Petersen et al., 2019; Piper & Charman, 2016; Piper & Yu, 2016). This occurs while South Africa is experiencing record unemployment, now reported to be the highest in the world, and hitting the black, previously marginalized population, the most (Naidoo, 2021).

It is known that the informal economic activity of citizens increases with an increase in unemployment (Ligthelm & Masuku, 2003). At the same time, in the global south, immigrant activity is concentrated in the informal sector because the type of immigrants, here, lack the resources required to enter formal self-employment (Martinez et al., 2015). In both cases, self-employment is borne out of unfavorable economic circumstances. The unemployment suffered by citizens compels them to self-employ (Davies & Thurlow, 2010), while the host country

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disadvantage faced by immigrants pushes them to self-employ (Gamieldien & Van Niekerk, 2017), a condition which has come to be known as blocked upward mobility (Alaslani, 2019; Laganà, 2011). The blocked mobility of the two populations may, however, differ in quantity and nature. So should its effects on their behavior. This study asks the question: *"Between immigrants and South Africans in the informal sector, who suffers the most economic disadvantage and how does this impact their self-employment performance?"* The purpose of the study is to measure the effect of disadvantage as a driver of the informal self-employment of immigrants and South Africans and to highlight harsh economic circumstances as a major factor in the tensions between immigrants and South Africans that self-employ in the informal sector.

2 Theoretical Framework

I make reliance on the blocked mobility thesis, a theory that explains how factors in the labor market and other spaces, in the economy, segregate against certain groups and prevent their economic progress in the process (Cormier, 2003). The theory further states that victims of blocked mobility will organize and create their own means of offsetting missing opportunities. According to Cormier (2003), the response to blocked mobility differs between immigrants and citizens in that immigrants work around depriving situations like job market discrimination by self-employing, yet natives challenge the depriving status quo and make demands from their governments to deliver on the rights and privileges that are believed to be due (Laganà, 2011). Job provision falls within the set of reasonable expectations that citizens have of their governments. This points to differences in expectations from the state where immigrants are devoid of the expectations that abound among natives, the expectations for state welfare. Due to this, the self-employment patterns of natives and South Africans should significantly differ. To test this assertion, I postulated that economic deprivation and self-employment are directly related. I tested this relationship separately in immigrants and in South Africans.

2.1 Economic Deprivation

Economic deprivation refers to not being able to access adequate income earning opportunities. While citizenship puts South Africans in a better position to obtain jobs than their immigrant counterparts, the high rate of unemployment is a major element of their economic deprivation (Maseko, 2021; Nonyana & Njuho, 2018; Oosthuizen, 2019). This is compounded by the unfavorable position of lack of wealth and low access to financial institutions, factors that severely undermine the ability to enter formal entrepreneurship (Freund, 2010). Borrowing requirements like collateral and proof of stable income, that are set by South African financial

Table 1 Economic deprivation scales

Question		
1. I feel that I am entitled to welfare assistance from the South African Government		
2. I am capable of providing for myself without government assistance		
3. I have sufficient access to resources and opportunities as other people in South Africa		
4. I have a good opportunity of getting a job		
5. I am treated the same way as everybody else in South Africa		
6. My social status limits my chances to access resources and opportunities		

institutions for securing loans, cannot be met by most of South Africa's poor (Matsebula & Yu, 2020). These factors constitute the economic deprivation of South Africans and may be forcing this population into self-employment (Dassah, 2015).

Immigrants, on the other hand, face their own set of depriving factors. For example, they face a hostile social context where they are discriminated in the job market (Hungwe, 2013). They are almost entirely barred from accessing bank finance (Hungwe & Gelderblom, 2014). With their rights not guaranteed by the state, they also face a host of other disadvantages, among which are lack of welfare benefits and disproportionate exposure to violence and crime (Adam & Moodley, 2015; Basardien et al., 2014). Despite these challenges, the immigrant population, in South Africa, fares relatively well in comparison to the black population of South Africa in that they are economically self-reliant (Crush & Peberdy, 2018). The self-reliance of immigrant populations has been observed in many host countries, and it is often attributed to their thrift and industriousness (Ishaq et al., 2010). It also appears that the immigrant population that self-employs in the South African informal sector may have come to the country for the purpose of self-employing (Crush & Peberdy, 2018; Kalitanyi & Visser, 2010). South Africans, however, appear to use self-employment as a temporary relief from unemployment (McKeever, 2006; Naidoo & Fenyes, 2003).

To measure economic deprivation, scales were adapted from Atkins (2014). They are listed in Table 1.

2.2 Self-Employment Performance

Self-employment performance refers to a situation where a person has created a reliable source of income for themselves. It is linked to the performance of the business that the individual owns. When the business is making adequate profits that enable it to grow and support itself, it is said to be sustainable (Fatoki & Patswawairi, 2012; Rehn et al., 2013). The success of a business is seen, therefore, in factors such as rate of sales, size of the business, number of employees, and complementary assets such as other businesses owned by the entrepreneur, and assets like vehicles that are used to support the business of the entrepreneur (Edelman et al., 2010; Murphy et al., 1996).

Table 2 Self-employment performance scales

Question		
1. Please select the interval that represents your monthly revenue 2. Has the business increased, decreased, or stayed the same compared to the same time last year? 3. If so, how many more businesses have you started with income generated from your current business? 4. How many employees do you have?		

The success of a business does not occur out of nothing. Instead, it is driven by the processes that the entrepreneur puts in place (Preisendoerfer et al., 2014). Entrepreneurs that exert appropriate and considerable efforts in their businesses reap profits as rewards (Edelman et al., 2010; Hout & Rosen, 1999). Exposure to deprivation should affect the ability of entrepreneurs to exert adequate and appropriate actions. Depending on the economic circumstances faced by an individual, they may enter entrepreneurship out of necessity or out of their own free will (Baptista et al., 2014). The exposure to deprivation may also affect the ability of entrepreneurs to manage their businesses optimally (Yeasmin, 2016). To measure self-employment performance, I made use of scales adopted from Murphy et al. (1996). They are in Table 2.

3 Hypothesis Formulation

The South African and immigrant populations that self-employ in the informal retail sector may be doing so because of the depriving economic status quo that persists in South Africa. South Africans face poverty and unemployment, factors that may be forcing them to self-employ (Dassah, 2015). Immigrants are discriminated against in the job market, and that may be forcing them to self-employ (Adam & Moodley, 2015; Basardien et al., 2014). While it is often taken for granted that immigrants are more deprived than natives, this may not be the case in South Africa where there is a native population that also suffers economic deprivation. The immigrants that self-employ in the retail informal sector, especially, display opportunity exploitation traits (Basardien et al., 2014; Ram et al., 2008). As a result, it cannot be accepted at face value that the economic deprivations that afflict natives and immigrants affect their self-employment in a similar fashion. To assess this, I postulated that even though immigrants and South Africans face economic deprivations, this deprivation has different effects on their ability to self-employ sustainably. This relationship is hypothesized as follows: *H1a: Deprivation faced by immigrants positively affects the self-employment of immigrant population. H1b: Deprivation faced by South Africans positively affects the self-employment of immigrant population.*

4 Research Methods

The study was conducted through a quantitative research method where cross-sectional data was collected using a survey instrument that had closed-ended questions. The instrument was administered by the author on respondents. The sample comprised South African and immigrant shopkeepers from the townships of KwaThema, Duduza, and Tsakane where, according to House and Street (2017), a combined population of 333,528 resides. This represented 0.61% of the South African population in 2017. Assuming that the three townships had a number of informal retailers that was proportional to their contribution to the South African population, they should have had a population of 550 informal retailers, according to Basardien et al. (2014). Applying the sample calculator formula $n = N/(1 + N(e^2))$ on this number yielded a sample of 242.

4.1 Data Analysis

Data was analyzed using the Social Package for Social Scientists where factor analysis was done to determine the correlation of items, and simple regression was conducted to assess the strength of the hypothesized relationships.

4.2 Ethical Considerations

Approval was obtained from the parent university of the author. The following guidelines, which were prescribed by the ethics committee, were adhered to. They include obtaining the informed consent of respondents, keeping confidential the identity of respondents, not incentivizing respondents to participate, treating respondents with dignity, and allowing respondents to withdraw at any time if they wished to do so.

5 Results

It was found that immigrant businesses were 1.63 times the size of those owned by South Africans and that they employed 28% more people. To test the hypotheses, *H1a: Deprivation faced by immigrants positively affects the self-employment of immigrant population and H1b: Deprivation faced by South Africans positively affects the self-employment of immigrant population*, simple linear regression was used with deprivation being a predictor and self-employment being the outcome. Table 3 shows the outcome of the regression.

Table 3 Regression between economic deprivation and self-employment performance

South African entrepreneurs				
	Parameters		Statistical significance	
Variable	*B*	*B*	SE	*P*
Intercept	1.02		0.906	0.263
Deprivation	0.609**	0.213	0.286	0.036
F	4.533**			0.036
*R*2	0.046			
Immigrant entrepreneurs				
	Parameters		Statistical significance	
Variable	*B*	*B*	SE	*P*
Intercept	2.864		0.861	0.001
Deprivation	0.071	0.033	0.232	0.759
F	0.094			0.759
*R*2	0.001			

B unstandardized parameters, β standardized parameters
***$p < 0.01$, **$p < 0.05$, *$p < 0.10$

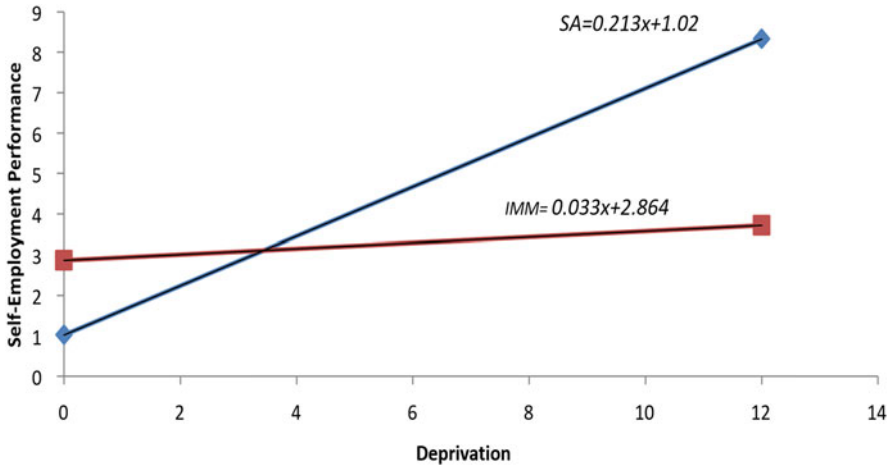

Fig. 1 South African and immigrant deprivation performance graphs

The results indicate that deprivation affects the self-employment of South Africans ($B = 0.609$, $\beta = 0.213$, p-value $= 0.036$) but not that of the immigrant population. Plotting the immigrant and South African graphs demonstrates the difference in the impact of deprivation on the self-employment of the two populations (Fig. 1).

6 Discussion

Immigrant businesses were 1.63 times the size of those of South Africans, and immigrants employed 28% more people than South Africans. With deprivation explaining 4.6% of the variation in the self-employment performance of South Africans, and having no impact on that of immigrants, one can agree with the studies that have observed immigrants coming to South Africa for the purpose of self-employing (Khosa & Kalitanyi, 2014, 2015). The results show that the self-employment of immigrants stays constant despite an increase in their perceived deprivation. This is not the case with the South African population which appears to exert less effort with a decrease in their perceived deprivation. This confirms studies of, for example, McKeever (2006) and Naidoo and Fenyes (2003) that indicate informal self-employment may be a temporary relief that South Africans are willing to neglect when offered better employment opportunities.

The results have various implications. First, they indicate that there may be differences in attitudes where South Africans do not view informal self-employment as a viable permanent solution to their economic self-sustenance while immigrants do. Second, they indicate that immigrants may be immune to the disadvantage that they face in South Africa. Thirdly, with various studies indicating that immigrants are more successful than South Africans, and the results showing that South Africans are pushed by economic circumstances to self-employ while immigrants are not, there is the implication that self-employment by choice may be more successful than that which is coerced.

7 Conclusion

With immigrant businesses being larger than those of South Africans and immigrants employing more people other than South Africans, it is apparent that immigrants are more successful than South Africans in informal self-employment. The results also indicated that the self-employment of South Africans may be a direct response to the harsh economic circumstances that they are facing, yet this is not the case for immigrants. This points to different motivations for self-employment between immigrants and South Africans, where immigrants appear to embrace informal self-employment irrespective of the economic conditions they face in South Africa. Perhaps these differences in self-employment translate to commitment to self-employment and the subsequent performance that we are seeing. This can be tested through further studies. From the results, one can conclude, however, that self-employment by choice may be more successful than that which is coerced.

Surprisingly, South Africans perceive more deprivation than immigrants. This is important to note, especially for those policy makers who are tasked with creating employment opportunities and increasing the economic activity of the black population. The findings of this chapter suggest that promoting informal self-employment

is one way of enabling the economic participation of the black population. The presence of the immigrant population that self-employs successfully in the informal sector can be leveraged to improve the skills of the local population by making policy interventions that will enable the sharing of knowledge between immigrants and South Africans. Enabling immigrants to contribute to South Africa in this way should improve the immigrant-citizen relations which are currently at a low.

References

Adam, H., & Moodley, K. (2015). Realities and discourses on South African xenophobia. *Strategic Review for Southern Africa, 37*(1), 200.

Alaslani, M. A. (2019). *The role of the blocked mobility hypothesis in explaining the pathways to entrepreneurship and the entrepreneurial aspirations*. University of Technology Sydney.

Atkins, R. (2014). Instruments measuring perceived racism/racial discrimination: Review and critique of factor analytic techniques. *International Journal of Health Services, 44*(4), 711–734.

Baptista, R., Karaöz, M., & Mendonça, J. (2014). The impact of human capital on the early success of necessity versus opportunity-based entrepreneurs. *Small Business Economics, 42*(4), 831–847.

Basardien, F., Parker, H., Bayat, M., Friedrich, C., & Appoles, S. (2014). Entrepreneurial orientation of spaza shop entrepreneurs evidence from a study of South African and Somali owned spaza shop entrepreneurs in Khayelitsha. *Singaporean Journal of Business Economics and Management Studies, 2*(10), 45–61.

Cormier, J. J. (2003). Blocked mobility and the rise of cultural nationalism: A reassessment. *International Journal of Politics, Culture, and Society, 16*(4), 525–549.

Crush, J., & Peberdy, S. (2018). *Criminal tendencies: Immigrants and illegality in South Africa*. SAMP.

Dassah, M. (2015). Naming and exploring the causes of collective violence against African migrants in post-apartheid South Africa: Whither Ubuntu? *TD: The Journal for Transdisciplinary Research in Southern Africa, 11*(4), 127–142.

Davies, R., & Thurlow, J. (2010). Formal–informal economy linkages and unemployment in South Africa. *South African Journal of Economics, 78*(4), 437–459.

Edelman, L. F., Brush, C. G., Manolova, T. S., & Greene, P. G. (2010). Start-up motivations and growth intentions of minority nascent entrepreneurs. *Journal of Small Business Management, 48*(2), 174–196.

Fatoki, O., & Patswawairi, T. (2012). The motivations and obstacles to immigrant entrepreneurship in South Africa. *Journal of Social Sciences, 32*(2), 133–142.

Freund, B. (2010). Is there such a thing as a post-apartheid city? In *Paper presented at the Urban Forum*. Springer.

Gamieldien, F., & Van Niekerk, L. (2017). Street vending in South Africa: An entrepreneurial occupation. *South African Journal of Occupational Therapy, 47*(1), 24–29.

House, I., & Street, K. (2017). *Mid-year population estimates*. Statistics South Africa.

Hout, M., & Rosen, H. S. (1999). *Self-employment, family background, and race*. National Bureau of Economic Research.

Hungwe, C. (2013). Survival strategies of Zimbabwean migrants in Johannesburg. *Jurnalul Practicilor Comunitare Pozitive, 13*(3), 52–73.

Hungwe, C., & Gelderblom, D. (2014). Understanding the social exclusion of Zimbabwean migrants in Johannesburg, South Africa. *Journal of Community Positive Practices, 1*, 75–91.

Ishaq, M., Hussain, A., & Whittam, G. (2010). Racism: A barrier to entry? Experiences of small ethnic minority retail businesses. *International Small Business Journal, 28*(4), 362–377.

Kalitanyi, V., & Visser, K. (2010). African immigrants in South Africa: Job takers or job creators? *South African Journal of Economic and Management Sciences, 13*(4), 376–390.

Khosa, R. M., & Kalitanyi, V. (2014). Challenges in operating micro-enterprises by African foreign entrepreneurs in Cape Town, South Africa. *Mediterranean Journal of Social Sciences, 5*(10), 205–205.

Khosa, R. M., & Kalitanyi, V. (2015). Migration reasons, traits and entrepreneurial motivation of African immigrant entrepreneurs: Towards an entrepreneurial migration progression. *Journal of Enterprising Communities: People and Places in the Global Economy, 9*(2), 132–155.

Laganà, F. (2011). Blocked mobility or unemployment risk? Labour market transitions of natives and immigrants in Switzerland. *International Journal of Comparative Sociology, 52*(4), 327–349.

Ligthelm, A., & Masuku, T. (2003). *Size, structure and profile of the informal retail sector in South Africa*. Bureau of Market Research, University of South Africa.

Martinez, C., Cummings, M. E., & Vaaler, P. M. (2015). Economic informality and the venture funding impact of migrant remittances to developing countries. *Journal of Business Venturing, 30*(4), 526–545.

Maseko, N. (2021). *Unemployment and sustainable livelihoods: Just transition interventions in the face of inequality*. Trade and Industrial Policy Strategies.

Matsebula, V., & Yu, D. (2020). An analysis of financial inclusion in South Africa. *African Review of Economics and Finance, 12*(1), 171–202.

McKeever, M. (2006). Fall back or spring forward? Labor market transitions and the informal economy in South Africa. *Research in Social Stratification and Mobility, 24*(1), 73–87.

Muchineripi, J., Chinyamurindi, W., & Chimucheka, T. (2022). African immigrants self-employment journey: Navigating contextual challenges in South Africa. *Journal of Global Mobility: The Home of Expatriate Management Research, 10*(4), 530–544.

Murphy, G. B., Trailer, J. W., & Hill, R. C. (1996). Measuring performance in entrepreneurship research. *Journal of Business Research, 36*(1), 15–23.

Naidoo, G., & Fenyes, T. (2003). Quantitative linkages between the formal and informal sectors in the South African economy. *South African Journal of Economic and Management Sciences, 6*(4), 693–723.

Naidoo, P. (2021). South Africa's unemployment rate is now highest in the world. *The Capital News, 44*(36), 15.

Nonyana, J. Z., & Njuho, P. M. (2018). Modelling the length of time spent in an unemployment state in South Africa. *South African Journal of Science, 114*(11–12), 1–7.

Oosthuizen, A. (2019). Youth unemployment: Statistics and solutions. *HSRC Review, 17*(4), 3–8.

Petersen, L., Thorogood, C., Charman, A., & Du Toit, A. (2019). *What price cheap goods? Survivalists, informalists and competition in the township retail grocery trade*. PLAAS.

Piper, L., & Charman, A. (2016). Xenophobia, price competition and violence in the spaza sector in South Africa. *African Human Mobility Review, 2*(1), 755.

Piper, L., & Yu, D. (2016). Deconstructing 'the foreign': The limits of citizenship for explaining price competition in the Spaza sector in South Africa. *Development Southern Africa, 33*(5), 658–676.

Preisendoerfer, P., Bitz, A., & Bezuidenhout, F. J. (2014). Black entrepreneurship: A case study on entrepreneurial activities and ambitions in a South African township. *Journal of Enterprising Communities: People and Places in the Global Economy, 8*(3), 162–179.

Ram, M., Theodorakopoulos, N., & Jones, T. (2008). Forms of capital, mixed embeddedness and Somali enterprise. *Work, Employment and Society, 22*(3), 427–446.

Rehn, A., Brännback, M., Carsrud, A., & Lindahl, M. (2013). Challenging the myths of entrepreneurship? *Entrepreneurship & Regional Development, 25*, 543–551.

STATSSA. (2017). *Mid-year population estimates 2017*. Pretoria. Retrieved from https://www.statssa.gov.za/publications/P0302/P03022017.pdf

STATSSA. (2019a). *General Household Survey 2018*. Pretoria. Retrieved from https://www.statssa.gov.za/publications/P0318/P03182018.pdf

STATSSA. (2019b). *Inequality trends in South Africa a multidimensional diagnostic of inequality*. Pretoria. Retrieved from https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf

STATSSA. (2019c). *Survey of employers and the self-employed 2017*. Pretoria. Retrieved from http://www.statssa.gov.za/publications/P0276/P02762017.pdf

Yeasmin, N. (2016). The determinants of sustainable entrepreneurship of immigrants in Lapland: An analysis of theoretical factors. *Entrepreneurial Business and Economics Review, 4*(1), 129–159.

The Impact of Advanced Manufacturing on Human Sustainable Well-Being: In Aluminium Industries

Fatema Maki

1 Introduction

1.1 Background

Recently, the manufacturing world has become dynamic with its requirements in terms of product quality, productivity and agility (Bhatia & Kumar, 2022). This is crucial for sustainable firm performance as supported by evidence in the literature review of this subject (Hassan Reza et al., 2021). Complex and dynamic production system is becoming a huge challenge that needs to be undertaken by firms (Mittal et al., 2018) because of the increased need for customised and innovative products. As a result, firms are starting to acquire Industry 4.0 technologies to deal with these challenges. Industry 4.0 comprises emerging technologies that help in transforming the conventional industrial structure (Hassan Reza et al., 2021) through the combination of computational and physical processes, which assists humans and machines to perform their tasks (Hermann et al., 2016). Consequently, radical changes are introduced within the firm involving all areas across physical infrastructure, operations management, manufacturing operations, technologies, and human resources, which has led to a change in the dynamics of human work (Cimini et al., 2020). The concept of Industry 4.0 involves a complex process of collecting, processing and sharing data over a network communication and allowing a significant amount of autonomy in an operation.

Introducing advanced manufacturing and adopting new technologies within a firm create an intelligent workspace and manufacturing paradigm. As a result, an

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industry's value chain is transformed through combining embedded production system technologies with intelligent production processes consequently increasing productivity and efficiency while introducing radical changes to the firm (Preuveneers & Ilie-Zudor, 2017).

In advanced manufacturing, real-time communication and cooperation are needed between humans, sensors and machines leading to integrated systems, which involve vertical and horizontal integration at various phases of the manufacturing process (Bibby & Dehe, 2018; Piccarozzi et al., 2018). This introduces the urge of reengineering the processes to develop an integrated system, which introduces new challenges and difficulties at organisational and managerial levels (Weyer et al., 2015; Wang et al., 2016). This system leads to the birth of a new work environment to cope up with the need for new interactions between humans and robots. Therefore, the high collaboration between humans and machines will require the development of new skills and competencies (Cagliano et al., 2019). With advanced manufacturing, humans will have to consider machines as their co-workers, as human roles will be altered. Humans in such environments are integrated into a decentralised decision-making process, instead of taking decisions the way it used to be in Industry 3.0; they now will be involved in engineering activities, and hence development of engineering skills will be needed (Dubey et al., 2016; Johansson et al., 2017; Pereira & Romero, 2017).

Organisational competitiveness will definitely enhance by applying technological advancement, which results in achieving greater flexibility through adaptable business structure and internal evolutionary development to face a changing business environment. However, this also introduces change to firms' internal transformation processes which both employers and employees have to deal with. Change management literature on several bases has shown that introduction of significant changes within a firm affects employees' well-being, where employees are found to suffer from serious stress and mental health problems; as a result, employees' productivity reduces, which in return affects the performance of the entire organisation. On the other hand, research on organisational behaviour states that stress caused to employees because of change introduction within a firm can be lowered by managers. This can be achieved by influencing employee engagement where managers show that they trust their employees, making them be part of the process by providing them with an environment where they feel safe to experiment.

In addition, innovation is driven by societal needs as well, where systems are adapted to comply and provide best conditions for the society's benefits and that is mainly achievable by searching and implementing new solutions. These advancements are showing no signs of slowing down; as a result, the idea of having to continuously be innovative to stay competitive has become the new normal (Piątkowski, 2020). "Lifelong learning" European policy emphasises on the necessity to constantly improve skills and learn throughout the period of their professional engagement. Having said that, it is obvious that the changes in enterprise activities will be associated with significant transformations in the processes; hence, it will always be expected from employees to enhance their skills and competencies. Therefore, changes in the expectation of competencies are introduced in the labour

market, which consequently will change human resource management as well (Piątkowski, 2020). Piątkowski (2020) stated that such changes mainly imply the role of individuals who work in intelligent manufacturing plants, where they are expected to improve their digital skills and acquire additional professional qualifications to help in the process of continuous professional development. All of the above-mentioned facts highlight that expectations towards employees as a result of technological revolution and digitisation have increased over the years and will continue increasing over the upcoming years.

Looking at it from a national perspective, Bahrain's 2030 vision highlights the importance of innovation as a primary factor that will contribute to the country's economic factor, allowing it to have a competitive advantage on a global scale. It has been stated on a global scale that Bahrain's innovation output is currently negligible. Hence, the country has kept a strategic plan within the country's vision to enhance the skills of their citizens through training and education mainly in the sector of applied sciences. It has also been emphasised that skills and competencies that are lacking within Bahrain's labour market will be outsourced.

Bahrain's 2030 vision states clearly that Bahraini citizens are not the preferred choice for employers in the private sector mainly because the education system does not provide young people with the required skills and knowledge; hence, part of the strategy plan is to develop the learning programmes and upgrade citizen skills (Bahrain.bh, 2023).

In addition to that, part of the sustainability goals, specifically SDG9 which states "Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation", only indicates that inclusive and sustainable industrial development is the primary source for the income generations, which as a result will lead to improvement in the living standards for all people.

The rate at which innovation and technological advancements have been adopted differs from one region to the other and from one sector to the other; however, development of skills and competencies is required to fulfil the requirements of the labour market.

Well-being of humans is seen as a key in sustainable development goal, and without it, good health is not possible. Good Health is defined by the World Health Organization as "a state of complete physical, mental, spiritual, and social well-being and not merely the absence of disease or infirmity". Human well-being is a crucial factor in human resource management and organisational life. Sustainable development when first introduced was focused mainly on three Es, economy, equity and ecology. However, from a psychological perspective, sustainable development promotes the well-being of humans through enrichment and growth. Human resource literature emphasises on the importance of considering factors such as job satisfaction, job design and job crafting in the workplace. Introduction of new technologies resulting in change within an organisation could possibly affect the well-being of the employees; hence, sustainable well-being calls on leadership styles that can combine both economic and human resources at its best level to avoid disturbing one factor over the other. Over the past years, the rate at which new technologies are introduced in the market has increased. Governments hence are

focused on seeking economic growth that is led by innovation, which is inclusive and sustainable; hence, this leads to frequent introduction of change in organisations on a regional level.

2 Research Rationale

After looking at the literature review by viewing a selection of articles and with the support of several authors, research related to Industry 4.0's technological advancement and the impact it could have specifically on human well-being is inadequate.

Cagliano et al. (2019), stated in their research paper that though Industry 4.0 is widely investigated, a gap in literature exists with relation to the challenges proposed by such technological advancement on behavioural level. In addition, Savastano et al. (2019), emphasised on how much literature exists on the engineering aspects of implementing technological advancement while overlooking human involvement and organisational aspects. Johansson et al. (2017), Pereira and Romero (2017), Vaidya et al. (2018) and Zhong et al. (2017) presented in their papers that to successfully implement and achieve advance manufacturing techniques, humans are considered the core of such implementation. As a result of such implementation, a new work environment is designed where new skills will be needed to successfully achieve human–machine integration. In view of these shortcomings, it is clear that a deeper investigation is needed on the human aspects involved in such transformation.

The research objectives will help in analysing the different behavioural factors that will be impacted as a result of applying advanced manufacturing within the firm. Through the research objective, leadership styles will be explored in different firms on their approach towards absorption of technological advancement and how is the well-being of employees taken care of during and after the implementation process. Also, what human behaviour is experienced by firms during and after the implementation process is explored.

3 Research Methodology

3.1 Research Design

Developing a research design before beginning with data collecting and evaluation is of significant importance as it determines the degree of success of the research (Creswell, 2014). This study focuses on examining the impact of advanced manufacturing on human well-being. Therefore, the research design opted is qualitative. Qualitative research supports researchers in drawing up theories as well as understanding reality based on different perspectives. The rationale for choosing this

approach is to explore different opinions and perspectives, and hence, qualitative is chosen.

3.2 Research Philosophy

Research philosophy is divided into three parts which are ontology, epistemology and methodology. The focus of each part is as follows:

- Ontology: what is reality
- Epistemology: what is perceived as acceptable knowledge based on assumptions of the researcher
- Methodology: combination of practices to yield knowledge and determine reality

In this study, the ontological perspective is based on the belief that reality is seen to be subjective where more than one reality exists. That is, each human that is to be interviewed will see things differently based on differences in experiences, positions, history and experience, among others. The epistemological view of this research will be focusing on interpretivism where researchers interpret the data collected themselves (Schwandt, 1994; Guba & Lincoln, 1994). Knowledge is advocated to be best gained through interactions allowing chances to understand the implications of numerous realities. Hence, interviews used for data analysis are seen to be useful.

3.3 Data Collection Method

Qualitative research carries several types of methods such as interviews, focus groups, ethnography and case study, among others.

The research methods that are seen to be appropriate to carry out the methodology are as such case studies based on an organisation, followed by semi-structured interviews with open-ended questions.

Case studies are to be used as it provides a complete evaluation and understanding of the whole phenomenon in its regular background without being controlled or being distorted (Diop & Liu, 2020). In addition, it allows acquiring different methods of evidence from a variety of bases such as interviews, which in return offers diversified types of insights allowing the impacts on human well-being to be investigated from different lenses (Yin, 2009).

In seeking to investigate the potential impacts of advanced manufacturing on human well-being, semi-structured face-to-face interviews were conducted with employees from different levels following the top-down approach, i.e. starting from shop floor employees up to management-level staff. The reason for this is that interviews in qualitative research open space for exchanging information and

knowledge, hence acquiring suitable quantities of data that will help in achieving the research objectives (Wong et al., 2011).

3.4 Sampling Population

The sampling population will be a case study based on organisations that are operating within the aluminium production industry from different regions.

For qualitative studies, different sampling methods are proposed by different researchers where non-probability sample selection is one of them, which stated that it is more suitable for such studies rather than purposeful sampling.

I am looking into carrying out the research within four firms in different countries.

4 Conclusion

Since this is just a proposal, a final answer cannot be given to this research yet. However, what is aimed to be achieved is to investigate whether or not technology has an impact on employees' well-being and to which extent are we expected to dedicate our life to work. This research is expected to go two ways; the impact could either be negative, positive or a mix of both worlds. As far as the organisations are concerned, this research could help them in identifying the mentality of the employees and what approaches to take while introducing change that requires effort from the employee on a personal level and career level. As a result, policy altering can also take place by amending the policy wherever possible keeping employees as key players and part of the process instead of doers of the process. Once this is kept in place, on a national level, all governments will be able to plan their strategies and implement them easily as the culture will already be embedded within the nation.

References

Bahrain.bh (Ed.) (2023). *From regional pioneer to global contender T H E—bahrain.bh*, *Bahrain Economic Vision* 2030. Kingdom of Bahrain. Retrieved January 8, 2023, from https://bahrain.bh/wps/wcm/connect/38f53f2f-9ad6-423d-9c96-2dbf17810c94/Vision%2B2030%2BEnglish%2B%28low%2Bresolution%29.pdf?MOD=AJPERES

Bhatia, M., & Kumar, S. (2022). Critical success factors of industry 4.0 in automotive manufacturing industry. *IEEE Transactions on Engineering Management, 69*(5), 2439–2453.

Bibby, L., & Dehe, B. (2018). Defining and assessing industry 4.0 maturity levels—Case of the defence sector. *Production Planning & Control, 29*(12), 1030–1043.

Cagliano, R., Canterino, F., Longoni, A., & Bartezzaghi, E. (2019). The interplay between smart manufacturing technologies and work organization. *International Journal of Operations & Production Management, 39*(6/7/8), 913–934.

Cimini, C., Boffelli, A., Lagorio, A., Kalchschmidt, M., & Pinto, R. (2020). How do industry 4.0 technologies influence organisational change? An empirical analysis of Italian SMEs. *Journal of Manufacturing Technology Management, 32*(3), 695–721.

Creswell, J. (2014). *Research design*. Sage.

Diop, K. A. S., & Liu, E. (2020). Categorization of case in case study research method: New approach. *Knowledge and Performance Management, 4*(1), 1–14.

Dubey, R., Gunasekaran, A., Childe, S., Wamba, S., & Papadopoulos, T. (2016). The impact of big data on world-class sustainable manufacturing. *The International Journal of Advanced Manufacturing Technology, 84*(1–4), 631–645.

Guba, E., & Lincoln, Y. (1994). *Competing paradigms in qualitative research* (pp. 105–117). Denzin.

Hassan Reza, M., Agamudai Nambi Malarvizhi, C., Jayashree, S., & Mohiuddin, M. (2021). Industry 4.0–Technological revolution and sustainable firm performance. In *2021 Emerging trends in industry 4.0 (ETI 4.0)*. IEEE.

Hermann, M., Pentek, T., & Otto, B. (2016). Design principles for industrie 4.0 scenarios. In *2016 49th Hawaii international conference on system sciences (HICSS)*. IEEE.

Johansson, J., Abrahamsson, L., Kåreborn, B., Fältholm, Y., Grane, C., & Wykowska, A. (2017). Work and organization in a digital industrial context. *Management Revue, 28*(3), 281–297.

Mittal, S., Khan, M., Romero, D., & Wuest, T. (2018). A critical review of smart manufacturing and industry 4.0 maturity models: Implications for small and medium-sized enterprises (SMEs). *Journal of Manufacturing Systems, 49*, 194–214.

Pereira, A., & Romero, F. (2017). A review of the meanings and the implications of the industry 4.0 concept. *Procedia Manufacturing, 13*, 1206–1214.

Piątkowski, M. J. (2020). Expectations and challenges in the labour market in the context of industrial revolution 4.0. The agglomeration method-based analysis for Poland and other EU member states. *Sustainability, 12*(13), 5437. https://doi.org/10.3390/su12135437

Piccarozzi, M., Aquilani, B., & Gatti, C. (2018). Industry 4.0 in management studies: A systematic literature review. *Sustainability, 10*(10), 3821.

Preuveneers, D., & Ilie-Zudor, E. (2017). The intelligent industry of the future: A survey on emerging trends, research challenges and opportunities in industry 4.0. *Journal of Ambient Intelligence and Smart Environments, 9*(3), 287–298.

Savastano, M., Amendola, C., Bellini, F., & D'Ascenzo, F. (2019). Contextual impacts on industrial processes brought by the digital transformation of manufacturing: A systematic review. *Sustainability, 11*(3), 891.

Schwandt, T. (1994). *Constructivist, interpretivist approaches to human inquiry*. Sage.

Vaidya, S., Ambad, P., & Bhosle, S. (2018). Industry 4.0—A glimpse. *Procedia Manufacturing, 20*, 233–238.

Wang, S., Wan, J., Zhang, D., Li, D., & Zhang, C. (2016). Towards smart factory for industry 4.0: A self-organized multi-agent system with big data based feedback and coordination. *Computer Networks, 101*, 158–168.

Weyer, S., Schmitt, M., Ohmer, M., & Gorecky, D. (2015). Towards industry 4.0—Standardization as the crucial challenge for highly modular, multi-vendor production systems. *IFAC-PapersOnLine, 48*(3), 579–584.

Wong, C., Boon-Itt, S., & Wong, C. (2011). The contingency effects of environmental uncertainty on the relationship between supply chain integration and operational performance. *Journal of Operations Management, 29*(6), 604–615.

Yin, R. (2009). *Case study research*. SAGE Publications.

How Social Media Is Helping Deaf and Hearing-Impaired Families in Learning Sign Language: A Case Study in the Kingdom of Bahrain

Fatema Saleh Al Dhaen

1 Introduction

There is no doubt that parents of children who are deaf/HI children show more stress than parents of children who are growing normally (Kobosko, 2011). Generally, the literature on sign language education identifies research gaps that emphasize on learning sign language for both families and instructors or preservice teachers (Alawajee, 2022; Luchivya et al., 2020). Communication issues are a common concern for deaf/HI children for a number of reasons. Parents find it challenging to accept their children's deafness or hearing impairments due to communication difficulties with them (Azleen, 2013). There are some parents who are unable to communicate with their children through sign language. Due to communication issues and emotional conditions within the family, the linguistic connection between parents and their deaf/HI children takes on a more complex form (Shekari et al., 2017).

Unfortunately, many parents ignore their obligations and refuse to learn sign language (Nor & Rashed, 2018). According to Marippan and Yasin, such disregard would seriously affect the deaf/HI children's psychological well-being (Marippan & Yasin, 2020). Family members of deaf or hearing-impaired children frequently feel frustrated, rage, and dissatisfaction because they are unable to explain their thoughts and understand other people's conversations. The children themselves frequently feel angry and discontent because they are unable to express their feelings.

The community of users' usage of sign language in a natural setting has allowed it to flourish and develop over time as it was passed down from generation to

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generation (Ngobeni et al., 2020). However, there is a lot of discussion about the potential benefits of utilizing sign language to educate young deaf people, particularly to teach them writing and reading. Numerous studies from many nations have shown that some of the communication problems that parents are facing with their deaf or hearing-impaired children are caused by their refusal to learn sign language (Luchivya et al., 2020). Gray (2011) asserts that deaf or hearing-impaired children experience delays in their cognitive development since they do not have a home language through which to communicate with their parents and siblings if those parents are unable to learn to sign.

2 Literature Review

Every country and region experience widespread deafness and hearing loss. Nearly 20% of the world's population, or more than 1.5 billion individuals, suffer from hearing loss (World Health Organization, 2019). Also, it is anticipated that by 2050, approximately 2.5 billion individuals will have some degree of hearing loss, and at least 700 million of them would need hearing rehabilitation (World Health Organization, 2021).

According to the Ministry of Social Development in the Kingdom of Bahrain, the number of deaf and hearing-impaired individuals has reached 2103 (Alwatan, 2022), which is quite big compared to Bahrain's population; therefore, the Kingdom of Bahrain has witnessed remarkable activity in the field of integrating the deaf into society and providing services that facilitate their lives and contribute to the development of their skills and cultures. The Bahrain Deaf Society had the greatest role in embracing the deaf, achieving the goal of integrating them into society, and encouraging governmental and civil institutions and society to support and provide services to them. The Bahrain Deaf Society was the main incubator for the deaf and people with hearing disabilities and actively contributed to their development through developmental, social, recreational, and educational programs and supported them to overcome all the difficulties they face and achieve their demands and needs in cooperation and coordination with official and civil authorities (Alwatan, 2022).

The Kingdom of Bahrain is currently experiencing a huge scientific and educational revival that started decades ago, particularly in education. The expansion of colleges and universities to serve students, scholars, and numerous community institutions in different parts of the Kingdom is in line with the vision of 2030. The goal of universities in Bahrain is to make a practical and innovative contribution to understanding society, including its traits, problems, and issues. This is done by keeping an eye on emerging educational trends, studying them, and working to find effective solutions.

The constitution of the Kingdom of Bahrain ensures that all of its citizens have an equal right to an education, free from discrimination or preference. Also makes certain that cultural and educational services are provided to its citizens. As mentioned, and specified by law, early childhood education is mandated and free (NIHR,

2012). In order to preserve equity and harmony among the communities in the Kingdom of Bahrain, the country has taken a great initiative by emphasizing on creating the ideal environment in terms of awareness, resources, and specialized training in dealing and interacting with deaf and hearing-impaired people; they have started efforts to integrate students with disabilities and special needs in public schools. Many schools welcome students with special needs without discrimination and offer teachers training and growth opportunities to help these kids blend with other pupils. A total of 175 schools have adopted the special education program at various educational levels determined by the Ministry (Bizbahrain, 2022).

According to the World Federation of the Deaf (WFD, 2016) Education Policy for Deaf Children, children with hearing impairments have a constitutional right to full access to high-quality education, and since hearing-impaired sufferers are typically visual learners, sign language and visual strategies must be made available to them as a matter of course. This might be taken to suggest that the policies established by the World Federation of the Deaf (WFD) would have been broken if excellent education was not made available to learners with HI utilizing visual techniques and sign language. It can also be inferred that learners with hearing impairment need to have access to sign language at home with their parents, siblings, and caregivers where they develop and learn before entering school.

The Kingdom of Bahrain has made significant progress toward reaching the Sustainable Development Goals (SDGs) outlined by the United Nations General Assembly, due to the alignment of its national development plan. Bahrain has made national-level progress toward achieving the UN's Millennium Development Goals (MDGs).

Reducing inequalities and quality education are very important goals to achieve better education for D/HI children and their parents and reduce the inequities for deaf society.

Bahrain has already achieved the same goals that this research is targeting, for example SDG10, which aims to reduce inequality. Bahrain has adopted the motto "No One is Left Behind" when providing government services, particularly through the Bahraini E-Government National Portal where services are provided in both English and Arabic to Bahrainis and outsiders (TDT, 2021). Also, Bahrain achieved SDG3 when the Government of Bahrain started to provide free and mandatory basic education (The Information & eGovernment Authority, 2018).

According to studies, some of the communication difficulties between parents and their deaf and hearing-impaired children are caused by the fact that the parents refuse to take sign language classes. According to Gray (2011), deaf and hearing-impaired children experience cognitive development delays because they lack a home language of communication with their parents and siblings when their parents do not learn how to sign. Gray (2011) goes on to say that a youngster who lacks a language of communication from an early age will grow up being completely unconscious of their surroundings.

Low (2015) also brought out the concern that deaf/HI children's poor communication abilities have a negative impact on their cognitive, intellectual, emotional, social, and behavioral development. According to McCullough and Duchesneau

(2016), parental neglect causes psychological problems in deaf and hearing-impaired children.

The primary form of communication for deaf people is sign language, yet because they are raised in a hearing society, they are actually functioning bilinguals. They are proficient in both official and casual sign language, or they can lip-read spoken language, which is helpful when there is a communication breakdown (Bank, 2015).

According to Alzahrani et al. (2015), deaf students typically arrive at schools with no formal language due to a lack of communication and language with their hearing parents. Most deaf children will communicate through a system of home signs and gestures, because most hearing parents do not know sign language. Moreover, the teachers in these primary schools are not highly skilled and do not have the proper training in Saudi sign language to be able to teach deaf children effectively. Another issue raised by Alzahrani et al. (2015) is that there are learning difficulties for deaf students who enter schools with a far weaker language foundation than their hearing peers.

Furthermore, Kimu (2012) carried out a study in Kenya with the purpose of comprehending and explaining how parents and educators experience parental engagement from their own perspectives in public primary schools in accordance with Epstein's typology of parental involvement (Epstein et al., 2009). Through a literature review, interviews, observations, and focus group discussions, the study's qualitative research methodology gathered data. One thousand three hundred seven (1307) teachers were included in the study, and they came from one hundred forty-one (141) public primary schools. Among Epstein's six categories of parental participation, talking to the school, assisting with homework, studying at home, making decisions, and working with the community to support the learner were pertinent.

3 Sign Language

According to the World Federation of the Deaf, 70 million individuals use sign language (Huenerfauth & Kacorri, 2015). Sign language is a very important communication language not only for deaf/HI individuals but even for their parents, siblings, friends, and teachers to be able to communicate with them. Nowadays, the significance of sign language for the full social presence of the deaf is widely acknowledged in influential literature from throughout the world (World Health Organization, 2007). Kamus (2010) defines sign language as gestures as head movements, eye contact, shaking hands, and other similar actions. The deaf/HI use sign language to communicate with one another when they are able to grasp it. However, because so few people are aware of sign language's existence and use, they are unable to communicate with the rest of humanity (Cooper et al., 2011).

According to Jiang et al. (2016), there are numerous advantages of learning a second language for the individual, such as cognitive benefits including the ability to multitask more effectively (Poarch & Bialystok, 2015), as well as better social

cognition and executive control (Bialystok and Cox et al., 2016; Hilchey & Klein, 2011); also, Weaver and Starner (Weaver & Starner, 2011) asserted that the development of a deaf child's language is greatly influenced by parental participation. Additional general advantages of learning sign language include being bimodal as well as bilingual (Bowman-Smart et al., 2019). It improves a variety of cognitive abilities, including use of co-gesture in speech (Casey et al., 2012), ability to recognize facial expressions (Bettger et al., 1997), and building of vocabulary growth and literacy in young children (Moses et al., 2015). Moreover, it enables efficient communication with members of the deaf population who do not communicate verbally or using pen and papers (Bowman-Smart et al., 2019). Also, Ee et al. (2020) argued that people motivation in learning sign language depends on their communication abilities. According to Ngobeni et al. (2020), some deaf students also struggle with the lack of sign language, which is linked to other problems like epilepsy, vision impairment, and autism spectrum disorders, which may hinder their ability to learn. In order to support children in beginning to learn sign language at an early age, parents must be willing to study sign language as soon as they become aware that their children are deaf (Ngobeni et al., 2020).

The study by Marippan and Yasin (Marippan & Yasin, 2020) determined how well versed parents were in signing with HI children. The results indicate that parents' sign language abilities are average, where the growth and enhancement of deaf/HI children's academic performance are influenced by parental skill levels. According to Napoli et al. (2015), parents of deaf always face a hard dilemma and must make difficult decisions. Should they consider getting their child a cochlear implant? Or should they learn to sign?

Bako (2022) explained that some people consider cochlear implant, but one of the primary barriers to think about cochlear implant, particularly in developing nations, is the cost. Few people can afford this expensive technology because it is so expensive. Access to services that support its life span also presents a significant issue for the relatively few who can afford it. Resolving a problem when any component of the device is flawed is difficult. The costs of repairing or replacing defective parts are exceedingly high and difficult to reach. The fundamental problem is a lack of convenient access to technical experts' services. Patients with cochlear implants will therefore go weeks or even months without using the technology. This lowers their standard of living.

4 Result

Based on some D/HI family members in Bahrain, some parents believed that it was essential to learn Arabic sign language and, however, that they needed to study under a trainer to learn sign language effectively. It was difficult and expensive to locate schools or private sign language instructors. The parents also felt embarrassed to study in public places. A typical parent's statement is as follows:

"Undoubtedly that sign language is important, therefore as a family we created a home sign language to communicate with my son easily, at the end of the day he can understand and cope with what we are saying."

Some parents were having trouble learning sign language. They asserted that learning sign language was challenging. However, several parents claimed that they had abandoned up long ago since sign language was difficult, and they were too old.

"When you're younger, learning a new language comes naturally, but as you get older, it might be challenging. The very worst part that I'm not educated; I hold Intermediate school certificate only".

Many of the families believed that the government or the school should make sure that parents receive training in sign language since family cannot afford such education.

"Frankly, it was very difficult to speak or sign with my deaf child, I tried my best but I failed, my opinion is to seek government or schools in this matter to facilitate the process or learning to fund us to learn through special institutions."

Some families made the point that language is crucial and can be taught by kids without the need for formal classes, which can disrupt their everyday tasks.

"I have learned sign language from my HI daughter, she teaches me signs after each class she attends, so I practice with her after each class she attends."

The majority of parents were willing to learn sign language, but they were concerned with the expense that came along with it, according to the results of the teachers' focus groups.

"Some families stated even if there are free classes, the transportation is the main issue."

A few families declared that they cannot learn the language due to some reasons.

"Some families confessed that the language is essential but not for them since they are too old, uneducated and somehow oblivious."

Since the majority of deaf children are born to hearing parents (Mitchell & Karchmer, 2004), it is likely that most hearing parents would want their child to use spoken language as their primary form of communication. This implies that they might prioritize an oralist approach; for example, if they afford to pay for cochlear operation, then why would they bother about the sign language.

"The children have been accustomed on to oral communication since childhood, so parents don't bother to learn sign language and they believed they want to improve their children oral skills."

Some of the family members of children with cochlear implants have been advised not to use sign language so eventually they will not learn it or use it with children due to the perception of sign language as that may hinder the successful oral communication.

"My daughter recently done the cochlear implant's operation, so we were advised by the doctor not use sign language any more with the children to improve the hearing and speaking process of my daughter."

Throughout focus group discussion, parents and family members noted that learning sign language required additional expenses during focus group talks. They had to download instructional resources including books, dictionaries, and

films from the internet. The first group of family representative statement is as follows:

"I can't afford to attend any workshops due to their fees, so I tried my best to download free material from the internet despite that it's a bit hard to find Arabic sign language, most of them were American sign language or British sign language, therefore it was a self-taught without a proper supervision or guidance or life practicing, then I felt lost and I stopped learning."

5 Discussion

Findings indicated that the primary motivation for parents to learn sign language is to improve communication with their children. Families should always care about their children and well-being and realize that by communicating with them, they can express their feelings and would not suppress anything into their hearts, which might cause psychological issues that is in line with Snoddon (2015), who asserted that the communication between parents and children would lead to satisfying lives; also, Razalli et al. (2019) affirmed that parents who are not familiar with sign language can obstruct their deaf/HI children's ability to learn and pick up the language. Such an impact will cause dissatisfaction to parents for not helping their children in their education process.

According to our results, parents/family members are frequently discouraged from learning sign language because they believe that studying such language will be too difficult (Lieberman et al., 2022); also, Perrotta (Perrotta, 2017) conducted a study in the United States and explained that 50% of the participants found that studying sign language is very difficult and it is stressful to learn and memorize the gestures.

There is a big contradiction that age could hinder the studying process regardless of the type of learning. For example, age is frequently linked to a reduction in cognitive skills necessary to sustain functional independence, such as learning (Clark et al., 2015). On the contrary, Imlach et al. (2017) asserted that age is not a barrier and does not affect academic performance. A similar result was found in the study of Luchivya et al. (2020), which found that the age is an obstacle to the parents who feel that they are too old to study.

Some of the parents/family members of the deaf/HI children who are using hearing aids or cochlear implants tend not to learn sign language because they were advised not to use sign language to improve their children's speech and hearing process. However, cochlear implants and hearing aids can sometimes make sound more audible but not always understandable (Hensley & Hansen, 2022). Therefore, it is an excellent idea to learn sign language with your children who use hearing aids as a backup in those situations (Amdahl, 2020).

6 Recommendation

According to the results of the previous research, most family members were willing to learn sign language in order to communicate with their kids. Despite the difficulties of learning sign language compared to other languages, it is crucial for parents to do so in order to communicate with their children (Napier et al., 2007).

According to Yusof et al. (Yusof, 2012), teaching parents how to read storybooks to deaf/HI children in sign language is a crucial activity for the growth of the bond between deaf/HI children and their parents. Parents may gain experience and attention from deaf/HI kids through this exercise. Aside from sign language courses, the school may also offer other activities and programs to improve the parents' and kids' knowledge of sign language. The implementation of a school-sponsored program involving parents is consistent with Epstein's parents involvement model, which places an emphasis on strong family ties, academic performance improvement, and increasing parental awareness.

Social media has increasingly become a big part of people's daily lives, on which adults now spend over 6 h each day (Ortiz-Ospina, 2019). Since social media platforms are so widely used in education and have such high levels of popularity, educators frequently use them as resources for their lessons. It is also acknowledged as an excellent educational tool that can be used to enhance learning behavior in light of many benefits (Al-Bahrani et al., 2015; Khan et al., 2021). One of the main advantages of using social media is that it offers a forum for educators and students to discuss ideas and evaluate them in front of others (Tess, 2013). Additionally, it is a good tool for students to get peer input quickly (Rahman et al., 2019).

The current era has seen a huge increase in the use of social media, such as Instagram, which popularity has grown dramatically among young people and students in particular. Instagram may be a helpful tool for learning languages, according to studies (Rizal, 2021).

Social media has demonstrated during the previous years that it may be an effective tool for deaf people to communicate and learn as well as to promote sociability in many contexts by providing users the opportunity to interact with others, making it an effective tool for removing isolation and lessening loneliness, which deaf people may feel or experience (Alnfiai & Sampali, 2017). Facebook for instance showed credibility to make it possible for deaf persons to share life experiences by interacting, networking, making new friends, obtaining mentorship, collaborating, and exchanging ideas (Alnfiai & Sampali, 2017).

Greenhow and Robelia (2009) indicated that the integration of social media in learning and teaching contexts may result in new kinds of inquiry, communication, cooperation, and identity work or have favorable cognitive, social, and emotional effects; also, Amin et al. (2020) revealed that social networking websites foster participation and critical thinking. They also increase peer support and communication about course content and evaluation (DiVall & Kirwin, 2012) and intercultural language learning (Mills, 2011) and have a positive impact on identity expression and digital (Manca & Ranieri, 2013).

According to Toofaninejad et al. (2017), deaf/HI children frequently asserted that social media had a beneficial effect on their learning through increased contact, learning motivation, as well as support and feedback.

7 Conclusion

Based on the previous research, the majority of parents of deaf/HI students believed that learning sign language would be too expensive, difficult, and time-consuming for them. They also believed that there were no enough institutions where parents could learn the language. Those who were eager to learn outnumbered parents who were not. Due to their attitudes toward learning sign language, parents were unable to fully engage in their kids' education and daily lives. Most parents admitted that they had trouble understanding their deaf/HI children, and vice versa. This makes it difficult for hearing parents or family members to communicate with their hearing-impaired children.

Family could always utilize from the current technology, especially social media platform, which the government or the society can initiate to allow those family members to learn without any kind of obstacles. Social media is accessible to everyone through their mobile and applications; they can learn and chat freely with no hindrance since Bahraini families are considered to be a shy community; studying through social media tools will be a splendid way to learn without any kind of obstruction such as time, commuting, or any other reasons.

The Ministry of Social Development, as the responsible body, should offer the education service in social media, such as Instagram, to teach sign language to family members of the deaf and hearing-impaired children. This will be done by offering education classes for parents and their families, helping them to learn sign language, and facilitating direct interaction through live chat, as education in social media is open to everyone. For those who prefer classroom classes, the ministry should set up a specialized institution that offers free sign language classes at times that are convenient for them and do not interfere with their job schedules. As mentioned above, there are children who would face many obstacles if their parents are not familiar with sign language, and this obstructs from learning and comprehending their education well. Thus, taking such initiatives would help to achieve two of the SDGs by satisfying families and children and providing opportunities for everyone to continue learning throughout their lives and guarantee inclusive, equitable, high-quality education by giving everyone the chance to learn and create more peaceful and prosperous societies.

References

Alawajee, O. (2022). Exploring the sign language proficiency of university undergraduate students in a preservices preparation program for teachers of deaf students. *Higher Education Pedagogies, 7*(1), 65–87. https://doi.org/10.1080/23752696.2022.2092882

Al-Bahrani, A., Patel, D., & Sheridan, B. (2015). Engaging students using social media: The students' perspective. *International Review of Economics Education, 19*, 36–50.

Alnfiai, M., & Sampali, S. (2017). Social and communication apps for the deaf and hearing impaired. In *2017 international conference on computer and applications (ICCA)* (pp. 120–126). IEEE.

Alwatan. (2022). Al-Nuaimi to the homeland: The number of deaf people reached 2103, male and female. . Retrieved 1 Jan 2023, from https://alwatannews.net/Bahrain/article/1034104/.

Alzahrani, A., Alamri, G., Alqarni, F., Alamri, A., & Andrews, J. (2015). The teaching of reading and writing Arabic with deaf students in Saudi Arabia: A survey of teacher methods. In *Poster session presented at the 41st Annual ACE-DHH Conference*.

Amdahl, K. (2020). *Pairing sign language with hearing aids*. Amdahl Hearing. Retrieved 5 Jan 2023, from https://amdahlhearing.com/pairing-sign-language-with-hearing-aids/

Amin, N. A. N., Almunawar, M. N., Hasnan, A. S., & Besar, N. N. (2020). The utilization of web 2.0 for knowledge sharing: The case of tertiary education in Brunei Darussalam. In *Handbook of research on managerial practices and disruptive innovation in Asia* (pp. 1–25). IGI Global.

Azleen, M. B. (2013). Persdektif Anak Berkerperluan Khas Terhadap Penerimaan-Penolakan Ibu Dan Bapa. Tesis Sarjana Pendidikan, Fakulti Pendidikan, Universiti Kebangsaan Malaysia.

Bako, B. B. (2022). The challenges of Cochlear implant users in Jos, North Central Nigeria. *International Journal of Otolaryngology and Head & Neck Surgery, 11*(4), 175–192.

Bank, R. (2015). *Centre for Language Studies: Radboud University Nijmegen and international Max Planck Research School for Language Sciences*. The Netherlands.

Bettger, J. G., Emmorey, K., McCullough, S. H., & Bellugi, U. (1997). Enhanced facial discrimination: Effects of experience with American sign language. *Journal of Deaf Studies and Deaf Education, 2*, 223–233.

Bizbahrain. (2022). How ready are businesses in Bahrain to accept people with special needs and challenges?. Retrieved 9 Jan 9 2023, from https://www.bizbahrain.com/how-ready-are-businesses-in-bahrain-to-accept-people-with-special-needs-and-challenges/.

Bowman-Smart, H., Gyngell, C., Morgan, A., & Savulescu, J. (2019). The moral case for sign language education. *Monash Bioethics Review, 37*(3), 94–110.

Casey, S., Emmorey, K., & Larrabee, H. (2012). The effects of learning American sign language on co-speech gesture. *Bilingualism: Language and Cognition, 15*(4), 677–686.

Clark, R., Freedberg, M., Hazeltine, E., & Voss, M. W. (2015). Are there age-related differences in the ability to learn configural responses? *PLoS One, 10*(8), e0137260.

Cooper, H., Holt, B., & Bowden, R. (2011). Sign language recognition. In *Visual analysis of humans* (pp. 539–562). Springer.

Cox, S. R., Bak, T. H., Allerhand, M., Redmond, P., Starr, J. M., Deary, I. J., & MacPherson, S. E. (2016). Bilingualism, social cognition and executive functions: A tale of chickens and eggs. *Neuropsychologia, 91*, 299–306.

DiVall, M. V., & Kirwin, J. L. (2012). Using Facebook to facilitate course-related discussion between students and faculty members. *American Journal of Pharmaceutical Education, 76*(2), 32.

Ee, L. W. S., Ramachandiran, C. R., & Logeswaran, R. (2020). Real-time sign language learning system. In Journal of physics: Conference series (Vol. 1712. 1, 012011). IOP Publishing.

Epstein, J. L., Sanders, M. G., Sheldon, S. B., Simon, B. S., Salinas, K. C., Jansorn, N. R., Voorhis, F. L., Martin, C. S., Thomas, B. G., Greenfeld, M. D., Hutchins, D. J., & Williams, K. J. (2009). *School, family, and community partnerships: Your handbook for action* (3rd ed.). Corwin Press.

Gray, J. (2011). Why don't some hearing parents of deaf children use sign language. *American Annals of the Deaf*, 135–211.

Greenhow, C., & Robelia, B. (2009). Old communication, new literacies: Social network sites as social learning resources. *Journal of Computer-Mediated Communication, 14*(4), 1130–1161.
Hilchey, M. D., & Klein, R. M. (2011). Are there bilingual advantages on nonlinguistic interference tasks? Implications for the plasticity of executive control processes. *Psychonomic Bulletin & Review, 18*(4), 625–658.
Huenerfauth, M., & Kacorri, H. (2015). Best practices for conducting evaluations of sign language animation. *Journal on Technology & Persons with Disabilities, 3*. https://scholarworks.rit.edu/cgi/viewcontent.cgi?article=2799&context=article
Imlach, A., Ward, D. D., Stuart, K. E., Summers, M. J., Valenzuela, M. J., King, A. E., Saunders, N. L., Summers, J., Srikanth, V. K., Robinson, A., & Vickers, J. C. (2017). Age is no barrier: Predictors of academic success in older learners. *npj Science of Learning, 2*(1). https://doi.org/10.1038/s41539-017-0014-5
Jiang, J., Ouyang, J., & Liu, H. (2016). Can learning a foreign language Foster analytic thinking?—Evidence from Chinese EFL Learners' writings. *PLoS One, 11*(10), e0164448.
Kamus, D. (2010). Edisi Keempat. Kuala Lumpur, Malaysia: Dewan Bahasa dan Pustaka.
Khan, M. N., Ashraf, M. A., Seinen, D., Khan, K. U., & Laar, R. A. (2021). Social media for knowledge acquisition and dissemination: The impact of the COVID-19 pandemic on collaborative learning driven social media adoption. *Frontiers in Psychology, 12*, 648253.
Kimu, A. M. (2012). Parent involvement in public primary schools in Kenya (Doctoral dissertation, University of South Africa).
Kobosko, J. (2011). Parenting a deaf child–how hearing parents cope with the stress of having deaf children. *Medical Science Monitor, 1*(3), OA38–OA42.
Lieberman, A. M., Mitchiner, J., & Pontecorvo, E. (2022). Hearing parents learning American sign language with their deaf children: A mixed-methods survey. *Applied Linguistics Review*.
Low, L. K. (2015). *Intervensi awal bahasa isyarat terhadap penguasaan kod tangan bahasa Melayu (KTBM) dalam kalangan kanak-kanak bermasalah pendengaran*. (Doctoral dissertation,. Universiti Pendidikan Sultan Idris.
Luchivya, R. O., Omolo, T. M., & Onditi, S. A. (2020). Challenges parents face in learning Kenyan sign language: Hearing parents of deaf children's perspectives. *African Journal of Education and Practice, 6*(7), 1–8.
Manca, S., & Ranieri, M. (2013). Is it a tool suitable for learning? A critical review of the literature on Facebook as a technology-enhanced learning environment. *Journal of Computer Assisted Learning, 29*(6), 487–504.
Marippan, F. M. H., & Yasin, M. H. M. (2020). The level of sign language skill for parents of hearing-impaired children. In *International conference on special education in South East Asia region 10th series 2020* (pp. 274–282). Redwhite Press.
McCullough, C. A., & Duchesneau, S. M. (2016). Psychological effects of oralism. In *The Sage Deaf studies encyclopedia* (pp. 724–728). https://doi.org/10.4135/9781483346489.n226
Mills, N. (2011). Situated learning through social networking communities: The development of joint enterprise, mutual engagement, and a shared repertoire. *CALICO Journal, 28*(2), 345–368. https://doi.org/10.11139/cj.28.2.345-368
Mitchell, R. E., & Karchmer, M. A. (2004). Chasing the mythical ten percent: Parental hearing status of deaf and hard of hearing students in the United States. *Sign Language Studies, 4*(2), 138–163. https://doi.org/10.1353/sls.2004.0005
Moses, A. M., Golos, D. B., & Bennett, C. M. (2015). An alternative approach to early literacy: The effects of ASL in educational media on literacy skills acquisition for hearing children. *Early Childhood Education Journal, 43*(6), 485–494. https://doi.org/10.1007/s10643-015-0690-9
Napier, J., Leigh, G., & Nann, S. (2007). Teaching sign language to hearing parents of deaf children: An action research process. *Deafness & Education International, 9*(2), 83–100.
Napoli, D. J., Mellon, N. K., Niparko, J. K., Rathmann, C., Mathur, G., Humphries, T., & Lantos, J. D. (2015). Should all deaf children learn sign language? *Pediatrics, 136*(1), 170–176.
Ngobeni, W. P., Maimane, J. R., & Rankhumise, M. P. (2020). The effect of limited sign language as barrier to teaching and learning among deaf learners in South Africa. *South African Journal of Education, 40*(2), 1–7.

NIHR. (2012). Constitution of the Kingdom of Bahrain. NIHR.org. Webpage https://www.nihr.org.bh/EN/eLibrary/Publication/MediaHandler/GenericHandler/documents/Constitution%20of%20the%20Kingdom%20of%20Bahrain.pdf

Nor, S. M., & Rashed, Z. N. (2018). Peranan dan cabaran guru-guru pendidikan khas membentuk kemenjadian murid-murid masalah pendengaran dalam abad ke 21. *Journal of Quran Sunnah Education & Special Needs*.

Ortiz-Ospina, E. (2019). The rise of social media. Our World in Data. Our World in Data. https://ourworldindata.org/rise-of-social-media

Perrotta, L. M. (2017). *The parental perspective of perceived benefits of baby sign language in preverbal children* [Doctoral dissertation]. https://cdr.lib.unc.edu.

Poarch, G. J., & Bialystok, E. (2015). Bilingualism as a model for multitasking. *Developmental Review, 35*, 113–124.

Rahman, S., Ramakrishnan, T., & Ngamassi, L. (2019). Impact of social media use on student satisfaction in higher education. *Higher Education Quarterly, 74*(3), 304–319. https://doi.org/10.1111/hequ.12228

Razalli, A. R., Rakoro, J. U., Ariffin, A., Hashim, A. T., & Mamat, N. (2019). Factors affecting sign language acquisition in hearing impaired learners during primary education. *Religación: Revista de Ciencias Sociales y Humanidades, 4*(15), 202–209.

Rizal, D. (2021). Instagram as a medium for teaching and learning English: A qualitative systematic review. *ELLITE: Journal of English Language, Literature, and Teaching, 6*(2), 112–119.

Shekari, E., Nakhshab, M., Valinejad, V., Modarres, Z. A., & Hosseinpour, A. (2017). *A systematic review of the effectiveness of early intervention and the role of parents in language development of hearing loss children* (Vol. 15, p. 5).

Snoddon, K. (2015). Using the common European framework of reference for languages to teach sign language to parents of deaf children. *Canadian Modern Language Review, 71*, 270–287.

TDT. (2021). *Bahrain achieves 10th sustainable development goal to reduce inequality: The daily tribune: Kingdom of Bahrain*. DT News.. Retrieved 23 Jan 2023, from https://www.newsofbahrain.com/bahrain/69244.html#:~:text=As%20a%20result%2C%20Bahrain%20has%20achieved%20the%20Sustainable,to%20offer%20services%20to%20Bahrainis%20and%20residents%20alike

Tess, P. A. (2013). The role of social media in higher education classes (real and virtual)–A literature review. *Computers in Human Behavior, 29*(5), A60–A68. https://doi.org/10.1016/j.chb.2012.12.032

The Information & eGovernment Authority. (2018). Kingdom of Bahrain portal for sustainable development goals.. https://www.sdgs.gov.bh/PDFfiles/EN/Voluntary%20National%20Review%20Report%20on%20the%20SDGs%20.pdf.

Toofaninejad, E., Zaraii Zavaraki, E., Dawson, S., Poquet, O., & Sharifi Daramadi, P. (2017). Social media use for deaf and hard of hearing students in educational settings: A systematic review of literature. *Deafness & Education International, 19*(3–4), 144–161.

Weaver, K. A., & Starner, T. (2011). We need to communicate! Helping hearing parents of deaf children learn American sign language. In *The proceedings of the 13th international ACM SIGACCESS conference on computers and accessibility* (pp. 91–98).

World Federation of the Deaf. (2016). WFD position paper on the language rights of deaf children. https://wfdeaf.org/wp-content/uploads/2017/01/WFD-Position-Paper-on-Language-Rights-of-Deaf-Children-7-Sept-2016.pdf

World Health Organization. (2007). *International classification of functioning, disability, and health: Children & Youth Version: ICF-CY*. World Health Organization.

World Health Organization. (2019). *Deafness and hearing loss.*. Retrieved 9 Jan 2023, from https://www.who.int/health-topics/hearing-loss#tab=tab_1.

World Health Organization (2021. *Deafness and hearing loss.*. Retrieved 11 Jan 2023, from (https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss.

Yusof, H. A. M. (2012). Perkembangan kecerdasan emosi kanak-kanak prasekolah bermasalah pendengaran: Implikasinya terhadap penglibatan ibu bapa. *Akademika, 82*(2), 137–142.

The Agile Adaptivity of Educators and Their Strategic Influence on the Learner During COVID-19 Pandemic

Noor S. J. I. Ahmed and Maria Akbar Saberi

1 Introduction

Educational techniques have evolved in recent years as a result of changing circumstances (Tuck et al., 2015). This has allowed educational institutions to persist in achieving ongoing success because of the great value education brings to all its patrons (Arokiasamy et al., 2017). Educators have always had a profound and long-lasting influence on learners. This influence not only has been on developing specific academic skills, but also had a positive impact on learners' self-esteem (Tekin-Iftar & Olcay-Gül, 2016). Self-esteem reinforcement in the classroom has been linked to enhanced motivation with learning. One example is the impact of the COVID-19 pandemic on the educational systems worldwide. During this time, the abundance of digital educational resources has placed new demands on higher education systems and institutions (Borisova, 2020), including the development of innovative curricula and alternative higher education methods (Rao, 2020).

During COVID-19, educational institutions all around the world were shut down, affecting most learners and causing a significant disruption in the education system. During COVID-19, Alqahtani and Rajkhan (2020) found that there were success elements for e-learning that shifted learners' perspectives, such as analysis and academic writing (Bist et al., 2019). Furthermore, managing change requires continuity and discipline at work, because people in general do not agree with change (Salcedo-Lagos et al., 2021). Therefore, resistance to institutional change occurs, such as in the education sector. Learners believed that e-learning is among the most

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difficult experiences in their academic life (Ladrera et al., 2020). However, the reality has shown it to be completely different. The importance of e-learning was proved even in its role as a contributor to the increase in the number of entrepreneurs due to e-learning. In addition to making enrolling in academic or professional courses easier, COVID-19 has assisted in bringing change and helping learners develop intellectually, acquire many new skills, think outside the box, and work with a team spirit under the guidance of the teacher.

2 Literature Review

This chapter discusses current research on educational institution educators who operate as owners of cutting-edge techniques for dealing with a variety of learners. The following are some key considerations concerning the significance of effectively managing change in light of the COVID-19 pandemic circumstances.

2.1 Strategic Agility

The education sector's ability to stay competitive in their business by adapting to new innovative ideas is referred to as strategic agility. Hunt and Taylor (2009) explained that strategic resilience and organizational performance are important in the educational sector. Ibrahim and Al-Hawary (2021) examined that there is a significant impact of strategic agility on organizational performance and the ability to innovate in e-learning. Additionally, the ability to innovate significantly improves the relationship between strategic flexibility and organizational performance, giving employees in the education sector the ability to learn, change, and face a variety of challenges through innovative ability in education, as well as learning continuity in a variety of situations (Bacevich, 1990; Łabowska et al., 2023). Mace (2016) focused more on the most innovative business model; business model enablers and strategic agility are terms that are explicitly evaluated by practitioners until they have been applied in the educational sector.

Sarah and Simon (2018) investigated by introducing the concept of strategic agility. According to Ibrahim and Al-Hawary (2021), strategic agility is defined as a company's capacity to make strong strategic commitments while being agile enough to handle and react to constant change brought on by rising strategic disruptions. Strategic pacing refers to educational management's capacity to continually recognize the necessity of improving the educational environment through strategic actions; as a result, adjusting the organizational configuration is required to ensure effective implementation (Mace, 2016). Agile institutions were proposed to be strategically well positioned to navigate the various educational departments and thus to manage the sustainability of educational institutions through strategic agility that has the advantage of the ability of educational institutions to develop innovative

ways to create more educational value for the various educational departments (Sarah & Simon, 2018). In addition, another idea is that all agile educational institutions rely strategically on all of these descriptive qualities to navigate the road to the institution level and accept change.

Mavengere (2013) discussed the means of strategic agility, which includes strategic sensitivity, strategic responsiveness, and collective skills. Sarah and Simon (2018) discussed the availability of a number of organizational variables for organizations to achieve their goals, the most important of which is strategic sensitivity in the organization that affects employee performance.

2.2 Education During COVID-19

Most of the education sectors have been impacted during COVID-19 and have changed their strategies and their teaching techniques to the learners (Kyriakoulis et al., 2016), and the goal of this systematic review was to identify the most effective teaching techniques for teaching evidence-based practice to undergraduates that have been used in educational institutions over the last several years. Also, Nimavat et al. (2021) focused on the fact that they have chosen e-learning technology as the best choice for distant learning or contact with learners and parents via the educational institution's official social networking sites. Tuck et al. (2015) argues that e-learning can improve their communication skills and encourage them to learn more about the technology and search international websites that help them achieve the right way of learning (Shahmoradi et al., 2018). Knowledge and skills in the field of information and communication technology have become a necessity and an integral part of preparing modern education for all learners to be adequately qualified to use a variety of information resources effectively and efficiently to best practice future job tasks (Ali et al., 2016). On the other hand, there are negative impacts in e-learning that results in learners taking all the information from the Internet, and this will lead to less valuable learning skills to the learners. Due to lack of development in learners (Gao et al., 2017), even if a learner has outstanding academic knowledge, he or she may lack the ability to convey such information to others (Malyal & Sharma, 2015).

Ahmed et al. (2021) investigate the contribution of educational management and (Purandare, 2011) higher education to effective educational institutions as change agents and argue that change of management in a crisis such as the COVID-19 can be well handled by administrators of educational institutions, who are essential components in the stability. With the emergence of the COVID-19 (Exsalabor et al., 2021), educational organizations around the world have strived to adapt successfully to change because education continues even during times of war or unforeseen circumstances.

De Klerk and Palmer (2021) studied that the impact of COVID-19 on the most disadvantaged communities is more difficult to analyze and shows numerous structural inequities, affecting their education level and forcing them to discontinue or delay studies owing to a lack of sophisticated technology and high costs. In order to

provide quality education (Gao et al., 2017), developing countries need to be able to adapt (Hunt & Taylor, 2009) and be prepared for various circumstances. Ahmed et al. (2021) discussed in their paper about the COVID-19 pandemic period (Manuti et al., 2020), taking into account international mandates, including legislation. The Sustainable Development Goals have become clearer and easier to promote equitable and inclusive education for all. Furthermore, education is essential for current and future generations. Niemczyk, De beer, and Steyn (Niemczyk et al., 2021) explained about the challenges that will arise in interacting with business and education if education is not maintained.

Salcedo-Lagos et al. (2021), during the COVID-19, examined educators' expectations and perceptions on learners' sentiments in virtual lectures. COVID-19 has enhanced and accelerated the growth of virtual education in the last couple of years (Salcedo-Lagos et al., 2021). Educators' expectations of their learners' sentiments during teaching (Thamsborg et al., 2015), strategies to organize study, and care for learning rather than wasting time in virtual lectures were investigated.

Niemczyk et al. (2021) observed that teamwork and inventive work are imperative to learner empowerment and ease of giving help from educators in these unexpected moments of crisis during COVID-19 for educational e-learning systems. The unique challenge of e-learning was monitored through websites (du Toit, 2018) that were provided between the educational institution and the learners to ensure that everyone's health was preserved and that all instructions from the Ministry of World Health and the country's Ministry of Health were followed. Many researches agreed with Shahmoradi et al. (2018) in their research, highlighting the significant improvements brought about by e-learning strategies. They also emphasized the importance of making the right decisions to solve problems and adapt educational techniques. This adaptability, coupled with the use of e-learning systems, helps learners face the challenges of acquiring new skills and enhancing their communication with educators (Exsalabor et al., 2021). Moreover, they examined university learners' and educators' attitudes toward translation as a tool in reading comprehension. Many learners, especially first-year learners, are at a lower level than learners who are already in advanced years of specialization due to the lack of complete knowledge of the new terms of the specialization that the learner will study, which makes them use translation programs to help them understand the new terms (Nourinezhad & Kashefian-Naeeini, 2020). Further, the new educators who have been employed for e-learning have been assisted by advanced technology through the use of translation sites, in order to understand some new key words.

Manuti et al. (2020) show that the importance of the HRM during COVID-19 has become more focused, and it wants to increase the employee's performance; the time is very appropriate for change, as some corporations have managed to re-evaluate and restructure employees, especially in the administrative human resources department, because they are the most important in affecting the educational institution positively or negatively. The employees and officials in the human resources department have the ability to (Arokiasamy et al., 2017) develop employees' skills and support and motivate them to learn, in order to achieve their goals (Lawania & Kapoor, 2018) during the COVID-19 period that has lasted for almost 2 years and

changed strategies thanks to the managers of the active and effective human resources. In addition to that, according to the findings of the research paper, there is an impact on the critical role that sustainable human resource management (Ladrera et al., 2020) practices play in capitalizing human resources and organizational performance in a time of great uncertainty and global crises like COVID-19 and other unforeseeable future crises.

2.3 E-Learning Challenges Faced by Educators and Learners

Thakker, Parab, and Kaisare (Thakker et al., 2021) show that e-learning platforms have helped the education sector solve the challenges that learners face during COVID-19. When educational institutions began to face the challenges posed by COVID-19, e-learning came to the forefront as the best practical and successful technology and strategy. It aims to provide solutions that will help enhance the e-learning (Kattimani & Naik, 2012) experience not only in times of COVID-19 but also in the long term, as learning continues in all circumstances and unexpected actions. E-learning will remain continuous for the coming years and for new generations. Ali et al. (2016) explained about the very quick technological development due to the culture of generations and their openness to science and learning. Parks (2021) mentioned that COVID-19 brought about many changes in directions and regulations in sectors including political, government, and education rules (Alqahtani & Rajkhan, 2020).

Research by Rao (2020) has explained about the different types of challenges during COVID-19 between the educators and learners through the e-learning educational systems. It has been focused more on the advantages that lead educators to prepare in advance and (Meinert et al., 2019) use the e-learning systems easily without facing difficulties during the lectures. One of the most important challenges faced by users of Internet networks is the weakness of Internet networks or their sudden interruption, which makes them learn ways to deal with these problems (Al Qaruty & Raslan, 2021), providing the necessary training for employees in educational institutions (Panda et al., 2015) or free programs to communicate with learners (Ali et al., 2016).

Mendonça et al. (2012) discussed the need to enhance lecturer awareness (Tuck et al., 2015) and distribute class assignments among learners so that they may work together as a team (Aljoumani, 2021; Moosa, 2019), encouraging them to support each other. Additionally, educators' perceptions are discussed and how they improve their experiences (Tekin-Iftar & Olcay-Gül, 2016) or increase the quality of their performance by recording online lectures and having them reviewed by a competent authority from the Ministry of Education or the State's Education and Quality Assurance authority, and most importantly, the presence of an academic advisor who helps learners to answer all their inquiries through (Hong, 2015) e-mail.

COVID-19 has assisted many smart educators with upcoming goals to devise several classroom activities that develop learners' skills (Dong & Gao, 2021); sometimes, it has encouraged many of the academically skilled educators to give them opportunities for expansion and innovation in e-learning (Guardia et al., 2019).

3 Research Methodology

A critical literature review methodology (Arokiasamy et al., 2017) has been adapted by this systematic research paper. The importance of e-learning and the benefits of learning for learners and educators are discussed along with the impact of technology on various societies and sectors, including the educational sector, which is one of the most important sectors for state renaissance, business continuity, knowledge, and scientific and cultural development. The world has changed as a result of the COVID-19 pandemic (Exsalabor et al., 2021), and there will be no going back to the past or to prior traditional tactics; nonetheless, the significance of growing learners' skills, coping with different levels, and obtaining and developing new talents will remain (Mairas et al., 2016). There is variable resistance to change among learners, based on their understanding of the pivotal role of learning and the development of literacy and scientific research skills (Ahmed et al., 2021). This understanding increases their cultural and educational awareness, instilling the confidence needed to navigate the changing world and diverse cultures from the pre-COVID-19 era (Ahmed et al., 2021).

4 Conclusion

This chapter has shown that strategic agility (Mavengere, 2013) saved educational institutions during COVID-19 pandemic, and those which did not have the strategic agility and plan to be agile faced many difficulties. Much research has proven the positive impacts on the education sector. The learner's self-direction scale has guided self-education to positive effects, with support for open distance (Veziroglu & Gönen, 2012), higher learning programs involving the learning environment (Botha & Coetzee, 2016), development of advanced strategies, and directing employees in educational institutions. The distinctive advantages of e-learning (Botha & Coetzee, 2016) include the ease of practicing their lives better than before, working and studying at the same time, and flexibility of teachers with learners, which help learners develop their academic and intellectual skills. Learners' success is dependent on the presence of a successful lecturer, one who is disciplined at work in a variety of situations and can manage change for learners in a way that is indirect or acceptable to everybody (Ahmed et al., 2021).

References

Ahmed, N., Hamdan, A., & Alareeni, B. (2021). The contribution of healthcare middle managers as change agents in the era of Covid-19: Critical review. In *The importance of new technologies and entrepreneurship in business development: In The Context of Economic Diversity in Developing Countries the Impact of New Technologies and Entrepreneurship on Business Development.* (Vol. 194, pp. 670–678).

Al Qaruty, R., & Raslan, L. (2021). Impact of ISLAMIC law & psychological problems caused by COVID19: Analytic study. *Journal of Legal, Ethical and Regulatory Issues, 24*(1), 1–11.

Ali, J. B., Al-Shawaf, H. M. H., & Almajran, A. A. (2016). Health sciences students' self-assessment of information and communication technology skills and attitude toward e-learning. *JMIR Medical Education, 2*(1), e5606.

Aljoumani, S. (2021). A new document on the transmission of knowledge in Islamic history an edition of the preliminary samāʿ list on the Sunan by Al-Dāraquṭnī. *Journal of College of Sharia and Islamic studies, 38*(2). https://doi.org/10.29117/jcsis.2021.0269

Alqahtani, A. Y., & Rajkhan, A. A. (2020). E-learning critical success factors during the COVID-19 pandemic: A comprehensive analysis of E-learning managerial perspectives. *Education Sciences, 10*(9), 216.

Arokiasamy, L., Mansouri, N., Balaraman, R. A., & Kassim, N. M. (2017). A literature review of competence development on academic career advancement: A human resource development perspective. *Global Business and Management Research, 9*(1), 403–414.

Bacevich, A. J. (1990). New rules: Modern war and military professionalism. *Parameters, 20*(4), 12.

Bist, D., Smith, P., & Davies, M. S. (2019). A qualitative investigation into the reasons for low academic achievement of international students in a private college. *International Journal of Higher Education Management, 6*(1), 47–66.

Borisova, E. V. (2020). Students in the digital format of the educational process of the higher educational institution: Risks and advantages. *Journal of Physics: Conference Series, 1691*(1), 012075.

Botha, J., & Coetzee, M. (2016). The influence of biographical factors on adult learner self-directedness in an open distance learning environment. *International review of research in open and distributed Learning, 17*(4), 242–263.

De Klerk, E. D., & Palmer, J. M. (2021). resetting education priorities during Covid-19: towards equitable learning opportunities through inclusion and equity. *Perspectives in Education, 39*(1), 12–28.

Dong, A., & Gao, Q. (2021). Framework of the teaching process based on machine learning and innovation ability cultivation in big data background. *Journal of Physics: Conference Series, 1992*(4), 042069.

du Toit, N. H. (2018). Designing a model for facilitating the Inclusion of higher education international students with disabilities in South Africa. *Social Inclusion, 6*(4), 168–181.

Exsalabor, A. A., Irawan, A., Pangaribuan, M. T., Nugrahani, H. S. D., & Zulkarnain, R. A. (2021). COVID-19 outbreak and education institutions in Indonesia: A critical analysis of the ministry of education's work efficiency. *IOP conference Series. Earth and environmental Science, 716*(1), 012074.

Gao, T., Wang, Z., Huang, Y., Keyhani, N. O., & Huang, Z. (2017). Lack of resistance development in Bemisiatabaci to Isariafumosorosea after multiple generations of selection. *Scientific Reports (Nature Publisher Group), 7*, 42727.

Guardia, J. J., Del Olmo, J. L., Roa, I., & Berlanga, V. (2019). Innovation in the teaching-learning process: The case of Kahoot! *On the Horizon, 27*(1), 35–45.

Hong, C. (2015). Making complaints-proficiency effects on instructor- and peer-directed email correspondence*. *Journal of Language Teaching and Research, 6*(1), 53–60.

Hunt, A., & Taylor, T. (2009). To adapt or not to adapt? Towards local costing of climate change impacts for decision making in adaptation. *IOP conference Series. Earth and environmental Science, 6*(32).

Ibrahim, R. A., & Al-Hawary, S. (2021). The mediating role of innovation capability on the relationship between strategic agility and organizational performance. *Sustainability, 13*(14), 7564.

Kattimani, S. F., & Naik, R. R. (2012). E-learning technology in the ICT era: Application to technical education. *DESIDOC Journal of Library & Information Technology, 32*(6), 459.

Kyriakoulis, K., Patelarou, A., Laliotis, A., Wan, A. C., Matalliotakis, M., Tsiou, C., & Patelarou, E. (2016). Educational strategies for teaching evidence-based practice to undergraduate health students: Systematic review. *Journal of Educational Evaluation for Health Professions, 13*, 1149027.

Łabowska, M. B., Borowska, E. I., Szymczyk-Ziółkowska, P., Michalak, I., & Detyna, J. (2023). Hydrogel based on alginate as an ink in additive manufacturing technology—Processing methods and printability enhancement. In A. Nayyar, M. Naved, & R. Rameshwar (Eds.), *New horizons for industry 4.0 in modern business. Contributions to Environmental Sciences & Innovative Business Technology*. Springer. https://doi.org/10.1007/978-3-031-20443-2_10

Ladrera, R., Rodríguez-Lozano, P., Verkaik, I., Prat, N., & Díez, J. R. (2020). What do students know about Rivers and their management? Analysis by educational stages and territories. *Sustainability, 12*(20), 8719.

Lawania, B. D., & Kapoor, S. (2018). Leveraging corporate social responsibility for the advancement of development goals in India: Sanitation and cleanliness movement in India. *Australasian Accounting Business & Finance Journal, 12*(2), 46–70.

Mace, R. (2016). *Business model innovation, business model enablers and the strategic agility paradox*. Capella University.

Mairas, A. R., MohdNazri, L. A., Zanirah, B. W., Ahmad TaufikHidayah, B. A., & Nor Jijidiana, B. A. (2016). The impacts of 'Problem-based learning' approach in enhancing critical thinking skills to teaching literature. *International Journal of Applied Linguistics & English Literature, 5*(6), 249–258.

Malyal, M., & Sharma, R. (2015). E-learning: In school education ISSUES & challenges and advantages: A review. *International Journal of Advanced Research in Computer Science, 6*(5), 137–140.

Manuti, A., Giancaspro, M. L., Molino, M., Ingusci, E., Russo, V., Signore, F., Zito, M., & Cortese, C. G. (2020). "Everything will be fine": A study on the relationship between employees' perception of sustainable HRM practices and positive organizational behavior during COVID19. *Sustainability, 12*(23), 10216.

Mavengere, N. B. (2013). Role of information Systems for Strategic Agility in supply chain setting: Telecommunication industry study. *Electronic Journal of Information Systems Evaluation, 16*(4), 327–340.

Meinert, E., Alturkistani, A., Foley, K. A., Brindley, D., & Car, J. (2019). Examining cost measurements in production and delivery of three case studies using E-learning for applied health sciences: Cross-case synthesis. *Journal of Medical Internet Research, 21*(6), e13574.

Mendonça, M., Popov, O., Frånberg, G.-M., & Cossa, E. (2012). "Introducing a student-centred learning approach in current curriculum reform in Mozambican higher education", *Education. Inquiry, 3, no. 1*, 37.

Moosa, R. (2019). Critical attributes of effective classrooms: Insights from classroom engagement. *Perspectives in Education, 37*(1), 87–100.

Niemczyk, E. K., De Beer, Z. L., & Steyn, H. J. (2021). The challenges posed by COVID-19 to the BRICS education systems: Lessons to be learnt. *Perspectives in Education, 39*(1), 173–188.

Nimavat, N., Singh, S., Fichadiya, N., Sharma, P., Patel, N., Kumar, M., Chauhan, G., & Pandit, N. (2021). Online medical education in India – Different challenges and probable solutions in the age of COVID-19. *Advances in Medical Education and Practice, 12*, 237–243.

Nourinezhad, S., & Kashefian-Naeeini, S. (2020). "Iranian EFL university learners and lecturers' attitude towards translation as a tool in reading comprehension considering background variables of age, major and years of experience", *cogent. Education, 7*(1), 1746104.

Panda, G., Mishra, S., & Mishra, S. K. (2015). Modern Technology & Professional Education. *Parikalpana: K I I T. Journal of Management, 11*(1), 46–55.

Parks, T. (2021). *Technological impacts during transition from face-to-face teaching to synchronous during the pandemic*. Capella University.

Purandare, A. S. (2011). Management education in 2020: Issues, challenges^ and opportunities the role of management education in 2020: Indian context. *Journal of Applied Management - Jidnyasa, 3*, 9–18.

Rao, T. S. (2020). Mathematics online teaching-learning methods, advantages and challenges during Covid-19: A critical study on teachers and learners. *Educational Quest, 11*(3), 175–181.

Salcedo-Lagos, P., Morales-Candia, S., Fuentes-Riffo, K., Rivera-Robles, S., & Sanhueza-Campos, C. (2021). Teachers' perceptions analysis on students' emotions in virtual classes during COVID19 pandemic: A lexical availability approach. *Sustainability, 13*(11), 6413.

Sarah, B. I., & Simon, B. B. (2018). Managing corporate sustainability with a paradoxical lens: Lessons from strategic agility: JBE. *Journal of Business Ethics, 148*(2), 347–361.

Shahmoradi, L., Changizi, V., Mehraeen, E., Bashiri, A., Jannat, B., & Hosseini, M. (2018). The challenges of E-learning system: Higher educational institutions perspective. *Journal of Education and Health Promotion, 7*(1), 116.

Tekin-Iftar, E., & Olcay-Gül, S. (2016). Increasing instructional efficiency when using simultaneous prompting procedure in teaching academic skills to students with autism Spectrum disorders *. *International Electronic Journal of Elementary Education, 9*(2), 451–472.

Thakker, S. V., Parab, J., & Kaisare, S. (2021). Systematic research of e-learning platforms for solving challenges faced by Indian engineering students. *Asian Association of Open Universities Journal, 16*(1), 1–19.

Thamsborg, L. H., Petersen, M. A., Aaronson, N. K., Chie, W., Costantini, A., Holzner, B., Leeuw, I. M., Verdonck-de, Young, T., & Groenvold, M. (2015). Development of a lack of appetite item bank for computer-adaptive testing (CAT). *Supportive Care in Cancer, 23*(6), 1541–1548.

Tuck, J., Myers, L., Mahoney, M., Hogben, A., Windsor, J., Berg, J., Marquesen, J., & Watson, L. (2015). P-177 sustaining compassion awareness education - using an action plan to embed learning. *BMJ Supportive & Palliative Care, 5*, A64.1.

Veziroglu, M., & Gönen, M. (2012). Review of the eligibility of picture books to the acquisitions of the preschool education program of the Ministry of National Education. *Egitimve Bilim, 37*(163), 226.

A Path Towards Sustainability in the Era of Data-Driven Big Data Analysis

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1 Introduction

Brundtland Commission report defines sustainability as "filling existing demands without sacrificing future generations."

Social, cultural, environmental, and economic concerns are the cornerstone of sustainability. Social sustainability is treating ourselves and others fairly and with respect. The cultural factor promotes varied attitudes and beliefs. Environmental sustainability is about protecting the Earth's biophysical system. Economic sustainability requires using existing resources efficiently to generate products and services that bring value to people's lives. Modern socioeconomic systems are based on linear economics, or use and throw. High resource depletion and escalating environmental challenges require circular economic frameworks. Circular economy is a regenerative and restorative system. Recent corporate models have featured environmental advances.

Big data analytics is a twenty-first-century business innovation. This study examines big data's business, socioeconomic, and environmental sustainability consequences.

Big data is a new term, but collecting large amounts of data for analysis is not. Big data is extremely large datasets that can be computationally analyzed to reveal patterns, trends, and associations, especially relating to human behavior and interactions. Big data analytics is the process of analyzing big data to find underlying patterns, correlations, trends, and preferences that help organizations make more efficient and informed business decisions.

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Big data is often defined by three features: volume, velocity, and variety. Data volume is measured in petabytes, exabytes, and terabytes. Velocity describes the pace of data collection, and variety its heterogeneity (Russom, 2011).

Veracity can be applied to illustrate data accuracy or factual consistency (Abbasi et al., 2016). The efficiency of creating and transporting information has increased from 0.3 exabyte in 1986 to 65 exabytes in 2007 (Manyika, 2011). Many firms utilize massive amounts of data to make better business decisions. Walmart utilized 2.5 petabytes of consumer data to change prices in 2012.

Improving speed and efficiency is linked to cost-cutting in the competitive world. Big data analytics allows businesses to make rapid, accurate choices, providing them a competitive edge that they did not have previously. This helps with cost savings, decision-making, and product development. Many industries, including healthcare, travel and hospitality, government, and retail, employ big data analytics today. Huge and diverse data makes sense when it can deliver insights unthinkable with little pieces of data.

Big data overcomes the limitations of traditional sampling approaches by analyzing the whole population. This allows diverse viewpoints, precise output, and accurate predictions (Varian, 2014). Big data analytics challenge academics who link results to old hypotheses. In most cases, we need more theoretical ideas to understand big data's complex reality.

Big data analytics affects everything tech related. Sustainability is similar. Many governments are studying big data analytics to promote sustainable development in smart cities worldwide. Governance, resilience, quality of life, effective use of natural resources, and civic amenities are possible applications of big data analytics (Khan et al., 2013). Big data analytics will help with diagnosis and environmental sustainability.

2 Prospects of Data-Driven Sustainability in the Corporate Sector

Digitalization boosts the current circular economy. "Take, make, and waste" is being replaced with "recycle, reuse, and restore."

How can corporations promote sustainability while maximizing profits? It is big data.

3 Big Data and Sustainability Within the Organizations

Effective corporate sustainability can only be achieved by understanding how business and nature affect each other. Complex interactions between natural and commercial worlds suggest big data analytics applications. Businesses struggled to

understand their environmental implications until the previous decade. Big data gives them access to different datasets that may be utilized to increase performance efficiency and meet sustainability goals (John Hsu, 2014).

Profit drives business. It does not always help the environment. Big data can solve some of the challenges current businesses confront. Businesses are integrating sustainability into their plans and strategies. Big data analytics helps them maximize earnings while conserving the environment. This is more significant in cases of big companies which are responsible for most of the environmental degradation as they can be more responsible in their own operations, thereby nurturing sustainability.

The scope of big data in guaranteeing sustainability is broad. Big data starts with intraorganizational processes. The deployment of smart sensors improves the systems to optimum efficiency and provides the essential components at times when and where they are needed.

Big data's most important application for businesses is providing more realistic and reliable sales forecasts, which reduces energy and resource waste and maximizes stock usage. Big data ensures environmental and economic viability in the supply chain by establishing the most efficient transit between raw material allocation, production areas, warehouses, and customers. Real-time stock dispatches can update the movement path of forklifts and other vehicles, minimizing fuel and energy consumption (Nancy Master, 2017).

4 Big Data and Sharing Economy

Collaborative consumption is growing in popularity. Successful platforms like Uber, BlaBlaCar, Ola Cabs, and Airbnb use the above concept. Companies collect and use several sources of comparable data to create profitable business plans (Dror & Alberto, 2016).

Sharing economy is eco-friendly. By reducing car usage, carbon footprint is reduced. Big data enabled efficient and profitable collaborative consumption.

Big data informs even these firms' pricing strategies. A complicated algorithm uses real-time data on automobile rental demand and availability to change pricing at regular intervals.

5 Big Data and the Socioeconomic Aspects of Sustainability

5.1 Big Data and Sustainable Development Goals

UN Global Pulse (2012) demonstrates how big data may be used to monitor sustainable development goals. This means big data can improve people's lives. Big data examples include the following. To measure poverty, cell phone spending is considered. Spending on mobile phone services can be used to estimate national

income levels. Online food price tracking helps determine a country's hunger index. It monitors real-time food security.

Seventeen SDGs exist. These aims have been measured using certain criteria and indicators. Policy judgments are made after analyzing each parameter's massive amount of data. Many governments lack adequate demographic statistics, which is a major barrier to UN Global Pulse (2012).

6 Big Data and Environmental Aspects of Sustainability

6.1 Monitoring and Assessing Environmental Situations

Big data analytics is used to analyze and monitor environmental concerns and dangers. Real-time satellite images, drone help, and sensors deployed in critical and sensitive regions can be used to discover deforestation and other environmental hazards. There are technologies that monitor and analyze environmental hazards such as water dangers and pollution levels, utilizing a wide variety of indicators and parameters. Aqueduct maps water danger. This program analyzes global water risk using multiple metrics. Big data-based platforms track agriculture. Farmer on is a cloud-based program that tracks livestock data, including health (Fig. 1).

Farmers may efficiently manage resources by tracking real-time livestock data. IW Financial Staff (2016) big data improves farming methods. Big data analytics can automate irrigation system and manure application based on weather forecast, soil conditions, temperature and moisture levels, harvest time, etc. (Dror & Alberto, 2016).

The model described above is based on that of Gartner that has been brought forth to the original model to meet the fundamental data analysis: process that happens, what will happen, and how can we make it happen, culminating in prescriptive analytics model which is undertaken to explore choices.

With big data and sustainability, human interventions may be investigated, and effective solutions can be implemented to meet the most discussed challenges of

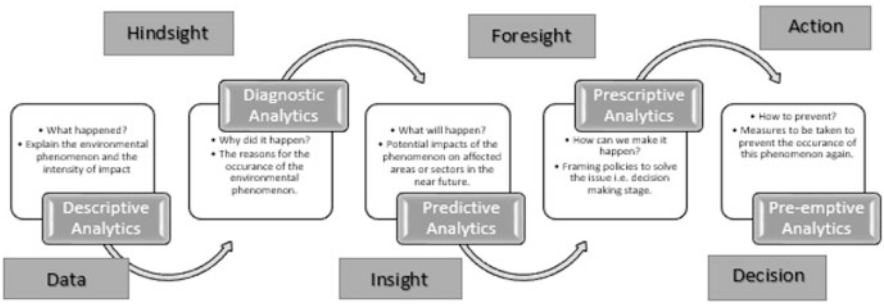

Fig. 1 Big data analytics for milk production, reproduction, nutrition, etc.

historical and real data availability to support sustainable growth. Preemptive analysis is important for predicting issues that may arise in the future. Programming languages have been created for this reason.

7 Risks and Challenges

Both big data and sustainability face hurdles. Notable macro-level difficulties include using big data to acquire socioeconomic and environmental data from countries (ICSU, 2015). Gartner's model divides the less economically developed nations in search of big data analytics for environmental concerns. Above is Gartner's concept of data analysis phases. The original model was modified for this investigation. The process includes answering why, what, when, and how questions. Prescriptive analytics follow descriptive analytics (Taras Kaduk, 2016). Add-on preemptive analytics explores preventative methods. With big data and sustainability, environmental phenomena may be investigated, and effective actions can be made to address global warming, pollution, etc. Big data analytics may now be used to cope with present and projected environmental challenges due to the availability of historical and real-time data. It would help define future policy to cope with the situation. Big data insights demand technological knowledge. There are many sophisticated programming languages developed for this purpose. R programming, Python, SAS, etc. are some of the programming languages used to handle the enormous amounts of data.

Micro- and macro-obstacles must be solved to make big data viable. Here are the highlights. Global big data concerns are macro-level issues. To use big data to promote sustainability, a varied mix of economic and environmental data is needed (ICSU, 2015). Less developed countries lack data-driven technologies and infrastructure. This divides nations pursuing global aims.

8 Conclusion

According to the report, corporations are embracing big data to develop environmentally friendly business strategies. Pro-environmental attitudes have led enterprises to switch from damaging old technologies to eco-friendly alternatives with higher application costs. Big data gives the most effective company solutions that blend environmental, cost, and profitability considerations. Big data analytics used to analyze sustainable development goals and identify environmental hazards give us hope for a people- or environment-focused big data revolution. The corporate world might also design and use the new big data ecosphere to boost the welfare of people, especially disadvantaged groups. Regional open-data platforms that handle data mobilization for global aims should be prioritized. More research is needed to prevent big data misuse.

References

Abbasi, A., Sarker, S., & Chiang, R. H. (2016). Big data research in information systems: Toward an inclusive research agenda. *Journal of the Association for Information Systems, 17*(2), 3.

Dror, E., & Alberto, J. (2016). Big data management and sustainability, strategic opportunities ahead. *Organization & Environment, 29*(2), 147–155.

Hsu, J., 2014. Why big data will have a big impact on sustainability. Retrieved from, https://www.theguardian.com/sustainable-business/big-data-impact-sustainable-business Accessed 29 Dec 2017.

ICSU (2015) Open Data in a Big Data World, an International Accord. Retrieved from, http://www.icsu.org/scienceinternational/accord/open-data-in-a-big-dataworld-long. Accessed 15 Jan 2018.

IW Financial Staff (2016) How Big Data is driving sustainability. Retrieved from, https://www.greenbiz.com/article/how-big-data-driving-sustainability. Accessed 27 Dec 2017.

Kaduk, T. (2016) 4 Stages Of Data Analytics Maturity: Challenging Gartner's Model. Retrieved from, https://www.linkedin.com/pulse/4-stages-data-analytics-maturity-challenging-gartners-taras-kaduk. Accessed 31 Dec 2017.

Khan, Z., Anjum, A., & Kiani, S. L. (2013). Cloud Based Big Data Analytics for Smart Future Cities. In *Proceedings of the 2013 IEEE/ACM 6th International Conference on Utility and Cloud Computing* (pp. 381–386). IEEE Computer Society.

Manyika, J. (2011). *Big data: The next frontier for innovation, competition, and productivity*. McKinsey Global Institute.

Master, N., 2017. What is Big Data's Role in Sustainability and Supply Chain Innovation? Retrieved from, http://www.rfgen.com/blog/what-is-big-datas-role-in-sustainability-and-supply-chain-innovation. Accessed 29 Dec 2017.

Russom, P. (2011). Big Data Analytics. *The Data Warehousing Institute, 4*(1), 1–36.

UN Global Pulse. (2012). *Big Data for Development: Challenges and Opportunities* (pp. 24–27).

Varian, H. (2014). Big data: New tricks for econometrics. *Journal of Economic Perspectives, 28*(2), 3–28.

How Do Innovative Work Behavior and Organizational Citizenship Behavior Improve Employee Productivity?

Mahmoud A. Salahat, Mousa A. Ajouz, and Imad AlZeer

1 Introduction

Organizations must operate effectively and efficiently in today's competitive and dynamic business environments. Employee productivity is measuring an individual or a group of workers' efficiency. It is the component that directly contributes to organizational profits (Ndidi et al., 2022). Regarding employee productivity, the twenty-first century has seen a big shift from production-oriented to more knowledge-intensive organizations. Knowledge employees emphasize nontraditional problem-solving skills, combining divergent and convergent thinking (Prasetyaningtyas et al., 2021). Because of this, this study focuses on nontraditional factors that affect employee productivity and empower innovation among employees. In spite of the importance of employee productivity, the current situation of employee productivity in educational institutions in Palestine is different.

Employee productivity is affected by many internal and external organizational factors; this study focuses on internal factors because the organization's leadership has control over internal organizational factors, so studying the effect of internal organizational factors on employee productivity helps educational institutions improve employee performance productivity. As this study mentioned earlier, the trend nowadays is to adopt nontraditional employee productivity approaches, and this study created a gap based on two main criteria: (1) the theoretical linkage between its DV, IVs, and mediators, which is identified according to the resource-based view theory, and (2) the role of the variables of this study in helping institutions adopt and implement nontraditional employee productivity components.

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Based on that, this study has two mediators; the first is innovative work behavior (IWB), which represents the first major gap of the present study. The second mediator is organizational citizenship behaviors (OCB). Also, according to the literature review, it has not been used in this place before as a mediator between employee engagement and employee training and organizational learning on the one hand and employee productivity on the other hand, and this represents the second major gap of this study.

The remaining of the chapter is arranged as follows: Section two presents a review of the literature and proposes the conceptual framework, while section three highlights the methodology adopted, and section four presents and discusses the findings. Finally, section five concludes the chapter.

2 Literature Review

2.1 Conceptual Framework of the Present Study

2.1.1 Employee Engagement

Employee engagement describes the level of an employee's behavioral and emotional state guided toward organizational objectives (Chin et al., 2019). Also, it is defined as an individual attachment and emotional commitment to the organization and its strategic goals (Kassa & Tsigu, 2021). Employees show a higher performance level when they find meaning in their work, organizational culture, and policies. According to the broaden and build theory (Fredrickson, 2004), the theoretical justification behind the relationship between employee engagement, innovation, and creativity is that the fully engaged employee experiences positive feelings such as interest, enthusiasm, and joy, which enhance employees' thought-action knowledge pool and build their skills by enlarging their thoughts, actions, and creativity. This increases their openness to new experiences and moves them to think nontraditionally (out of the box) and become more innovative in their work and results. Furthermore, the literature review revealed that employee engagement has a significant positive relationship with OCB (Rurkkhum & Bartlett, 2012) and IWB (Ali et al., 2022). Based on the previous discussion, this study hypothesizes the following:

H_1: There is a significant positive relationship between employee engagement and OCB.

H_2: There is a significant positive relationship between employee engagement and IWB.

2.1.2 Employee Training

Employee training is defined as an activity to enhance current and future job performance (Haryono et al., 2020). It is the process of shaping and equipping individuals by developing their skills, knowledge, abilities, and behaviors to perform their job quickly, effectively, and rationally. Training encourages employees by improving their technical skills and enhancing their work motivation. More importantly, training empowers job-related skills, which is an essential requirement to keep up with the rapidly changing environment of "demand and technology." The performance of an organization is affected by training positively. It has a vital role in employees' flexibility and high standards of work performance ability.

Moreover, training enhances the organizational ability toward positive change; well-trained employees know when and where to use their knowledge and skills. The literature review revealed that employee training has a significant positive relationship with employee productivity (Nda & Fard, 2013). Along the same line, employee training affects IWB behavior significantly and positively (Odoardi et al., 2022). Based on the previous discussion, this study hypothesizes the following:

H_3: There is a significant positive relationship between employee training and employee productivity.

H_4: There is a significant positive relationship between employee training and IWB behavior.

2.1.3 Organizational Learning

Organizational learning refers to continuing processes that enable and facilitate individuals and groups to learn, which occurs when there is a common and shared understanding in the organization (Namada, 2018). It is defined as the basis and the primary key to attaining sustainable competitive advantage of organizational performance (Kiziloglu, 2015). Organizational learning is considered a focal point between exploiting past experiences, adopting environmental changes, and providing access to futuristic options.

Furthermore, organizations become more able to react and respond to new environmental challenges if they are better equipped with dynamic, flexible, and responsive structure provided by organizational learning faster than the competitors. The high commitment to organizational learning enables organizations to actualize their objectives more easily. According to the literature review, organizational learning has a significant and positive relationship with OCB (Gusmão et al., 2018). Similarly, organizational learning affects IWB significantly and positively (Sutardi et al., 2022). Based on the above discussion, this study hypothesizes the following:

H_5: There is a significant positive relationship between organizational learning and OCB.

H_6: There is a significant positive relationship between organizational learning and IWB.

2.1.4 Organizational Citizenship Behavior (OCB)

Employee performance refers to how an individual behaves in the workplace and how well he or she does the job in terms of quality, effectiveness, and efficiency. As the educational sector has become more competitive, university leadership has given more attention to enhancing the main element that creates an innovative environment. Literature review revealed that employee performance is affected by employee engagement (Sugianingrat et al., 2019) and also affected by employee training (Guan & Frenkel, 2018) and work environment (Basit et al., 2018), along the same line that employee performance affects employee productivity. More importantly, the literature review revealed that the main dimensions of employee performance are in-role performance and extra-role performance (organizational citizenship behavior). OCB refers to voluntary behavior executed by an employee because he or she believes that it directly promotes the effectiveness of organization functions without directly influencing his or her productivity (Salahat & Majid, 2016). Along the same line, OCB is very important and essential for the organization; they support attaining organizational objectives and enable the employee to improve his or her overall performance. OCB is affected by employee engagement (Rurkkhum & Bartlett, 2012) and organizational learning (Gusmão et al., 2018). At the same time, OCB affects employee productivity significantly and positively (Barsulai et al., 2019). Based on the above discussion, OCB can be deployed as a mediator between the variables mentioned earlier. So, this study hypothesizes the following:

H_7: There is a significant positive relationship between OCB and employee productivity.

H_8: Does OCB mediate the relationship between employee engagement and employee productivity.

H_9: Does OCB mediate the relationship between organizational learning and employee productivity.

2.1.5 Innovative Work Behavior (IWB)

Innovative ideas are the vital cause behind organizational success and survival. IWB is defined as the performance of an individual to generate, introduce, and apply new ideas in an intentional way at work that contributes to organizational performance; it is considered the process of inventing new problem-solving applications that identify the problems, find solutions, and implement organizational solutions (Nguyen et al., 2020). Innovation research is vital in many academic fields, such as economics, management, sociology, and industrial design. These studies highlighted the importance of innovation-related issues for modern business. Employee efficiency and innovative work practices, work behavior, and employees' contribution toward

organizational change are considered major human resource management concerns. So, based on the importance of innovation, IWB plays a critical role in organizational success.

Furthermore, this study deploys IWB as its second mediator to examine its mediating role between employee engagement, employee training, and organizational learning on the one hand and employee productivity on the other hand since it has not been used in this place before, according to the literature review, and this represents the second significant gap of the present study. IWB is affected by employee engagement (Sifatu et al., 2020), employee training (Anjum et al., 2016), and organizational learning (Aboobaker & Zakkariya, 2021). At the same time, IWB affects employee productivity significantly and positively (Asurakkody & Shin, 2018). Based on the above discussion, IWB can be deployed as a mediator between the abovementioned variables. So, this study hypothesizes the following:

H_{10}: There is a significant positive relationship between IWB and employee productivity.

H_{11}: Does IWB mediate the relationship between employee engagement and employee productivity.

H_{12}: Does IWB mediate the relationship between employee training and employee productivity.

H_{13}: Does IWB mediate the relationship between organizational learning and employee productivity.

3 The Methodological Process

3.1 Research Design and Population

A quantitative method using primary data was adopted to investigate the factors influencing employee productivity in Palestinian higher education institutions. The higher education employees were selected as a source of information because of the need for previous research focusing on this segment. However, employee productivity in higher education institutions is essential in improving the educational process, affecting current and future generations. The higher education employees are also knowledgeable about the study dimension and can provide sufficient information regarding IWB behavior.

3.2 Research Instrument and Data Collection

The measurement items were developed based on an intensive literature review to achieve content validity. The research instrument contains items that measure employee engagement adopted from (Majid et al., 2020); employee training adopted from (Hanaysha & Tahir, 2016); organizational learning adopted from (Hanaysha,

2016); OCB adopted from (Podsakoff et al., 2009); IWB adopted from (Yuan & Woodman, 2010); and employee productivity adopted from (Lee & Brand, 2010). Additionally, the employed instrument used a 5-point Likert scale varying from 1 for strongly disagree to 5 for strongly agree.

The target respondents have been identified as higher education employees in the West Bank, Palestine. To determine, the sample size G*Power that is highly recommended by Cohen 1992 has been adopted, which recommended 88 observations as a sample size according to (Hair et al., 2016).

The data was collected using self-administered and electronic questionnaire techniques. Data collection occurred between the 29th of October 2020 and the 11th of January 2023. Thus, the questionnaires were online distributed based on convenience random sampling, and 105 valid responses were received.

Finally, the received data were analyzed using partial least squares (PLS) in SmartPLS 4. Thus, following the best practices in partial least squares, the measurement model was assessed for indicators internal consistency reliability, convergent validity, and discriminant validity. The PLS path modeling multiple regression approach was conducted to test the hypotheses using the 5000 bootstrapping technique (Hair et al., 2016).

4 Results and Discussions

4.1 Measurement Model

The measurement model was assessed for indicator and internal consistency reliability, convergent validity, and discriminant validity. First, indicator reliability was evaluated according to Hair, 2016 criteria, where all items with a factor loading less than 0.4 were eliminated, and the remaining items had outer loading between 0.650 and 0.931, which is statistically significant at 0.05, thus indicating acceptable indicator reliability (Ajouz, Abdullah, & Kassim, 2020).

To verify the construct reliability of the measurement model, three criteria were used, namely Cronbach's alpha (CA) and composite reliability (Rho_a & rho_c). Table 1 shows that Cronbach's alpha values ranged from 0.839 to 0.936; composite

Table 1 Assessment of the measurement model

Constructs	Cronbach's alpha	Composite reliability		AVE
		Rho_a	Rho_c	
Employee productivity	0.879	0.889	0.913	0.678
Organizational citizenship behavior	0.848	0.85	0.897	0.686
Innovative work behavior	0.908	0.916	0.928	0.648
Employee engagement	0.839	0.859	0.877	0.506
Employee training	0.926	0.942	0.945	0.774
Organizational learning	0.936	0.946	0.951	0.796

Table 2 Discriminant validity based on HTMT criteria

	EP	OCB	IWB	EE	ET	OL
Employee productivity	–					
Organizational citizenship behavior	0.882	–				
Innovative work behavior	0.611	0.637	–			
Employee engagement	0.629	0.614	0.447	–		
Employee training	0.102	0.184	0.279	0.124	–	
Organizational learning	0.562	0.581	0.553	0.374	0.556	–

reliability: Rho_a varied from 0.946 to 0.850; and composite reliability: rho_c varied between 0.951 and 0.877, suggesting that the model's reliability was established (Abuamria & Ajouz, 2020).

Additionally, the average variance extracted (AVE) has been evaluated to establish convergent validity. From the data in Table 1, it is apparent that convergent validity was established and exceeded the AVE cutoff values of 0.5 (Ajouz, Salhab, & Idais, 2020), where the values varied from 0.506 to 0.796.

SmartPLS (Ringle et al., 2022) describes three essential criteria of discriminant validity, which are cross-loading criteria, Fornell-Larcker criteria, and heterotrait-monotrait ratio of correlations (HTMT) criteria. Accordingly, by evaluating the cross-loadings of all indicators with all constructs, the results show that all indicators have a higher loading in their respective construct than other constructs, indicating the establishment of discriminant validity based on cross-loading criteria. In the same vein, the construct loading with all other constructs was evaluated, and the results show that all constructs have a higher loading in their respective construct than other constructs, indicating the establishment of discriminant validity based on the Fornell-Larcker criteria.

Lastly, Henseler, 2015, suggested the use of HTMT criteria, where the HTMT should be less than 0.9 according to Gold (2001) (Ajouz & Abuamria, 2022). The results of the HTMT analysis are set out in Table 2, which indicates the establishment of discriminant validity.

4.2 Structural Model

Figure 1 provides the summary statistics for PLS bootstrapping. The relationship diagram shows that the proposed model explains 61.2% of the variance in employee productivity. As illustrated in Tables 3 and 4, ten out of the thirteen hypotheses were supported at the 0.05 level. The insignificant hypotheses (H_3, H_4, and H_{12}) were found to be irrelevant to the formation of employee productivity by the collected data. Interestingly, there was also a supported argument for the mediation role of OCB and IWB. However, the mediator effect of IWB between employee training and employee productivity was not statistically significant.

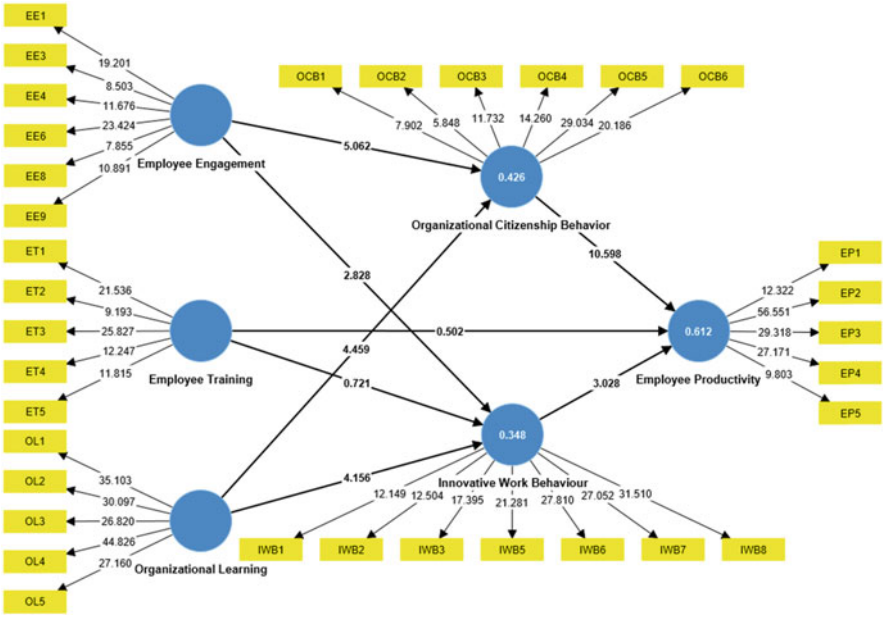

Fig. 1 Structural model results

Table 3 PLS-SEM results: path coefficients of the adjusted model

H_X	Relationship	Std beta	T-value	P-value	Decision
H_1	EE > OCB	0.437	5.062	0.000	Supported
H_2	EE > IWB	0.289	2.828	0.005	Supported
H_3	ET > EP	−0.042	0.502	0.616	Not supported
H_4	ET > IWB	0.082	0.721	0.471	Not supported
H_5	OL > OCB	0.362	4.459	0.000	Supported
H_6	OL > IWB	0.391	4.156	0.000	Supported
H_7	OCB > EP	0.660	10.598	0.000	Supported
H_{10}	IWB > EP	0.205	3.028	0.003	Supported

Table 4 PLS-SEM results: path coefficients of indirect effects

H_X	Relationship	Std beta	T-value	P-value	Decision
H_8	EE > OCB > EP	0.288	4.050	0.000	Supported
H_9	OL > OCB > EP	0.239	4.332	0.000	Supported
H_{11}	EE > IWB > EP	0.059	2.045	0.041	Supported
H_{12}	ET > IWB > EP	0.017	0.678	0.498	Not supported
H_{13}	OL > IWB > EP	0.080	2.310	0.021	Supported

In detail, the result depicted that employee engagement had a significant effect on OCB (H_1: $\beta = 0.437$; $t = 5.062$, $P < 0.05$) and IWB (H_2: $\beta = 0.289$; $t = 2.828$, $P < 0.05$). The path coefficient between employee engagement and OCB was greater than the causal relationships between employee engagement and IWB, which indicates greater causal effects. The results unexpectely showed that employee training had no significant effects on employee productivity with a wrong sign (H_3: $\beta = -0.042$; $t = 0.921$, $P > 0.05$) and IWB (H_4: $\beta = 0.082$; $t = 0.721$, $P > 0.05$). In contrast, organizational learning significantly impacted OCB (H_5: $\beta = 0.362$; $t = 4.459$, $P < 0.05$) and IWB (H_6: $\beta = 0.391$; $t = 4.156$, $P < 0.05$), where the path coefficient was almost similar. Likewise, both OCB (H_7: $\beta = 0.660$; $t = 10.598$, $P < 0.05$) and IWB (H_{10}: $\beta = 0.205$; $t = 3.028$, $P < 0.05$) significantly impacted employee productivity, supporting H_7 and H_{10}.

In the mediation effects, the role of OCB was statistically significant in the relationship between employee engagement and employee productivity (H_8: $\beta = 0.228$; $t = 4.050$, $P < 0.05$) and between organizational learning and employee productivity (H_9: $\beta = 0.239$; $t = 4.332$, $P < 0.05$). Notably, the mediation role of IWB between employee engagement and employee productivity as presented in H_{11} had statistically significant effect (H_{11}: $\beta = 0.059$; $t = 2.045$, $P < 0.05$), and organizational learning had significant positive effects on employee productivity through the mediator role of IWB (H_{13}: $\beta = 0.080$; $t = 2.310$, $P < 0.05$). The results also show that employee training had no significant effects on employee productivity through the mediator role of IWB (H_{12}: $\beta = 0.017$; $t = 0.678$, $P > 0.05$).

5 Discussion and Conclusions

Research findings showed that, as predicted, OCB and IWB were found to positively influence employee productivity among the employees working in the educational industry. Such a finding is consistent with extant literature (Barsulai et al., 2019). (Asurakkody & Shin, 2018) reported similar findings and advocated the relevance of IWB in encouraging employee productivity.

In addition, this study's findings have empirically validated the mediating role of OCB between employee engagement and organizational learning with employee productivity and concluded that OCB is a fundamental antecedent in predicting employee productivity. The majority of existing literature showed a positive impact of employee engagement and organizational learning on OCB. For instance, (Rurkkhum & Bartlett, 2012; Sugianingrat et al., 2019) found that employees with a high level of engagement can maintain a more OCB. Similar views were shared by (Gusmão et al., 2018) who argued that highly organized learning employees could integrate more OCB.

Our empirical findings showed that IWB has a mediating role between employee engagement and organizational learning with employee productivity. This finding is compatible with various studies that connect employee engagement with IWB (Sifatu et al., 2020), organizational learning with IWB (Aboobaker & Zakkariya,

2021; Udin, 2021), and IWB with employee productivity (Asurakkody & Shin, 2018). However, some studies indicated that employee training directly impacts IWB (Anjum et al., 2016). The finding of current research is incompatible with past evidence. This is mainly because the training programs received by employees in educational sectors seem irrelevant to their main tasks and have no effect on their IWB and productivity.

To the best of the researchers' knowledge and existing evidence, this research is an initial attempt to empirically validate the mediating role of OCB and IWB in predicting employee productivity in the education sector in Palestine. Thus, this study adds value to the existing domain of employee productivity in the global context, including Palestine. This research determined the mediating role of IWB and OCB in improving employee productivity. It was also shown that the proposed model explains around 61% of the variance in employee productivity in the educational sector.

Due to practical constraints, this research targets employees from the local educational sector using convenience random sampling. The generalization of study findings might be challenged. Hence, further research may employ a larger sample size in different contexts to generalize the findings. Despite the limitations mentioned earlier, our study's empirical findings contribute to the growing body of research on OCB, IWB, and employee productivity.

References

Aboobaker, N., & Zakkariya, K. (2021). Digital learning orientation and innovative behavior in the higher education sector: Effects of organizational learning culture and readiness for change. *International Journal of Educational Management, 35*(5), 1030–1047.

Abuamria, F. M., & Ajouz, M. A. (2020). Potential users' acceptance of Shariah-compliant precious metal backed crypto currency: A Malaysian perspective. *International journal of management research and social science, 10*(7), 224–231.

Ajouz, M., Abdullah, A., & Kassim, S. (2020). Acceptance of Sharīʿah-compliant precious metal-backed cryptocurrency as an alternative currency: An empirical validation of adoption of innovation theory. *Thunderbird International Business Review, 62*(2), 171–181.

Ajouz, M., & Abuamria, F. M. (2022). Does Mobile payment promote financial inclusion among Palestinians women: A quantitative approach through structural equation modeling. *Journal of Islamic Economics, Banking and Finance, 10*(2), 67–78.

Ajouz, M., Salhab, A., & Idais, A. (2020). Factors influencing the potential User's acceptance of Rocab Mobile application for public transportation in Palestine: Insights from innovation diffusion theory and technology acceptance model. *Management Economics Resources Journal, 2*(5), 1–20.

Ali, H., Li, M., & Qiu, X. (2022). Employee engagement and innovative work behavior among Chinese millennials: Mediating and moderating role of work-life balance and psychological empowerment. *Frontiers in Psychology, 13*(942580), 1–15.

Anjum, A., et al. (2016). Effort-enhancing HR practices and innovative work behavior: Role of employee empowerment. *International journal of academic research in business & social sciences, 6*(10), 2222–6990.

Asurakkody, T. A., & Shin, S. Y. (2018). Innovative behavior in nursing context: A concept analysis. *Asian Nursing Research Journal, 12*(4), 237–244.

Barsulai, S., Makopondo, R., & Fwaya, E. (2019). The effect of organizational citizenship behavior on employee productivity in star rated hotels in Kenya. *European Journal of Hospitality & Tourism Research, 7*(1), 1–8.

Basit, A. A., Hermina, T., & Al Kautsar, M. (2018). *The Influence of Internal Motivation and Work Environment on Employee Productivity* (pp. 790–800). KnE Social Science.

Chin, T. L., Yap Peng Lok, S., & Kong, P. K. P. (2019). Does transformational leadership influence employee engagement. *Global Business and Management Research: An International Journal, 11*(2), 92–97.

Fredrickson, B. L. (2004). The broaden--and--build theory of positive emotions. *Philosophical Transactions of the Royal Society B: Biological Sciences, 359*(1449), 1367–1377.

Guan, X., & Frenkel, S. J. P. R. (2018). How perceptions of training impact employee performance: Evidence from two Chinese manufacturing firms. *Personnel Review, 48*(1), 163–183.

Gusmão, F. D., Christiananta, B., & Ellitan, L. (2018). The influence of strategic leadership and organizational learning on organizational performance with organizational citizenship behavior as an intervening variable. *International of Journal Science and Resource, 6*(4), 124–131.

Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications.

Hanaysha, J. (2016). Testing the effects of employee empowerment, teamwork, and employee training on employee productivity in higher education sector. *International Journal of Learning and Development, 6*(1), 164–178.

Hanaysha, J., & Tahir, P. R. (2016). Examining the effects of employee empowerment, teamwork, and employee training on job satisfaction. *Procedia - social and behavioral sciences, 219*, 272–282.

Haryono, S., Supardi, S., & Udin, U. (2020). The effect of training and job promotion on work motivation and its implications on job performance: Evidence from Indonesia. *Management Science Letter, 10*(9), 2107–2112.

Kassa, A. G., & Tsigu, G. (2021). Corporate entrepreneurship, employee engagement and innovation: A resource-based view and a social exchange theory perspective. *International Journal of Organizational Analysis, 30*(6), 1694–1711.

Kiziloglu, M. (2015). The effect of organizational learning on firm innovation capability: An investigation in the banking sector. *Global Business and Management Research: An International Journal, 7*(3).

Lee, S. Y., & Brand, J. L. (2010). Can personal control over the physical environment ease distractions in office workplaces? *Ergonomics, 53*(3), 324–335.

Majid, M., Ramli, M. F., Badyalina, B., Roslan, A., & Hashim, A. J. A. J. C. M. (2020). Influence of engagement, work-environment, motivation, organizational learning, and supportive culture on job satisfaction. *International Journal Human Resources Studies, 10*(4), 186207–186207.

Namada, J. M. (2018). Organizational learning and competitive advantage. In *Handbook of research on knowledge management for contemporary business environments* (pp. 86–104). IGI Global.

Nda, M. M., & Fard, R. Y. (2013). The impact of employee training and development on employee productivity. *Global Journal Commercial. Management. Perspection, 2*(6), 91–93.

Ndidi, A. M., Amah, E., & Okocha, B. F. (2022). Micromanaging behaviour and employee productivity in SMEs in Rivers state. *International journal of social sciences and management, 6*(5), 745–755.

Nguyen, T., Tran, N., Doan, X., & Nguyen, H. (2020). The impact of knowledge sharing on innovative work behavior of Vietnam telecommunications enterprises employees. *Management Science Letter, 10*(1), 53–62.

Odoardi, C., Cangialosi, N., & Battistelli, A. (2022). HR training practices and innovative work behaviour: A moderated mediation model. *International Journal Human Resources Studies, 22*(1–2), 1–18.

Podsakoff, N. P., Whiting, S. W., Podsakoff, P. M., & Blume, B. D. (2009). Individual-and organizational-level consequences of organizational citizenship behaviors: A meta-analysis. *The Journal of Applied Psychology, 94*(1), 122.

Prasetyaningtyas, S. W., Heryanto, C., Nurfauzi, N. F., & Tanjung, S. B. (2021). The effect of work from home on employee productivity in banking industry. *Journal Application Managemen, 91*(3), 507–521.

Ringle, C. M., Wende, S., & Becker, J.-M. (2022). *SmartPLS 4*. SmartPLS GmbH." http://www.smartpls.co

Rurkkhum, S., & Bartlett, K. R. (2012). The relationship between employee engagement and organizational citizenship behaviour in Thailand. *Human Resource Development International, 15*(2), 157–174.

Salahat, M., & Majid, A. H. A. (2016). The effect of career planning and recruitment and selection on customer satisfaction: Mediating role of extra-role performance; evidence from Palestine. *Australian Journal of Basic and Applied Sciences, 10*(16), 292–304.

Sifatu, W. O., Sjahruddin, H., Fajriah, Y., Dwijendra, N. K., & Santoso, A. (2020). Innovative work behaviors in pharmacies of Indonesia: Role of employee voice, generational diversity management and employee engagement. *Systematic Reviews in Pharmacy, 11*(2), 725–734.

Sugianingrat, I. A. P. W., Widyawati, S. R., da Costa, C. A. D. J., Ximenes, M., Piedade, S. D. R., & Sarmawa, W. G. (2019). The employee engagement and OCB as mediating on employee performance. *Int. J. Product., 68*(2), 319–339.

Sutardi, D., Nuryanti, Y., Kumoro, D. F. C., Mariyanah, S., & Agistiawati, E. (2022). Innovative work behavior: A strong combination of leadership, learning, and climate. *International. Journal. Social. Management. Studies., 3*(1), 290–301.

Udin, U. (2021). A theoretical model of leadership styles (transformational and transactional) influence on innovative work behavior and employee performance: Testing the role of knowledge sharing and organizational learning as mediation variables. *International journal of management research and social science, 3*(5), 313–321.

Yuan, F., & Woodman, R. W. (2010). Innovative behavior in the workplace: The role of performance and image outcome expectations. *The Academy of Management Journal, 53*(2), 323–342.

Are Employees a Part of Sustainability in Organizations? A Qualitative Study on the Perception of Sustainability Practices Among the Salesforce

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1 Introduction

Over the past 20 years, the concept of sustainable development (SD) has gradually spread to the business world, in particular through the integration of the concept of corporate social responsibility (CSR). By reconsidering their strategic and operational activities, many organizations express their desire to adopt a moral and ethical posture on the economic, environmental, and social levels while profiting from an increase in their competitiveness and long-term profitability. The implementation of sustainable development approaches impacts the strategy, policies, and processes of organizations and leads to profound and transversal changes aligned with the SD indicators. These changes primarily concern employees, the company's first stakeholders, who are required to comprehend their meaning in order to change their professional practices and align with the core values of their organizations. With this in mind, the implementation of a sustainable development approach in organizations cannot be operational and effective without understanding employees' perceptions. Thus, the role played by employees in achieving SD objectives is vital and should be enhanced by active participation of human resource (HR) professionals (Igalens & Tahri, 2012).

This chapter is structured as follows. The next section is dedicated to literature review that serves as the theoretical background for this research. The literature reviews are founded around two main theories: the organization person fit theory and

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the social exchange theory. We suggest that these two theoretical backgrounds could serve the research problem statement and demonstrate the need for staff involvement for the implementation of sustainable development that can be justified in several ways. First, the implementation of an SD/CSR approach represents a paradigm shift. It leads to ambitious objectives (reduction of the ecological footprint, community involvement, responsible production and consumption, etc.) that lead to profound organizational changes, in terms of strategies, practices, or processes. The company's staff is the first stakeholder in this process. Employees can contribute by using their knowledge, developing new skills, but also by bringing a concrete and critical perspective through their practical experience (Farooq et al., 2014). The subsequent session outlines the research methodology and reports the results of this study. The final section presents the discussion and ends with the concluding remarks as well as the suggestions for future research.

2 Literature Review

2.1 Organization Person Fit Theory

While traditional selection methods focused mostly on job-related analyses and identification of skill sets essential for in-role conduct, more recent studies have explored the importance of considering factors outside of work when making hiring decisions. Using a compatibility between a person's personality, beliefs, and values and the organization's professed culture, norms, and values, it can be seen that the emphasis has switched away from traditional models that are primarily centered on "KSA" for "jobs" toward hiring for organizational coherence (Morley, 2007). According to the attraction-selection-attrition (ASA) model proposed by Schneider (2001), an individual's work values are a primary factor in determining whether or not they will be satisfied in their position as an employee of an organization. Individuals are more inclined to be engrossed in and seek employment with organizations that display characteristics similar to their own, and employers are more likely to hire candidates who are most similar to the organization. A person's or a company's values are something that may be compared to another in a "direct and meaningful" way (Cable & Judge, 1997). According to Arthur et al. (2006), if P-O fit is going to be used for employment decision-making, which increasingly appears to be the case, then measures of P-O fit must be held to the same psychometric and legal standards as are other selection tests. This is because P-O fit is becoming increasingly prevalent as a factor in employment decision-making.

For recruiters to reap the benefits of P-O fit, improved accuracy in fit measurement is essential. Significant relationships have been found between P-O fit and organizational citizenship practices (O'Reilly & Chatman, 1986; Cable & DeRue, 2002), team building (Posner, 1992), ethical standards (Posner et al., 1985), turnover (Chatman, 1991), work attitudes (Cable & DeRue, 2002), and work performance (Tziner, 1987). Values and principles represent decision-making, and this includes

decisions about membership in groups and organizations. Values are the foundation upon which an organization's culture is built, serving as a set of standards against which employees can measure their own attitudes and actions. P-O fit may be measured, in particular, by determining in what ways an individual's values align with those of the organization (Cable & Judge, 1997; Chatman, 1991).

The term "person-organization fit" (P-O fit) refers to the degree to which an individual and the organization that employs them are compatible with one another. This level of compatibility is determined by the degree to which the features of both organizations and individuals are similar. Higher levels of organizational commitment, work satisfaction, job retention, organizational citizenship behaviors, and job performance are all associated with it. In recent years, there has been a large and hastened growth in the number of journal articles published in which person-organization fit is a major aspect of the study. One possible explanation for this rise is that person-organization fit is becoming more prevalent as a research topic (Subramanian et al., 2022). The term "organizational culture fit" (or simply P-O fit) refers to the degree to which an organization and its workforce share values and beliefs regarding the qualities that are most valuable to either party. A successful "P-O fit" exists when an organization and its workers share values and priorities (Kristof, 1996; Kristof-Brown et al., 2005; Chatman, 1989).

Two basic types of conceptualizations for P-O interactions are supplementary and complementary. Supplementary fit evaluates how effectively an individual and a company share certain traits (basically morals, interests, and personal characteristics). The most often researched variety of supplementary P-O fit is value congruence (Edwards & Cable, 2009). Therefore, value congruence research looks at the effects of an employee's attributes being in line with those of their employer. The amount to which one individual's characteristics fit into those of the other is measured by complementary fit. Need-supply (NS) and demand-ability (DA) models are two typical ways to classify this type of fit. An employee has DA fit if they possess the knowledge, skills, and abilities that are required by the company, while NS fit occurs when the organization meets the employee's needs (Kristof, 1996). There is evidence that suggests a correlation between P-O fit and outcomes like job satisfaction, organizational engagement, employee retention, social behaviors in the workplace, and performance outcomes (Das, 2022; Kristof-Brown et al., 2005; Hoffman & Woehr, 2006; Verquer et al., 2003). On the other hand, O'Reilly and Chatman (1986) showed that higher levels of P-O fit, that authors quantified as person-group fit, lower the levels of conflict and foster situations that are conducive to creative thinking. In conclusion, research on P-O fit has demonstrated that greater levels of P-O fit are beneficial to the psychological health of an individual (Follmer et al., 2018; Lamiani et al., 2018; Vogel et al., 2016).

2.2 Social Exchange Theory

Homans (1974) proposed the initial empirical social exchange theory, as well as the first to incorporate emotion in a systematic method. Since Homans (1961), Blau (1964), and Emerson's (1962) early works, exchange theory has been one of the most important ideas in the field of social psychology. This theoretical approach is based on earlier philosophical and psychological approaches that came from utilitarianism and behaviorism, combined. "Social exchange ... refers to voluntary behaviors of persons that are motivated by the rewards they are anticipated to bring and normally do bring from others," writes Blau (1964). He says that social exchange is based on the idea that one person does a favor for another. While there is usually an expectation of some kind of return in the future, the exact nature of that return is not predetermined (Blau, 1986). The theory of social exchange elucidates the pragmatic value of relationships and their dependency on persons or entities. This emerged to conceptualizing the logical foundations of choice and how people's expectations about the results of social interaction are formed (Heath, 1976).

2.3 Individuals' Social Behavior Can Be Classified into Four Categories, Each of Which Is Explained by Social Exchange Theory

As a first step, the framework characterizes the reinforcement tools that motivate people to connect socially, such as the benefits and resources that can be gained from this activity. People are motivated to engage in exchange relationships because rewards have a positive connotation and resources provide an individual with the ability to obtain those rewards (Emerson, 1976). Resources can be everything from affection and gratitude to monetary value and material possessions (Foa & Foa, 1980).

Tangibility, or "concreteness," is the second dimension of resources. The resources that have a low tangible worth could be considered symbolic, and symbolic resources have a higher value for the persons that receive them (Cropanzano & Mitchell, 2005). In general, resources make it possible to gain two distinct sorts of rewards, i.e., socioemotional and financial gains. The socioemotional advantages are those that arise as a result of scenarios in which acquired resources boost self-esteem and address social demands, whereas the economic rewards are those that address cash needs (Shore et al., 2006). The second aspect corresponds to the exchange mechanisms. According to the theory, resource exchanges are based on an arbitrary cost-benefit analysis (Cropanzano & Mitchell, 2005). Two key factors influencing the decision of a person to engage in exchange relations are necessary for such an analysis. These requirements are a) the extent to which a person or a group of individuals have previously received rewards for a similar performance and b) the extent to which the outcome of the transaction is useful to the participant (Homans,

1961). This is typically linked to Homans' theories, according to which individuals are more inclined to engage in future behaviors under similar circumstances if they frequently obtain rewards for their efforts. It is crucial to comprehend individual differences in exchange orientation, in whether costs and benefits are compared across time, and in circumstances in which people perceive things in order to fully comprehend how others perceive things (Varey, 2015).

Third, social capital and social structures influence social exchange connections. The impact on social structures illustrates the dependence of the results of direct interaction on the nature of the initial relationship between the parties (Cropanzano & Mitchell, 2005). Social standards, regulations, information sources, perceptions, and obligations are only a few examples of the various social entities represented by social capital. These things are a part of social organizations' structures. The development of social collaborations and their results can be both facilitated and restricted by social capital (Nahapiet & Ghoshal, 1998; Wasko & Faraj, 2005). Distribution of power and equity within social networks may be one of the results. Social capital has been demonstrated as a reward for relationships as well as an element that facilitates inter-person collaboration. Interpersonal contacts were found to be motivated by the anticipated maximization of social benefits, such as strengthened social links and networks (Wang & Liu, 2019).

Reciprocity, the fourth mechanism underlying social exchange, creates duties between the parties (Cropanzano & Mitchell, 2005; Emerson, 1976). The significance of reciprocity in social interaction and interdependence between social actors is explained by research in experimental economics and evolutionary psychology, which postulates that people are genetically oriented to behave in such a way that reciprocity is ensured (Thibaut & Kelley, 2017). The expectation of reciprocity serves as the standard, creating expectations for the results of exchange and influencing behavior and attitude. People enter into relationships expecting that the favor (i.e., contributions to relationships) would be rewarded, even though there is no momentary obligation to do so. Social exchange is long-term oriented because there is no set period of time when the favor must be returned (Molm, 1997). The rule of reciprocity, on the other hand, functions as a controlling mechanism, maintaining interactions based on interdependence between actors that are mutually beneficial (Cropanzano & Mitchell, 2005).

According to the practices observed within companies, the road to be covered for the total and continuous involvement of employees in the implementation of SD remains important. Some employees, with regard to the functions they hold, may appear to be a priority for SD managers. The energy devoted to engagement is then focused on specific employees or groups of employees. Nevertheless, it is the entire staff who participates in the implementation of the SD. By abandoning some of the employees, the bearers of the approach run the risk of giving rise to some resistance. It is for this reason that all employees must be targeted, regardless of hierarchy or profession. In this sense, the approach must be carried out in the interests of cohesion and coherence. In addition to employee participation through a better knowledge of the approach and the new practices associated with it, the involvement of all employees promotes the collaboration of individuals and their departments. On the

other hand, it is necessary to take into consideration that the concern for mobilization may vary according to the hierarchical level and the type of employment of the employees. Rather than neglecting individuals or groups of people, it seems more appropriate to categorize employees according to various criteria in order to adapt messages and tools according to distinct and specific targets.

The next session is devoted to the research design settled to provide plausible answers to the research statement.

3 Research Design

We adopted a qualitative approach, based on in-depth semi-structured interviews lasting between 30 min and 1 h 30 min. A total of 12 interviews were conducted with salesforce employees. The interviews were conducted on the basis of an interview guide that addressed various topics summarized in Appendix A. The interviews were all recorded, transcribed, and subjected to a content analysis based on manual coding around a few major categories of codes that are both pre-established and emerging: employees' perception of their brand on sustainable development (actions, commitments, and contradictions perceived on a daily basis); effective practices of SD in their daily professional life, at the local level (store); perception of SD in general; and employees' expectations in this regard. We note that these emerging categories of perceptions are articulated around three levels: that of the brand to which the employee belongs (the group), that of the store in which they work, and that of the organization sector in general. The results detailed below show that on each of these three levels, it is different aspects of the SD approach that are evoked by employees: strategic speeches and commitments related to SD at the brand level, SD practices at the local level, and SD values at the sector level. We also used the R software to determine the sentiment scores of these dimensions.

4 Results

4.1 Perceptions of Sustainability Practices Among Salesforce Staff

The analysis of the verbatims reveals several aspects explaining different perceptions regarding sustainable practices among the salesforce. These factors are grouped on the basis of conceptual classification of the verbatims. These dimensions are set out in the following paragraphs, as well as the most relevant verbatim which illustrates them. Thus, the extract related to sustainable practices in organizations is displayed (Fig. 1).

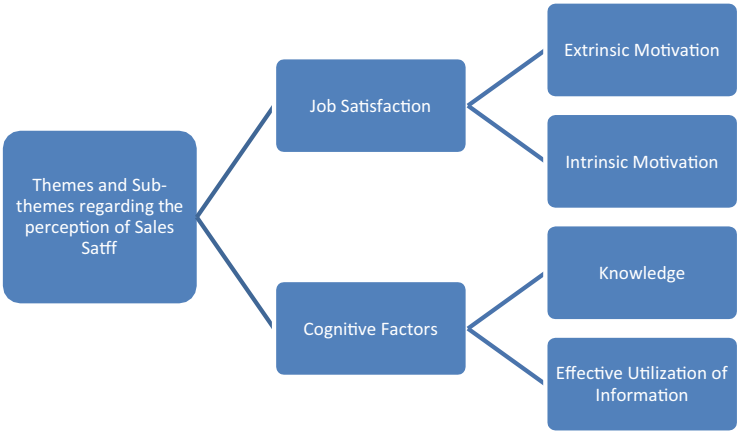

Fig. 1 Verbatim content analysis

Extract on employees' perception of sustainable practices related to job satisfaction:

This research focuses on the perception that the salesforce has regarding the sustainable practices in their organizations. The observation and opinions they develop around sustainable practices are explained through the importance they align with their company's responsible strategies. Interviewees' perceptions of sustainability are expressed in speeches. Words are the vectors. The choice of vocabulary is therefore not neutral in the formulations of respondents' perceptions of sustainable practices. Indeed, a perception or an opinion can be represented by a summary, a summary of how the respondent sees these practices and its contours. Those summaries may contain the meaning given to sustainability and societal commitment, its objectives, its aims, its role, its dimensions, etc.

Job satisfaction is one of the emerging themes developed from the response of the sales staff. The conceptual domain of the job satisfaction construct was defined by Churchill, Ford as "all features of the job itself and the work environment which salesmen find gratifying, fulfilling, and satisfying, or frustrating and unsatisfactory." The sales staff found job satisfaction regarding the organization's sustainability practices based on two major dimensions. One is the rewards and incentives received from selling organic products. One of the respondents said, "We have incentives here and bonuses so when we sell organic products in specific categories, we will get incentives." Hence, they are found to be satisfied with the sustainability practice of having organic products and selling it.

Another dimension of job satisfaction that emerged is the nature of work. Most of the respondents are satisfied with the type of work they are engaged with. They are confident in selling their products as they all are completely aware of the ingredients.

They were given training on the ingredients and the products often in the country or internationally as and when required. This gave them confidence that their process is transparent. One of the respondents said, "Also it is vegan we know it is not

Table 1 Sentiment analysis via R

Statements from the respondents	Sentiment score	Type of sentiments
"I feel proud working for this brand knowing it is doing good thing for the people not only for the brand but for the people of course we feel proud"	0.56598	Positive
"You know you are helping your company is helping you know what I mean you feel involved every time we send kids to the school you know how you feel we are mothers also we care it is really impacting the community"	0.4752543	Positive
"We have incentives here and bonuses so when we sell organic products in specific categories we will get incentives"	0.2752989	Positive
"Also it is vegan we know it is not harmful and also we have training about these products every time to understand the ingredients and the effects"	0.3367877	Positive
"We all know it is a learning process"	0.2828427	Positive

harmful and also we have training about these products every time to understand the ingredients, the prices, the benefits, and the effects." Another respondent added to this by stating, "Also we as a sale force have training in all the new products and about the whole supply chain, from where are the products, how they are done, which materials and so on. The line management from the head office in the UK does this training. So, we all know. It is a learning process." Others have also added, "When we have the training, they also introduce what are the actions implemented to have an impact on the society because every three months we have training . . . We have training especially since we have new products we should learn about the ingredients."

Apart from the above extrinsic motivational factors, the employees also feel emotionally satisfied being a part of the organization with sustainability practices. The sales team feels emotionally happy to be a part of specific organizations' sustainability techniques, such as assisting in children's education and moms' livelihood. One of the respondents was emotional in tears and smile and said, "You know you are helping your company is helping you know what I mean you feel involved every time we send kids to the school you know how you feel we are mothers also we care it is really impacting the community." Similarly, the employees also feed proud to sell products that have been evolved as a sustainable practice. "I feel proud working for this brand knowing it is doing good thing for the people not only for the brand but for the people of course we feel proud."

A sentiment analysis was conducted using R to analyze the type of sentiments displayed by the respondents. Table 1 depicts that the sales staff have depicted positive emotions regarding the sustainability practices employed in an organization.

Extract on employees' perception regarding the congruence with these practices of the SD:

Another sub-theme that evolved from the interview is the knowledge about the sustainability practices in the organization. The salesforce is aware of the

sustainability practices in the organizations. The organizations are keen to provide training to their sales staff on sustainability practices. Downward communication is found to be appropriate in most of the organizations we have inquired. The employees feel satisfied with the way their immediate supervisors treat them and the training and other communication they receive through brochures, videos, and country manager or immediate boss. However, the upward communication, or specifically the feedback from the salesforce on the implementation of sustainability practices based on the needs of the locale they serve, is lagging in most of the cases. One of the respondents stated, "We cannot go beyond the line. We have a branch here from where we get the guidelines.

. . . Of course, we can make some feedback but the implementation of these ideas based on the local culture is not so promising." Hence, it can be identified that international organizations need a salesforce to implement sustainability practices but do not need to follow a decentralized approach in sustainability practices. Another sub-theme in cognitive factors is the effective use of information about sustainability practices. Once trained and learned about the importance of sustainability and the practices employed by the organizations, the employees use it as a major sales tactic to convince customers to buy. They feel that these practices are unique features of their products or brands. "So we try our best to do our work. I ask the customers also about their needs and try to refer them to the appropriate products. Many customers do not really understand the concept and hesitate to make a choice so I help them and I explain. Some customers are open to try new products and buy some of them are not flexible and will not buy. I don't force them to buy. It should be natural. We do not force our customers. But what we do here is to offer free tiny samples. We let them try first and they will be convinced and return to buy maybe." Another respondent added, "Some of the customers came with the hope to get really good results because they have already used chemical products and they did not get any results so they enter into our shops with the hope to get benefits from the nature. Here is our role to help them identify their needs and customize the products they want to buy. We should communicate with clients and understand their issues. They know that when they use these products even if there is no results there is no harm. This is one of the most beneficial thing about using organic products. There are no side effects at all. Clients are aware about that but you know some of them need to get instant results. This is what happens with chemical products. Using organic natural ingredients might take time to see the results. This is how we try to convince our clients."

4.2 The Main Practices Cited Among the Salesforce

In this research, all the salesforce works within organizations that implement sustainable practices or strategies and are socially committed to the environment demands. The level of knowing about these practices is different from one employee to another. For those who have deep understanding of the sustainability practices of

the organization, it was easy to explain and narrate the whole strategy. In this study, four main types of sustainable practices are cited among the salesforce. The first range of practices is related to the community engagement. One of the respondents said, "*In YouTube channels they show all the process of manufacturing and they involve people from underdeveloped countries from poor countries and help them to improve their lives*." Another said: "*The community is very important and especially the women for example if you buy some of our products you will contribute to send some kids in schools. For example our workers are from Ghana. They are all women*." In the same line, one of the respondents added: "*We can also what do . . . for other poor countries. Because you know it is also known for other community how we can help*."

The second level is related to the eco-friendly practices, namely recycling and packaging reducing. Some of the respondents said: "*We change the design of packing for example they are smaller and all the details are in the package to avoid using big quantity of paper and all the package are eco-friendly even the bottles now they are refilled and can be reused.*" Another explained: "*Our products here are 100% recycled from the package to the capsule. Even some of the table and decoration items are made of coffee and recycled products. So it is a concept here, a whole approach. Everything is recycled here because we believe in second life*." Some of the respondents also explained the alternative to the product packaging in their stores: "*Also we use scarfs to wrap the products to avoid using the plastics packages. We know that our products are organic and not harmful. We also fight against testing on animals*."

The third type of practices is related to the impact on customers. This practice describes how the salesforce convinces the clients to adapt the green product and how they enhance their level of engagement toward the sustainability approach. One of the respondents said: "*Clients now know more about healthy products and they know that this is important. They want organic and natural ingredients. It helps them with their problems with the skins with the body.*" Another said: "*Also our campaign is based on this approach so our customers can return the products to be recycled. We give them bags where they can put the used capsules and after that they can gain points and gifts. So like that we encourage them also to adopt this behaviour.*" In the same line, another vendor added: "*So we try our best to do our work. I ask the customers also about their needs and try to refer them to the appropriate products. Many customers do not really understand the concept and hesitate to make a choice so I help them and I explain*." "*This is how we try to convince our clients. Take time in the cure process but ensure that there is no harm at all. Some of them are really convinced and developed a high level of loyalty to some products and they do believe in the results of our products*."

A fourth category of practices also emerged from this research, and it is related to the work environment, more specifically to the HRM practices that reflect a socially responsible management. In fact, some respondents related that: "*I choose this work because the work environment is comfortable and I feel well at ease here [. . .]I feel important here because I represent the sale force*." One vendor explained: "*Even if we are not satisfied with something we have the freedom to express our thoughts*

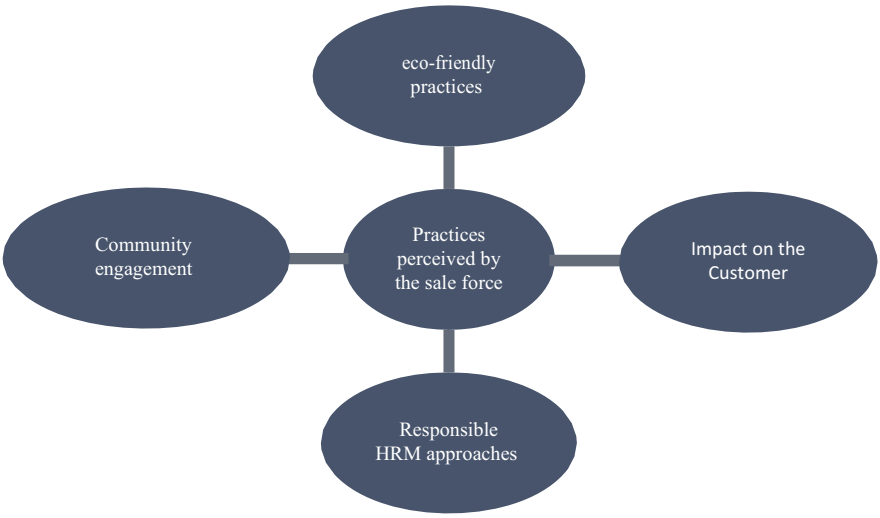

Fig. 2 Categories of sustainable practices perceived among the salesforce

here and share our concerns with the line management. There is no fear of telling the truth in our company. We are all important. We don't feel any kind of injustice or unfair treatment." Another respondent claimed: *"We have an excellent team, we communicate, we don't have conflicts, we try to explain everything to each other and to divide the work equally, and also we share the information so everyone knows about the work and its requirements. It is fun here. I feel comfortable. We collaborate here and we have a good harmony. We do respect each other*." Some of the respondents explained: "*We have a professional development plan and we feel we have our voice here. Our relationship is professional for sure but also based on friendship and we have a direct communication with each other.*"

The illustration below summarizes the types of sustainable practices perceived by the salesforce (Fig. 2):

4.3 Architypes Among the Salesforce Regarding the Sustainability Practices in the Organizations

On a practical level, employees can adopt various behaviors regarding how they do perceive the sustainable practices in the organizations. In this sense, we identified four possible behaviors ranging from unaffiliated behavior, where the worker completely ignores societal demands, to proactive behavior where the employee has deep understanding and anticipates these demands. The first type of behavior is described by a low degree of knowledge about the sustainable practice and focus on the selling; even if the brand itself is recognized as eco-friendly, they do not have

enough knowledge about it. Through this type of behavior, the sales worker will aim only to improve his/her performance, vis-à-vis the line manager, without integrating the principles of sustainable development. The communication pattern in this situation is up-down, and the worker has no margin of taking initiative. Some of the respondents illustrate this case: *"We don't have a big space of freedom in that we should tell about everything. The meetings are done in the head office for example. We are not allowed to attend them and we don't really know about the content. Most of the time we receive the instructions and we execute*." Another said: "*It is also about selling here and we are the salesforce so it is important that we also encourage the customers to buy the products. We have not got a huge idea about the products but we do our best*." Some of the respondents explained: "*We also have training about the products and the ingredients. But this was not enough for us. We should understand these organic products and how we will convince the customers about this. We need more information and more training and more communication with the team leader*."

The second type is described as adaptive behavior. In this case, the salesperson tries to understand the societal/environment demands by a high level of communication and alignment with the settled strategy. The employee has a high level of congruence, and the communication with the line management is a two-way communication. However, the depth of knowledge related to the sustainable practice is low. One of the respondents claimed: "*I don't really know how they implement this but I have great communication with my team leader. I will ask if I need assistance with these aspects*." Another added: "*We have not got a huge idea about the products but we do our best. We read the brochures, we try to know better about the products and the ingredients, we communicate with the supervisor all the time.*"

The third type of salesforce is employees that have good understanding of the sustainable approach and have developed deep acquaintance throughout the training or individual search to improve their knowledge about these practices. But they do not have a flexible margin to take initiative and the communication is one-way. Some of the respondents explained this situation: "*Also they will teach us about the capsules that are made of aluminium and that they are recycled. So we know what we use as material and we know that we use friendly environment materials. So like they will explain and explain also the supply chain procedures. [. . .] We cannot go beyond the line. It is a branch here. We should apply the given guidelines. We cannot choose based on the need of the customers for example so it is like that we don't suggest we execute*." Another maintained: *"I know the ingredients of the product. They are all organic and they are not harmful. I know that we have impact comparing to other chemical products. But I feel I am a sales force. I have to sell sometimes it is hard because I don't have the possibility to share with the team leader*."

The fourth type is the proactive salesforce. This category defines the salespersons that have deep knowledge of the sustainability approach, high level of flexibility, and two-way communication with their co-workers and the line management. These employees seem to be more creative in the way they introduce the eco-friendly product, and also they feel more confident in terms of selling the green products. One

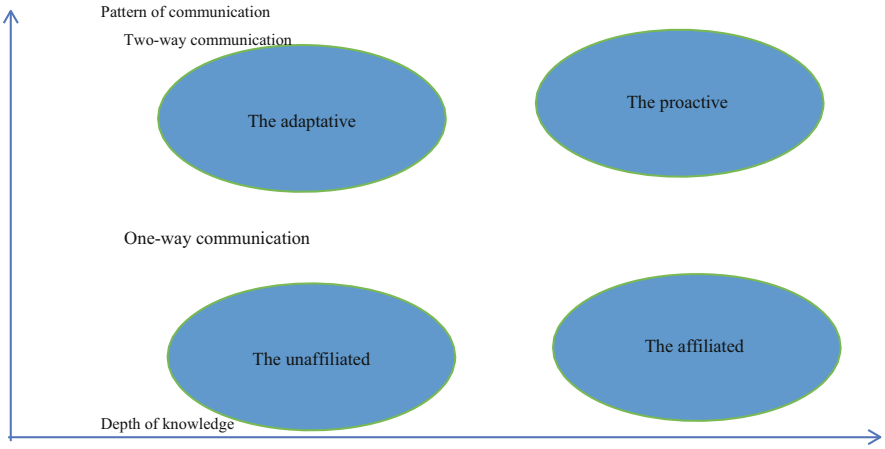

Fig. 3 Types of sustainable practice behaviors among the salesforce

of the respondents gave a detailed explanation of this case: "*The materials that we use are not harmful to both the customers and the environment. We use specific ingredients that protect the jewellery from deterioration. Even the package is conceived in a specific way to preserve the silver and the environment. This is how we do things here. We do care about the impact of our products. It is a whole concept. It is not only the product, it is the package, the material. We have also many training sessions to help us improve our understanding of the products. [. . .]. We have a professional development plan and we feel we have our voice here. Our relationship is professional for sure but also based on friendship and we have a direct communication with each other*." Another respondent added: "*Also we use scarfs to wrap the products to avoid using the plastic packages. Sometimes some clients are upset because they think it is expensive but I explain that you could use a scarf and the colour is very nice and also use them for next purchasing. I try to explain that they should be involved even if the price is expensive because they should understand that they are making impacts. For example, I can discuss with the team leader. They understand us here [. . .]. This impact on the environment should be built by everyone, we really need this. We need to get involved customers their loyalty. We need honesty and transparency. We really need this.*"The following illustration identifies these behaviors (Fig. 3).

4.4 Comparative Analysis Between the Salesforce Perceptions Regarding the Sustainable Practice

In the previous session, we identified four main behaviors of the salesforce regarding their perception of the sustainability in the organizations. This research compared these different behaviors. This comparison identified the similarities and differences

Table 2 Level of implementation of practices among the salesforce

Level of comparison	Motivation	Constraints
Similarities	– The brand image. The organizational climate. The identification process	– The lack of engagement from the clients – The pricing strategy
Differences	– Level of implementation of the SD practices – The lack of reward/incentive	– The communication pattern – The lack of information/ knowledge

Extract of verbatims related to the comparative analysis: The similarity in motivation and constraints

in terms of the level of motivation toward the sustainability practices and the constraints in terms of adopting this approach. In fact, the verbatim analysis demonstrates that some salespersons share the same patterns in terms of level of motivation as response to their perception of the sustainable development practices and also how they perceive the obstacles to the implementation of a responsible business that corresponds to the societal/environmental demands. On the other hand, they might have some divergent perspectives due to the level of implementation of these practices and the low level of the perceived reward. These levels of comparison are summarized in the tables provided (Tables 2, 3, and 4) (Fig. 4).

5 Implications

While much research has been devoted to the impact of sustainable practices on external stakeholders (investors, civil society, customers . . .), little has been done on vis-à-vis salesforce employees. However, employees are at the same main determinant level (or brakes) and sometimes the first-level recipients of these practices. For this reason, strategic SD should be introduced in the coming years, attentive to the changes introduced by the global organizational strategy in the attitudes and behaviors of employees.

State that many companies realize that a socially responsible corporate image is a valuable strategic asset. Indeed, several authors suggest that the perception of the company's sustainable development practices has a significant and positive influence on employees' organizational commitment. This positive impact can be explained in two levels. First, the way the company treats its external stakeholders sends a signal to employees about how it might behave with its internal stakeholders (Igalens & Tahri, 2012). This means that socially responsible practices all initiated by the company for its external stakeholders (community at large) are linked to the perception of the company's responsible conduct by employees (De Roeck et al., 2014). Then, these practices demonstrate the responsible ethical behavior of the

Table 3 comparative analysis: The similarity in motivation and constraints

Aspect	Verbatims	Components
Motivation	"[...] as I told you here we try to do our best to improve the brand. It is not a question of individuals. It is about our company"	– The brand image
	"Our teamwork is based on collaboration. We are a family here. I spend more time here than with my family. We never feel frustrated. The HR managers are transparent and inform us about everything"	– Organizational climate
	"I feel proud working for this brand knowing it is doing good thing for the people not only for the brand but for the people of course we feel proud"	– The identification process
Constraints	"We struggle to make them understand the difference it is not always obvious for them the impact they can make on the environment" "Many customers do not really understand the concept and hesitate to make a choice" "Specially the local people they are not really interested we are struggling as sales force to convince them and explain the impact it is really difficult"	– The lack of engagement from the clients
	"It is hard to convince the clients and explain to them because they are used to the chemical products. They cannot see the benefits. Besides our prices are a little bit higher than the average of available products in the same market" "[...] also it is related to the economic crisis people cannot afford expensive products. I think that the line management should consider this factor and try to go for more discounts for example"	– The pricing strategy

Extract of verbatims related to the comparative analysis: The differences in motivation and constraints

company that makes it possible to refurbish its reputation (Igalens & Tahri, 2012) and to increase the level of engagement of employees. As a result, they develop a sense of self-esteem by identifying with it (Echaine & Smouni, 2022) and feel a deep sentiment of fitting with the core values of the organization. Such practices are perceived by employees as a form of respect and improve their job satisfaction and congruence with the company (Echaine & Smouni, 2022) and disseminate to the study's findings reveal that not only can employees' perception toward their organizations sustainability performance, but creating an ethical working environment is another important way to improve organizational sustainability performance.

Table 4 Comparative analysis: The difference in motivation and constraints

Aspect	Interview	Components
Motivation	"We have impact in the environment for example this is our new campaign be seen be heard for teenagers to raise awareness about the teenagers issues and problems" "But it is not easy because we are a new brand in the market. We also made a new range of products. We created jewellery. We should do more"	– The level of implementation of SD practices (including the green supply chain management)
	"But when it comes to the salary it is not really fair because it is a new brand so the line management would not allow an increase of our salaries" "We have also many training sessions to help us improve our performance and our understanding of the products"	– The lack of reward/incentives
	"Also, we have incentives here and bonuses so when we do a great performance we are rewarded"	
Constraints	"If I have suggestion yes I can do but the problem here is that the line management is not settled here" "We do also regular meetings even with the line management in the UK. They are really our mentors. This is standard in the body shop, developing the communication with the sales force"	– The communication pattern
	"Until now some of us are not satisfied. We need more proper trainings about the products. We do not understand a lot of products. We do not see how these ingredients are used for example" "You must have the knowledge and have the deep ideas and share with the customers"	– The lack of information sharing/ knowledge

6 Conclusion

This research testifies to the plasticity of the SD concept, each employee being able to decline it in a personalized way. It highlights the commonalities and differences in the relative importance that the interviewees give to the different dimensions and stakeholders of SD: employees, suppliers, consumers, communities, and environment. Finally, this research shows how these perceptions of SD are formed by being anchored in various preexisting reference frames, linked, for example, to the company itself, the specificities of the country, the employee's value system, or the profession exercised.

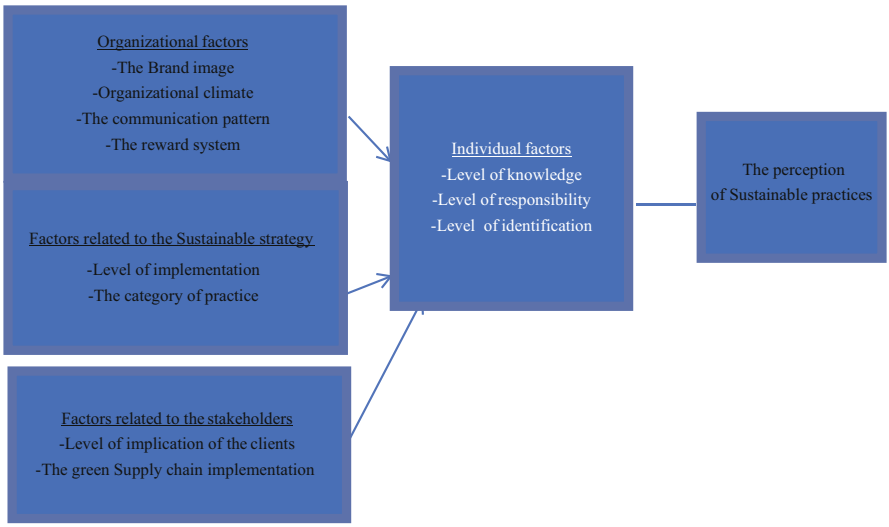

Fig. 4 Conceptual model for the perceptions of the sustainability practices among the salesforce

The objective of employee contribution to an SD approach involves setting up an environment and a work structure conducive to mobilization. With this in mind, work organization can be oriented to promote employee autonomy by offering them greater flexibility.

References

Arthur, W., Bell, S. T., Villado, A. J., & Doverspike, D. (2006). The use of person-organization fit in employment decision making: An assessment of its criterion-related validity. *Journal of Applied Psychology, 91*(4), 786–801.

Blau, P. M. (1964). *Exchange and power in social life*. Wiley.

Blau, P. M. (1986). *Exchange and power in social life (2nd printing)*. Transaction Books.

Cable, D., & DeRue, D. S. (2002). The convergent and discriminant validity of subjective fit perceptions. *Journal of Applied Psychology, 875*, 875–884.

Cable, D. M., & Judge, T. A. (1997). Interviewers' perceptions of person-organization fit and organizational selection decisions. *Journal of Applied Psychology, 82*(4), 546–561.

Chatman, J. (1989). Improving interactional organizational research: A model of person-organization fit. *Academic Management Review, 14*, 333–349.

Chatman, J. (1991). Matching people and organizations: Selection and socialization in public accounting firms. *Administrative Science Quarterly, 36*, 459–484.

Cropanzano, R., & Mitchell, M. S. (2005). Social exchange theory: An interdisciplinary re- view. *Journal of Management, 316*, 874–900.

Das, R. (2022). Does public service motivation predict performance in public sector organizations? A longitudinal science mapping study. *Management Review Quarterly, 73*, 1–35.

De Roeck, K., Marique, G., Stringlhamber, F., & Swaen, V. (2014). Understanding employees' responses to corporate social responsibility: Mediating roles of overall justice and organisational identification. *The International Journal of Human Resource, 25*(1), 91–112.

Echaine, M., & Smouni, R. (2022). Quelles pratiques RSE des PME marocaines : une analyse des forces centripètes et centrifuges. *Revue Internationale du Chercheur, 3*(2), 719–733.

Edwards, J. R., & Cable, D. M. (2009). The value of value congruence. *Journal of Applied Psychology, 94*, 654–677.
Emerson, R. (1962). Power-dependence relations. *American Sociological Review, 27*, 31–41.
Emerson, R. (1976). Social exchange theory. *Annual Review of Sociology, 21*, 335–362.
Farooq, O., Payaud, M., Merunka, D., & Vallette Florence, P. (2014). The impact of corporate social responsibility on organizational commitment: Exploring multiple mediation mechanisms. *Journal of Business Ethics, 124*(4), 563–580.
Foa, E. B., & Foa, U. G. (1980). *Resource theory* (pp. 77–94). Social Exchange.
Follmer, E. H., Talbot, D. L., Kristof-Brown, A. L., Astrove, S. L., & Billsberry, J. (2018). Resolution, relief, and resignation: A qualitative study of responses to misfit at work. *Academy of Manage- ment Journal, 61*, 440–465.
Heath, A. (1976). *Rational choice and social exchange: A critique of exchange theory*. Cambridge University Press.
Hoffman, B., & Woehr, D. (2006). A quantitative review of the relationship between person–organization fit and behavioral outcomes. *Journal of Vocational Behaviour, 68*(3), 389–399.
Homans, G. C. (1961). *Social behavior and its elementary forms*. Harcourt, Brace and World.
Homans, G. C. (1974). *Social behavior: Its elementary forms* (Revised ed.). Harcourt Brace Jovanovich.
Igalens, J., & Tahri, N. (2012). Perception de la RSE par les salariés : construction et valida- tion d'une echelle de mesure. *Revue de Gestion des Ressources Humaines, 1*(83), 3–19.
Kristof, A. (1996). Person-organization fit: An integrative review of its conceptualizations, measurement, and implications. *Journal of Personnel Psychology, 49*, 1–49.
Kristof-Brown, A. L., Zimmerman, R. D., & Johnson, E. C. (2005). Consequences of individuals' fit at work: A metanalysis of person-job, person-organization, person-group, and person-supervisor fit. *Journal of Personnel Psychology, 58*, 281–342.
Lamiani, G., Dordoni, P., & Argentero, P. (2018). Value congruence and depressive symptoms among critical care clinicians: The mediating role of moral distress. *Stress Health Journal, 34*, 135–142.
Molm, L. (1997). *Coercive power in social exchange*. Cambridge University Press.
Morley, M. J. (2007). Person-organization fit. *Journal of managerial psychology., 22*, 109.
Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review, 232*, 242–266.
O'Reilly, C. A., & Chatman, J. A. (1986). Organization commitment and psychological attachment: The effects of compliance, identification, and internalization on prosocial behavior. *Journal of Applied Psychology, 71*, 492–499.
Posner, B., Kouzes, J., & Schmidt, W. (1985). Shared values make a difference: An empirical test of corporate culture. *HumanResource Management, 24*, 293–309.
Posner, B. (1992). Person–organization values congruence: No support for individual differences as a moderating influence. *Human Relations, 45*, 351–361.
Schneider, B. (2001). Fits about fit. *Applied Psychology: An International Review, 50*(1), 141–152.
Shore, L. M., Tetrick, L. E., Lynch, P., & Barksdale, K. (2006). Social and economic exchange: Construct development and validation. *Journal of Applied Social Psychology, 364*, 837–867.
Subramanian, S., Billsberry, J., & Barrett, M. (2022). *A bibliometric analysis of person-organization fit research: Significant features and contemporary trends* (pp. 1–29). Management Review Quarterly.
Thibaut, J. W., & Kelley, H. H. (2017). *The social psychology of groups*. Routledge.
Tziner, A. (1987). Congruency issue retested using Fineman's achievement climate notion. *Journal of Social Behavior and Personality, 2*, 63–78.
Varey, R. (2015). *Social exchange (theory)* (pp. 1–3). Wiley Encyclopedia of Management.
Verquer, M. L., Beehr, T. A., & Wagner, S. H. (2003). A meta-analysis of relations between person–organization fit and work attitudes. *Journal of Vocational Behavior, 63*, 473–489.

Vogel, R. M., Rodell, J. B., & Lynch, J. W. (2016). Engaged and productive misfits: How job crafting and leisure activity mitigate the negative effects of value incongruence. *Academy Manage- ment of Journal, 59*, 1561–1584.

Wang, X., & Liu, Z. (2019). Online engagement in social media: A cross-cultural comparison. *Computers in Human Behavior, 97*, 137–150.

Wasko, M. M., & Faraj, S. (2005). Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. *MIS Quarterly, 291*, 35.

Analysing Trainees' Engagement Pattern in LMS During Online Training: A Quantitative Approach

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1 Introduction

The world has seen some momentum in online learning in various forms since the outbreak of the COVID pandemic, which drove people worldwide to continue teaching and learning through online methods and highlights learning continuity. The maturation of LMS usage and the introduction of advanced features such as attendance, grading assignments, giving quizzes and providing feedback, among others, have influenced the training process favourably, enhancing trainees' involvement level on various dimensions. As technology gets more engaged in education, fields such as artificial intelligence, data mining and big data analytics gain traction.

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As a result, more learning management systems (LMSs) are being used to measure learners' engagement and learning gains for different learner groups (Knight et al., 2020). It is fascinating to track every single activity of learners based on their digital footprints by analysing the activity logs of LMSs, such as Moodle, GoSkills, TalentLMS and Thinkific, which are just as problematic as offline methods (Leow, 2020). From online education development, the concept of 'heutagogy' emerged, bridging the gap between 'pedagogy' and 'andragogy'. This allows trainees to overcome barriers promoting qualitative learning at all stages, as suggested by Sustainable Development Goal 4 (Bykasova, 2021). Since online training restricts peers' and teachers' physical interaction, analysing learners' engagement at different stages is vital to developing effective online courses (Roblyer & Ekhaml, 2000). It is believed that learner engagement is the fastest way to resolve dropouts, retention issues and desolation and helps achieve cognitive development easily (Banna et al., 2015).

In recent decades, sustainable education (SE) has become a global topic because of the institution's portrayal of sustainable development (SD) in academic or non-academic field (Yuan & Zuo, 2013). The trend towards making society more sustainable is bolstering SD promotion in higher education institutions (HEIs) (Rampasso et al., 2019). Education in the SE sector must be used in many ways to achieve Sustainable Development Goals, including technology transfer, sustainable production, financing and consumption, as proposed in SDGs 4 and 5 (Buckler & Creech, 2014).

Limited research in the domain impeded identifying trainee engagement using LMS, as the use of LMS in the pre-COVID-19 era focused on identifying student engagement in academic courses (Dixson, 2015). Subsequent studies support that those online sessions are just as efficient as the F2F sessions regarding the diffusion of knowledge and engagement in learning (Robertson et al., 2005). According to (Reschly & Christenson, 2012), engagement can be defined as the epiphany of motivation and can be defined in three ways: behavioural, emotional and cognitive, so that knowledge can be assimilated (Fredricks et al., 2004). The foremost task to increase learners' engagement is to measure it accurately through different established means like self-reports and programmed measurements (Harris, 2008). The matter goes more interesting when the learners belong to different cohorts of students, professionals and faculties during a common training event. LMS in online education facilitates institutions to access the learner data through which they can track activities and behaviour (Heathcote & Dawson, 2005). The rapid advancement in technology adoption results in the vacuousness of research in measuring learning engagement and teaching-learning effectiveness (Lopes, 2008). Despite all the usefulness, numerous times researchers have pointed towards the impact of LMS towards arousing the motivation and tenacity in engaging the learners, whether its effect is the same among all the cohorts, which ultimately opens a new paradigm in front of researchers to conduct more advanced studies in the realm (Chen & Almunawar, 2021).

2 Theoretical Underpinnings

The social presence theory (Short et al., 1976) explains a learner as an actual individual in technology-mediated learning, where 'intimacy' and 'immediacy' are prime determinants (Gunawardena & Zittle, 1997). In addition, according to media richness theory (Daft & Lengel, 1986), the media is vital in providing 'rich' information, and the efficiency varies depending on the type of media employed, implying that the appropriate medium is viable in obtaining the highest level of learner engagement. Furthermore, LMS shows a substantial relationship between student happiness and timely feedback features, ability to communicate alternative points of view, and linguistic variety (Rumeser & Emsley, 2017). The implementation of cohort-based learning using social media and communication platforms has considerably benefited the extension of the learner's competence through an interchange of ideas and knowledge, which also increases strong learner engagement (Alzain, 2019). The fact got more entrenched when related to the social constructivist approaches (Bandura et al., 1961; Vygotsky, 1978), which emphasises the importance of social synergy in developing the learning acumen of a participant with his fellow mates that is significantly higher compared to his solo performance. The concept of connectivism (Downes, 2005) emphasises that successful learning gain will only happen if 'links' can be established between different nodes so that knowledge transfer can happen seamlessly (Goldie, 2016). Therefore, it is always interesting to explore the learner's engagement across different cohorts in a common platform and verify the impact of LMS on various parameters of learners' effectiveness.

While discussing technology-mediated learning, the contribution of (Garrison et al., 2001) in the form of the community of inquiry (CoI) framework is worth mentioning, where a group of people engage in critical thinking and reflection to develop their interpretations and reinforce shared understandings of a topic (Pardales & Girod, 2006). Therefore, as an expansion of social constructivist theory, the CoI emphasises the importance of engagement of the learning community for attaining holistic and effective online learning in addition to cognitive and faculty-centric factors (Garrison et al., 2010). The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) synthesises all related theories in this niche domain, identifying performance expectancy, social influence, facilitating condition and effort expectancy as direct determinants for developing behavioural intention. The performance expectancy is the faculty members' belief in the benefits of e-learning; the social influence is the degree to which a teacher believes that fellow students will accept the benefits of using technology in e-learning; the effort expectancy will emphasise the user-friendliness of technology by the faculty members; and the facilitating conditions are those that the technology will help to support the proliferation of e-learning (Radovan & Kristl, 2017).

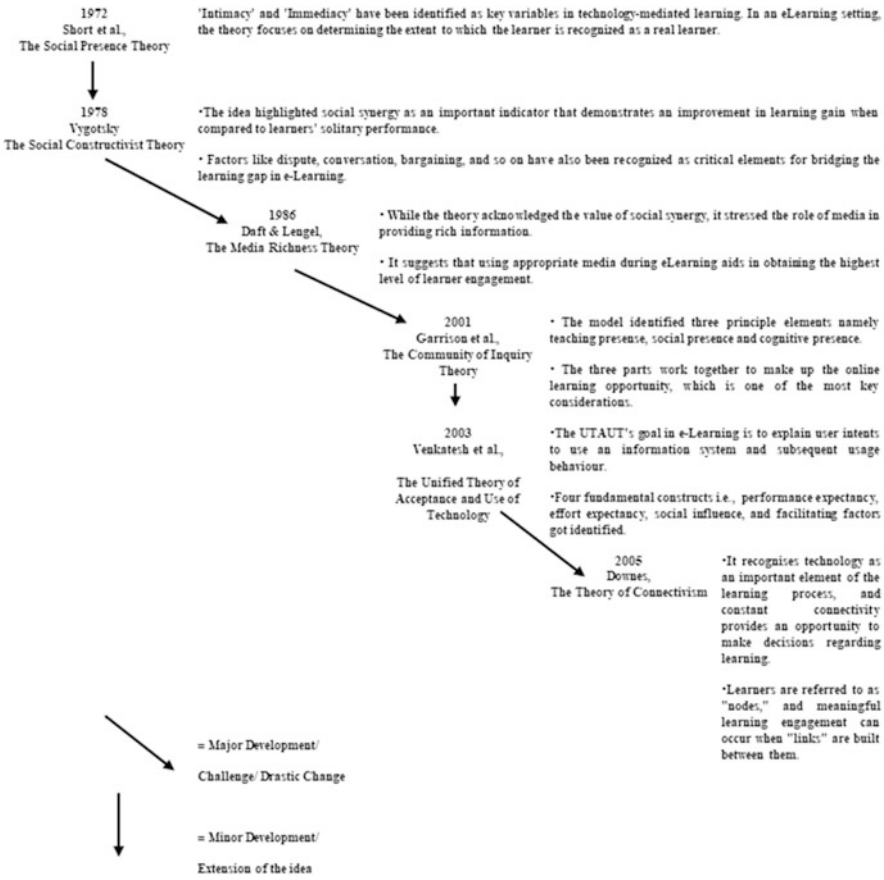

Fig. 1 Chronology of theories. (Source: Author's contribution)

3 Chronology of Theoretical Development

To identify the theoretical development process as it relates to this study's special example of determining learners' engagement, the chronology of the theoretical development has been prepared and presented below (Fig. 1):

4 Development of Research Question

Several studies have already revealed that problems with the implementation of LMS in educational delivery have arisen as a result of a variety of factors, the most significant of which is the failure to provide the necessary training to stakeholders

before implementing a system designed for use in a business environment (Veluvali & Surisetti, 2022). According to the current research, many impediments prohibit LMS from being used to its full potential in the educational sector for increasing learner engagement; therefore, evaluating student progress and providing them with a learner extension trajectory are critical. With such factors under consideration, the study focuses on the following research questions:

RQ 1: Is the level of engagement consistent among different learner groups in a training program?

Previous studies (Kucuk & Richardson, 2019; Sari, 2020) have had reasonably homogeneous stakeholders, such as students or professionals. However, the situation becomes more interesting when the actions of mixed group trainees can be evaluated while keeping other things constant. In the same vein, McKenzie (2022) argued in their study that there had been very little research on evaluating the learners' participation in a mixed-response group and teacher-student dynamics (McKenzie, 2022). Therefore, the study's primary goal is to investigate the level of involvement among different types of learners in a training event.

RQ 2: Does using a learning management system (LMS) affect the learning outcome of the trainees?

Lee et al. (2022) identify learner engagement as one of the main determinants of learning outcomes. The learning outcome is itself the result of several other factors, including mastery of the content, development of transferable skills and overall satisfaction (Lee et al., 2022). With the growing use of LMS in e-learning, it has become a prominent field of research to investigate the actual requirement of using LMS over traditional tools for conducting a training program and whether trainee performance was impacted in the long run. Based on the literature analysis, determining the influence of LMS usage on the learning outcomes of the trainees has been identified as the study's second objective.

RQ 3: Does the frequency of accessing the learning management system (LMS) impact the speed of learners' responses?

Academic performance is a vital dimension through which trainee involvement can be measured in most studies, but it is also true that the learner's response time during the evaluation process is also important, and only a few studies have looked into this parameter. Learners' learning styles differ from situation to situation, and presuming that all cohorts will learn in the same way would under- or over-forecast the outcome. Thus, response time and accuracy have a high potential for measuring student involvement in an efficient online learning environment (Henrie et al., 2015). As a result, the study's third goal is to see if there is any correlation between the frequency of LMS access and the trainee or learner's response time.

5 Sample Descriptor

As previously indicated, three free learning science training programmes were conducted while keeping variables such as the number of sessions, faculty and session time constant to study the participation of different cohorts of learners in

Table 1 Qualification-wise classification of participants

Particulars of participants	Figures
Faculties	61
Professionals	52
Students	43

technology-mediated learning. A total of 264 participants enrolled in the training programmes, of which 156 people, or 59%, finished the entire procedure. 70%, or 109 of 156 participants, were male, while the remaining 30%, or 47 participants, were female. 26 persons held a PhD, 13 individuals held an M.Phil. or were research scholars, 70 individuals held a postgraduate degree, 5 individuals held an engineering degree, 17 individuals held a bachelor's degree and the remaining 12 individuals were undergraduates. Table 1 provides a brief overview of the samples and their characteristics:

6 Research Methodology

The study looks at three learning science training programmes delivered via Moodle LMS. Participants from more than a dozen nations participated in the training programmes, including faculty members from higher education and training institutions, undergraduate and postgraduate students and working professionals in rural development or other linked sectors. A total of 156 people participated in the experiment, including attending a 2-day training programme with three sessions each day, completing an evaluation test after the training programme and submitting a feedback form. Among them, 61 (39.11%) were faculty, 51 (32.69%) were professionals and 44 (28.20%) were students. The participants were instructed to use the LMS throughout, including attending sessions, downloading course lessons, downloading certificates and so on, with the Cisco Webex programme serving as the video conferencing medium. The course content, session topics and resource persons were all consistent across all training programmes, and the evaluation questions were consistent across all three batches to preserve uniformity. No individual has been allowed to attend the same training twice to avoid the issue of data redundancy. After the last session, participants were given a 24-h window to complete the evaluation test and provide comments, after which no participants were permitted to go for any assessment or feedback. Based on the learnings of sessions, 30 multiple-choice questions were asked to the participants, which they needed to answer within 30 min. An auto-submit option has been enabled to automatically store and submit replies 30 min after they are entered. The required data were collected using LMS and evaluated empirically using the SPSS software. For the sake of simplicity and accuracy in determining the correct responses, only multiple-choice questions got asked. One mark has been granted for each correct answer, and no negative marking has been applied.

7 Data Analysis and Discussion

At the onset, the dataset extracted from the LMS got loaded in SPSS, and the data's normality was checked. Based on the result, the non-parametric test has been ratified. The box and whisker plot and Pearson correlation coefficient have been embraced as the preferred tools for representing the data per the study's objective. The box plot approach helps to divide the dataset into quartiles and minimum and maximum values, which give a clear visual representation of the dataset, and the Pearson correlation coefficient helps to establish the relationship between the continuous variables (Thirumalai, 2017). Box plot (Tukey, 1977) method has been proven to be a prominent way of representing graphical data in a simplified and easy computational form. Based on the research purpose, three variables were selected from the bulk data of LMS: the evaluation score of the participants for measuring the learner's performance, the number of LMS hits and the time for completing the evaluation after the training session. The case processing summary of SPSS during the data analysis shows no anomaly, proving that the data is consistent (Fig. 2).

The figure represents the cohorts' performance in the training programme. It is also significant to mention here that there is no outlier in the box plot. The maximum score for all the groups was 100, whereas when we carefully focus on other parameters, we will find that the mean for faculties was 57.11, followed by students 56.27 and professionals 55.16, respectively. The minimum value was 12 for the professionals, followed by the faculties at 10 and students at 4, respectively. Therefore, it can be interpreted that despite having a wider range, the average performance of the faculties is better compared to the students and development professionals in the e-training programme. The fact got more confirmed when we conscientiously evaluated the inter-quartile range to find out the spread of the data, which shows that the difference of the third quartile (Q3) from the first quartile (Q1) of Tukey's hinges becomes 28.70 (72–43.30) for faculties and 36 (76–40) for students. Another

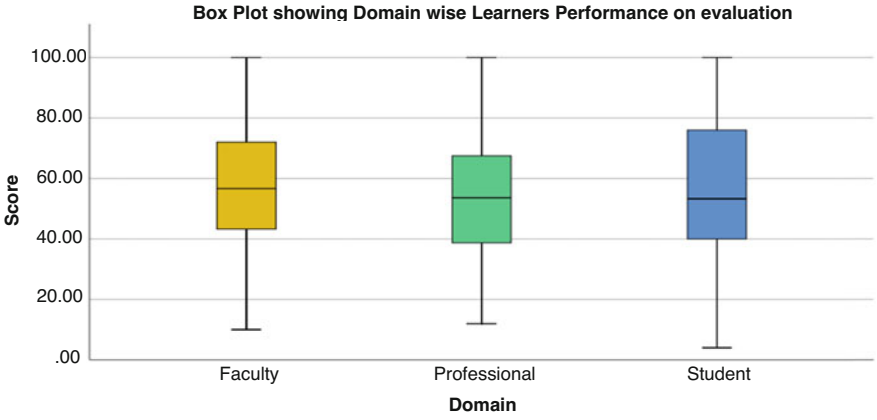

Fig. 2 Box plot graph showing cohort-wise learner's performance based on the evaluation

Table 2 Correlation analysis between LMS hits and assessment score of the trainees

		Score	LMS hits
Score	Pearson correlation	1	0.403[a]
	Sig. (two-tailed)		0.000
	N	156	156

[a]Correlation is significant at 0.01 level (two-tailed)

Table 3 Correlation analysis between LMS hits and assessment response time of the trainees

		Time	LMS hits
Time	Pearson correlation	1	−0.513[a]
	Sig. (two-tailed)		0.002
	N	156	156

[a] Correlation is significant at 0.01 level (two-tailed)

significant inference that can be drawn from the box plot is the distance between the second quartile (Q2) and the third quartile (Q3) for the three clusters, which shows that more students scored higher when got compared to their counterparts. Technological acceptance, the feeling of relatedness with the communication medium and the involvement of the learning community are some of the reasons that may be held responsible for the performance differentiation among the clusters.

Two variables, i.e. the hits on LMS and assessment score, have been considered to measure the impact of LMS engagement on learner performance using the Pearson correlation coefficient. With the gradual predominance of using LMS in e-training, the non-invasive statistical log data generated while using LMS helps researchers establish some relationship between the student interaction with the system and the level of grades they achieved (Macfadyen & Dawson, 2010). However, researchers like Beer et al. (2009) questioned the usefulness of log data because more LMS hits failed to ensure learners' involvement with the learning materials and may result in some internet connection-related problems (Beer et al., 2009). Still, such issues can be avoided by combining synchronous and asynchronous discussions where live sessions can be recorded and uploaded in the LMS. Pearson correlation coefficient for LMS hits and assessment score of the participants was explored to be less positively correlated and statistically significant ($r = 0.403$; $p < 0.01$). It may be deduced as the use of LMS increases; participants will do slightly better than those who use less LMS in the same training programme (Table 2).

The final objective of the study was to determine whether there is any significant relationship between the frequency of LMS usage among the trainees and the response time they took in answering the evaluation test. The empirical study showed that the relationship between learner engagement and academic score is significant, relatively strong and positively correlated with a trainee's behavioural and emotional engagement (King, 2015; Zhu, 2010). Pearson correlation coefficient for LMS hits and evaluation response time was explored to be moderately negatively correlated and statistically significant ($r = -0.513$; $p < 0.01$). It can be assumed that as the use of LMS increases, trainees will take less time responding to assessment questions, resulting in a shorter response time for the completion of the evaluation (Table 3; Fig. 3).

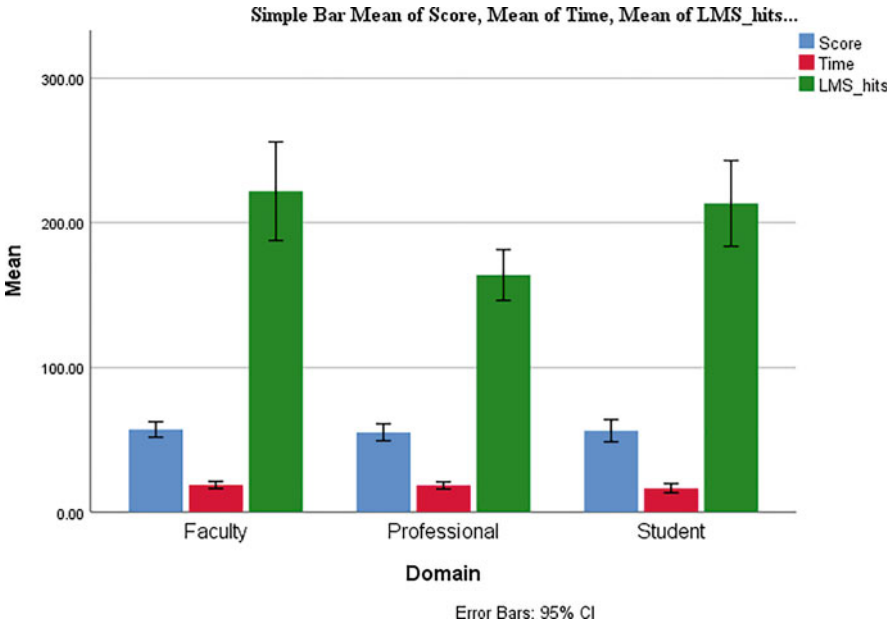

Fig. 3 Simple bar mean of assessment score, response time and LMS hits of faculties, professionals and students

Therefore, considering the above results, it may be implied that the increase in the use of LMS not only in the higher education sector but also in the training sector has encouraging effects in boosting learner engagement and goes hand in hand with the premier learning theories. The fact looks more promising when the data was projected through a simple mean bar chart for all three domains to identify the difference in engagement among the cohorts.

8 Limitations and Future Scope

The work has provided a generalised view of the detection of engagement among learners in a standardised training programme. However, despite the best efforts, the study has several limitations that should be acknowledged. It is indeed true that a larger heterogeneous sample covering more factors like age, gender, course design, course module and faculty feedback will result in a more acceptable output in determining the learner's engagement. Recent studies have incorporated parameters like computer vision-based method, eye tracking, electrodermal activity and ECG monitoring, in addition to the traditional method for tracking the engagement of the learners in a learning event which can accurately measure the academic, psychological, cognitive and physiological engagement (Papamitsiou, 2020). The architecture of designing a live interactive training programme and rolling out the same through

LMS is not very popular in India as mostly google forms and video conferencing tools like Google Meet, Cisco Webex and Microsoft Teams got used for registration and discussion. Learner retention is a crucial objective in outcome-based education. Future research can be expanded to discover such trainees early and help them through countermeasures, as well as to employ educational data mining (EDM) to broaden the scope of the study (Sukhbaatar et al., 2018).

9 Conclusion

The study aims at a diversified and heterogeneous population as the duration of the sessions is short and more job-centric compared to the traditional higher educational scenario. Thus, such inter-segmental studies will provide a new dimension to research and will be useful in building more targeted and practical courses for diverse cohorts, as similar andragogy may not meet the learning demands of all segments. Different advanced studies in learner engagement show that despite increasing user experience in e-learning, the tools or standardised scale for measuring active or passive engagement during learning sessions is still inconclusive and needs academic fraternity or research groups' attention (Santoso, 2016). The COVID-19 pandemic has forced institutes to change their operation from completely offline to blended or online. However, with time, a change in training strategies will pivot changes in the outdated module. Therefore, the augmented and modified training approaches are indispensable to overcome the stagnancy for achieving better outcomes from the end learners (Hasan et al., 2021). The findings and recommendations should be viewed as a first step towards developing a tailored, effective, efficient and engaging online training system that will aid in designing specialised training courses. That will meet the learning demands of all groups, and teaching factions can monitor learners' progress at multiple points. Higher education sustainability methods, particularly in private institutions (PIs), were incorporated into the researcher's industrial supply chain management (SCM) model, which is in cognisance with the theme of SDG 4. Through an integrated SCM approach, the primary goal of this study was to give a systematic assessment of the progression of the sustainable performance of PIs. Researchers also used this chance to share their thoughts on private universities and where they think research should go. The Integrated Tertiary Education Supply Chain Management (ITESCM) can contribute to efficient and productive university operations to ensure long-term sustainability in PIs. To get the most out of their SCM integration, successful companies must look outside their own four walls and collaborate with their trading partners for effective leadership and an environmentally responsible future.

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References

Alzain, H. A. (2019). The role of social networks in supporting collaborative E-learning based on connectivism theory among students of PNU. *Turkish Online Journal of Distance Education, 20*(2), 46–63. https://doi.org/10.17718/tojde.557736

Bandura, A., Ross, D., & Ross, S. A. (1961). Transmission of aggression through imitation of aggressive models. *Journal of Abnormal and Social Psychology, 63*(3), 575–582. https://doi.org/10.1037/h0045925

Banna, J., Lin, M. F. G., Stewart, M., & Fialkowski, M. K. (2015). Interaction matters: Strategies to promote engaged learning in an online introductory nutrition course. *Journal of online Learning and teaching/MERLOT, 11*(2), 249.

Beer, C., Jones, D., & Clark, K. (2009). *The indicators project identifying effective learning: Adoption, activity, grades and external factors. ASCILITE 2009 - The Australasian Society for Computers in Learning in Tertiary Education* (pp. 60–70).

Buckler, C., & Creech, H. (2014). *Shaping the future we want: UN decade of education for sustainable development*.; final report. Unesco.

Bykasova, L. (2021). Heutagogy as a concept of online education in higher school. *E3S Web of Conferences, 258*, 1–10. https://doi.org/10.1051/e3sconf/202125807073

Chen, C. K., & Almunawar, M. N. (2021). *cloud learning management system in higher education. research anthology on architectures, frameworks, and integration strategies for distributed and cloud computing* (pp. 1564–1586). https://doi.org/10.4018/978-1-7998-5339-8.ch076

Daft, R. L., & Lengel, R. H. (1986). Organisational information requirements, media richness and structural design. *Management Science, 32*(5), 554–571. https://doi.org/10.1287/mnsc.32.5.554

Dixson, M. D. (2015). Measuring student engagement in the online course: the Online Student Engagement scale (OSE).(Section II: Faculty Attitudes and Student Engagement)(Report). *Online Learning Journal (OLJ), 19*(4), 143.

Downes, S.: An introduction to connective knowledge (2005).

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement potential of the concept. *Review of Educational Research, 74*(1), 59–109.

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *International Journal of Phytoremediation, 21*(1), 7–23. https://doi.org/10.1080/08923640109527071

Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. *Internet and Higher Education, 13*(1–2), 31–36. https://doi.org/10.1016/j.iheduc.2009.10.002

Goldie, J. G. S. (2016). Connectivism: A knowledge learning theory for the digital age? *Medical Teacher, 38*(10), 1064–1069. https://doi.org/10.3109/0142159X.2016.1173661

Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer–mediated conferencing environment. *International Journal of Phytoremediation, 21*(1), 8–26. https://doi.org/10.1080/08923649709526970

Harris, L. R. (2008). A phenomenographic investigation of teacher conceptions of student engagement in learning. *The Australian Educational Researcher, 35*(1), 57–79.

Hasan, K. K., Mukherjee, D., & Saha, M. (2021). Learning continuity during COVID-19 pandemic using the virtual classroom–a cross-border experimental multi case approach. *Journal of Education Culture and Society, 12*(1), 335–345.

Heathcote, E., & Dawson, S. (2005). *Data mining for evaluation, benchmarking and reflective practice in a LMS. In E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp. 326–333). Association for the Advancement of Computing in Education (AACE).

Henrie, C. R., Halverson, L. R., & Graham, C. R. (2015). Measuring student engagement in technology-mediated learning: A review. *Computers and Education, 90*, 36–53. https://doi.org/10.1016/j.compedu.2015.09.005

King, R. B. (2015). Sense of relatedness boosts engagement, achievement, and well-being: A latent growth model study. *Contemporary Educational Psychology, 42*, 26–38. https://doi.org/10.1016/j.cedpsych.2015.04.002

Knight, S., Gibson, A., & Shibani, A. (2020). Implementing learning analytics for learning impact: Taking tools to task. *Internet and Higher Education, 45*, 100729. https://doi.org/10.1016/j.iheduc.2020.100729

Kucuk, S., & Richardson, J. C. (2019). A structural equation model of predictors of online learners' engagement and satisfaction. *Online Learning Journal, 23*(2), 196–216. https://doi.org/10.24059/olj.v23i2.1455

Lee, J., Park, T., & Davis, R. O. (2022). What affects learner engagement in flipped learning and what predicts its outcomes? *British Journal of Educational Technology, 53*(2), 211–228. https://doi.org/10.1111/bjet.12717

Leow, F. T. (2020). Using LMS analytics to optimise learning design from the activity theory perspective. *International Journal of Creative Multimedia, 1*(1), 117–136. https://doi.org/10.33093/ijcm

Lopes, V. (2008). Course management systems and campus-based learning. *Canadian Journal of Higher Education, 29*.

Macfadyen, L. P., & Dawson, S. (2010). Mining LMS data to develop an "early warning system" for educators: A proof of concept. *Computers and Education, 54*(2), 588–599. https://doi.org/10.1016/j.compedu.2009.09.008

McKenzie, S. (2022). A team-teaching approach for blended learning: An experiment. *Studies in Higher Education, 47*(4), 860–874. https://doi.org/10.1080/03075079.2020.1817887

Papamitsiou, Z. (2020). Utilizing multimodal data through fsQCA to explain engagement in adaptive learning. *IEEE Transactions on Learning Technologies, 13*(4), 689–703. https://doi.org/10.1109/TLT.2020.3020499

Pardales, M. J., & Girod, M. (2006). Community of Inquiry: Its past and present future. *Educational Philosophy and Theory, 38*(3), 299–309. https://doi.org/10.1111/j.1469-5812.2006.00196.x

Radovan, M., & Kristl, N. (2017). Acceptance of technology and its impact on teacher's activities in virtual classroom: Integrating UTAUT and CoI into a combined model. *Turkish Online Journal of Educational Technology, 16*(3), 11–22.

Rampasso, I. S., Anholon, R., Silva, D., Ordoñez, R. C., Santa-Eulalia, L. A., Quelhas, O. L. G., & Aguirre, L. (2019). G.: Analysis of the perception of engineering students regarding sustainability. *Journal of Cleaner Production, 233*, 461–467.

Reschly, A. L., & Christenson, S. L. (2012). *Jingle, jangle, and conceptual haziness: Evolution and future directions of the engagement construct* (pp. 3–19). In Handbook of research on student engagement. Springer.

Robertson, J. S., Grant, M. M., & Jackson, L. (2005). Is online instruction perceived as effective as campus instruction by graduate students in education? *The Internet and Higher Education, 8*(1), 73–86.

Roblyer, M. D., & Ekhaml, L. (2000). How interactive are YOUR distance courses? A rubric for assessing interaction in distance learning. *Online Journal of Distance Learning Administration, 3*(2), 1. Retrieved from, https://www.westga.edu/~distance/ojdla/summer32/roblyer32.html

Rumeser, D. and Emsley, M.: Learning style and learning method preference in project management education: What happens when things get more complex?. Proceedings of the 11th European Conference on Games Based Learning, ECGBL 2017, (October), pp. 860–865.

Santoso, H. B. (2016). Measuring user experience of the student-centered E-learning environment. *Journal of Educators Online, 13*(1), 1–79.

Sari, F. M. (2020). Exploring English Learners' engagement and their roles in the online language course. *Journal of English Language Teaching and Linguistics, 5*(3), 349. https://doi.org/10.21462/jeltl.v5i3.446

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. Toronto; London; Wiley.

Sukhbaatar, O., Ogata, K. and Usagawa, T.: Mining Educational Data to Predict Academic Dropouts: A Case Study in Blended Learning Course. IEEE Region 10 Annual International Conference, Proceedings/TENCON, 2018(October), pp. 2205–2208 (2019). doi: https://doi.org/10.1109/TENCON.2018.8650138.

Thirumalai, C. (2017). Data analysis using box plot on electricity consumption. *International Conference on Electronics, Communication and Aerospace Technology ICECA, 2017*, 598–600.

Tukey, J. W. (1977). *Exploratory data analysis*. Addison-Wesley.

Veluvali, P., & Surisetti, J. (2022). Learning management system for greater learner engagement in higher education—A review. *Higher Education for the Future, 9*(1), 107–121. https://doi.org/10.1177/23476311211049855

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. (2003). D.: User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*, 425–478. https://doi.org/10.1016/j.inoche.2016.03.015

Vygotsky, L. (1978). Interaction between learning and development. *Readings on the Development of Children, 23*(3), 34–40.

Yuan, X., & Zuo, J. (2013). A critical assessment of the higher education for sustainable development from students' perspectives–a Chinese study. *Journal of Cleaner Production, 48*, 108–115.

Zhu, X. X. (2010). *A study of the relationship between fear of failure, learning engagement and academic performance in high school students (Doctoral dissertation, Master's thesis)*. Hebei Normal University. https://www. doc88. com/p-5794120159939.html.

The Effects of Flipped Classroom Practice on Improving Students' Engagement When Interpreting Relations Between Geometrical Shapes

Majed Zainab and Alwadi Hasan

1 Introduction

Passive engagement in the mathematical content has been commonly reported by many international academic associations (Clark, 2015). In one of the mathematics courses that had been taught to year 3 students, it has been noticed that lecturing does not improve math students' problem-solving skills in geometry. Students' repetitive questions on how to solve a certain geometrical problem during lecturing have indicated to me that there is a weak alignment between my teaching activity (lecturing) and learning activities (solving geometrical problems), which negatively affects alignment to one of the course's intended learning outcomes including interpreting relations between geometrical shapes (Biggs & Tang, 2011). As a result, students experience difficulty in learning geometrical shapes, and accordingly, they were passively engaged in the classroom. This main issue comprises three aspects including engagement with instructor, with classmates, and with the mathematical content.

2 Literature Review

Many of the research that have been conducted in higher education context have shown the effectiveness of flipped learning model on students' performance in comparison to that in traditional teaching model. Flipped learning has been

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described as employing interactive group-based learning activities inside the classroom and placing all other traditional teaching events outside the classroom (Bishop & Verleger, 2013). Studies had indicated that flipped classroom promotes student motivation as a result of the active learning environment (McLaughlin et al., 2014). Bergmann and Sams (2012) demonstrated that flipped learning model enhances student-centered approach, develops self-independent learning, and increases students' engagement. Engagement has been defined by Schaufeli and his colleagues (2002) as "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (cited in Schaufeli et al., 2006, p. 702). Therefore, students' engagement is a dependent variable that can be improved when implementing suitable teaching method.

3 Research Aims and Question

The main aim of this study is to develop students' engagement when interpreting relations between geometrical shapes. Therefore, the research question is:

What is the effect of pre-class assignment on improving students' engagement when interpreting relations between geometrical shapes?

To achieve the study's aim and to answer the research question, two cycles had been conducted in this study with two specific aims: (1) to measure students' performance in interpreting the relations between geometrical shapes and (2) to measure students' attitude toward the introduced change (pre-class assignment) on improving their engagement.

4 Research Method

This research included two cycles: the first cycle has been conducted and the introduced change was using pre-class video assignment, which was uploaded in Moodle 3 days before the lecture. Students were asked to watch the video before they came to the lecture. During the class time, worksheets were distributed to the students, and they were asked to work individually to solve the given problems. However, students were uncomfortable with the introduced change in the teaching practice; thus, they were allowed to work in groups based on their preference, with freedom of group selection. It has been noticed that group working increased students' interactions with each other, and they were more engaged with the content. Thus, pre-class video assignment was continued to be used also in the second cycle with intervention in students' group selection. Groups' selection has been controlled to assure that students were sitting in mixed-ability groups to scaffold their learning. When students were working with more capable peers, their learning developed as they got more responsive support (Vygotsky, 1980).

The research has been designed to be mixed method; mixing quantitative with qualitative paradigm provides a better understanding of the research problem (Creswell, 2009). Although the sample size was only 78 students, they were my targeted population in TC1MA354. Students had the opportunity to decide not to participate without any consequence; however, all the students were willing to take part in this research and had signed the consent form of participation. To improve the overall quality of the collected data, triangulation has been assured when selecting and designing the instruments of this study. In particular, three instruments have been used when gathering data including survey, observation check list, and oral test at the end of each conducted cycle. To answer the research question and to achieve the first aim of the conducted cycle, observation checklist and oral test were constructed. The observation checklist has been developed based on scales of College and University Classroom Environment Inventory (CUCEI; Fraser et al., 1986). Six of the seven scales of CUCEI had been used as the main items in the observation checklist including personalization, involvement, student's cohesiveness, satisfaction, task orientation, and individualization (Appendix 1). The seventh scale innovation was not included in the observation checklist as it is not part of this research's aim to be measured. The observation checklist was used to measure student's performance in interpreting relations between geometrical shapes.

The oral test was established to measure student's achievement in interpreting relations between geometrical shapes. The oral test consisted of five questions, which have been created based on the Academic Efficacy Scale from the Pattern of Adaptive Learning Scales (PALS; Midgley et al., 2000). Students' efficacy to learn is an integral part in students' engagement with the content which was the major issue in my teaching practice before implementing the action research. Based on the five statements that had been adopted from the efficacy scale, related five questions had been created as shown in Appendix 2. The five questions are: (1) What are the skills that you mastered in the flipped class this year? (2) Can you figure out how to do the given difficult question? (3) Can you do almost all the work in the flipped class if you do not give up? (4) By showing you the work of the following question, can you learn how to do it? (5) Answer the question based on the work that has been explained to you.

The third instrument (online survey) was quantitatively constructed to measure students' attitude toward the implemented change (Appendix 3). The null hypothesis that will be tested is that there are no significant differences in students' engagement after implementing pre-class assignment. The establishment of this survey was based on the literature review of flipped learning model. The survey included five statements to measure students' attitudes toward pre-class activities and eight statements to measure students' attitudes toward in-class activities. These items were adopted from the survey that has been conducted in a flipped classroom study by McNally and his colleagues in 2016. McNally et al. (2016) reported reliability coefficient alphas between 0.68 and 0.88, which ranged in the acceptable internal consistency for all the variables. Five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was developed in the survey. In addition, a modified version of the Utrecht Work Engagement Scale for Students (UWES-S; Schaufeli et al., 2006)

was added to the developed survey to assess student's engagement. The scale includes items that assess student's engagement in three main domains including vigor, dedication, and absorption. The three aspects were described by Schaufeli et al. (2002) as "Vigor is characterized by high levels of energy and mental resilience while working, the willingness to invest effort in one's work, and persistence even in the face of difficulties. Dedication refers to being strongly involved in one's work and experiencing a sense of significance, enthusiasm, inspiration, pride, and challenge. Absorption is characterized by being fully concentrated and happily engrossed in one's work, whereby time passes quickly and one has difficulties with detaching oneself from work" (cited in Schaufeli et al., 2006, p. 702). Thus, 13 statements were adapted from UWES-S to measure these three domains. Google form was used to construct the survey online and then was distributed to the targeted population via email.

5 Data Analysis

5.1 Survey Analysis

Analyzing of the quantitative instrument (survey) was firstly performed using the Statistical Package for Social Sciences (SPSS) version 23. To begin with, descriptive analysis was performed to understand students' attitude toward the implemented change in both cycles. Table 1 had indicated the overall means and standard deviations of the independent variable (pre-class activity and in-class activity) and dependent variable (class engagement) in cycle 1 with $M = 3.74$ and SD = 1.2.

To understand which aspects of students' attitude are more influenced by the applied intervention in cycle 1, mean and standard deviation had been calculated for each domain of class engagement as shown in Table 2. As indicated in the table, absorption (AB) is the highest influencer of students' engagement in cycle 1 with $M = 3.77$ and SD = 1.3.

Table 1 Descriptive statistics of cycle 1

	Mean	SD	*N*
Class engagement	3.7446	1.27737	78
Pre-class activity	3.8769	1.33766	78
In-class activity	3.8782	1.15323	78

Table 2 Descriptive statistics of class engagement domains in Cycle 1

	N	Range	Mean	SD
Class engagement	78	4.00	3.7446	1.27737
CE_VI	78	4.00	3.7590	1.33265
CE_DE	78	4.00	3.7103	1.27499
CE_AB	78	4.00	3.7778	1.31004
Valid *N* (listwise)	78			

Table 3 Descriptive statistics of cycle 2

	N	Mean	SD
Class engagement	78	3.6686	1.05758
Pre-class activity	78	3.7923	1.20149
In-class activity	78	3.7821	1.00070

Table 4 Descriptive statistics of class engagement domains in cycle 2

	N	Minimum	Maximum	Mean	SD
Class engagement	78	1.00	5.00	3.6686	1.05758
CE_VI	78	1.00	5.00	3.6436	1.12430
CE_DE	78	1.00	5.00	3.7000	1.03886
CE_AB	78	1.00	5.00	3.6581	1.17940
Valid *N* (listwise)	78				

Table 5 Paired sample statistics

		Mean	N	SD	SE mean
Pair 1	Class engagement	3.7446	78	1.27737	0.14463
	Post Class engagement	3.6686	78	1.05758	0.11975

In comparison, the overall mean and standard deviation of cycle 2 variables were slightly lower than that of cycle 1 with $M = 3.66$ and SD = 1.05 of class engagement, $M = 3.79$ and SD = 1.2 of pre-class activity, and $M = 3.78$ and SD = 1.0 of in-class activity as shown in Table 3. Mean and standard deviation had also been calculated for each domain of class engagement as shown in Table 4. The table shows that dedication (DE) is the highest influencer of students' engagement in cycle 2 with $M = 3.7$ and SD = 1.03.

Moreover, to provide enough evidence about accepting or rejecting the null hypothesis, paired t-test was performed. As shown in Table 5, class engagement's mean of cycle 1 is equal to 3.7, which is close to class engagement's mean of cycle 2 ($m = 3.6$). In addition, Table 6 has demonstrated that p-value is bigger than 0.05 (p-value = 0.664). This value indicates that there is no significant difference in students' engagement after implementing pre-class assignment in cycle 1 and that in cycle 2. This reveals that the null hypothesis cannot be rejected.

Scatterplot was also conducted to understand which implemented practice is better. Figure 1 shows a strong positive correlation between pre-class activity and in-class activity in cycle 1 as $R^2 = 0.83$. There is also a strong positive association between class engagement and pre-class activity with $R^2 = 0.88$ in Fig. 2 and a strong positive correlation between class engagement and in-class activity with $R^2 = 0.86$ in Fig. 3.

On the other hand, the implemented practice in cycle 2 has revealed a moderate positive correlation ($R^2 = 0.6$) between pre-class activity and in-class activity as shown in Fig. 4. Also, Figs. 5 and 6 had indicated an important finding of the implemented practice in cycle 2. There was moderate correlation between dependent variable (class engagement) and independent variable (pre- and in-class activity) with $R^2 = 0.57$ and $R^2 = 0.50$, respectively. This finding revealed that implemented practice of cycle 1 is better than that in cycle 2.

Table 6 Paired sample test

		Paired differences							
					95% confidence interval of the difference				
		Mean	SD	SE mean	Lower	Upper	*t*	*df*	Sig. (two-tailed)
Pair 1	Class engagement—Post Class engagement	0.07594	1.53659	0.17398	−0.27051	0.42238	0.436	77	0.664

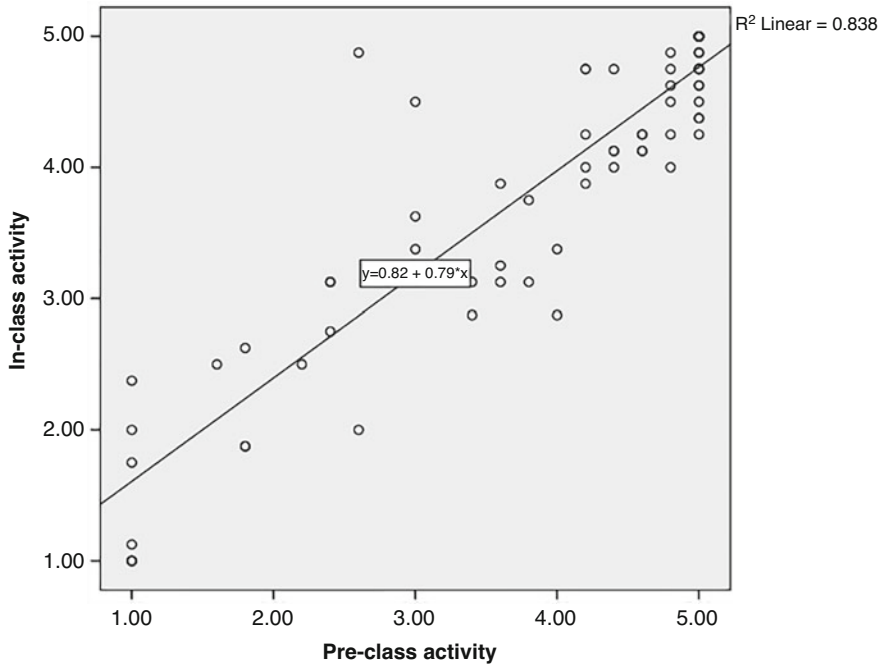


Fig. 1 Correlation between pre-class activity and in-class activity in cycle 1

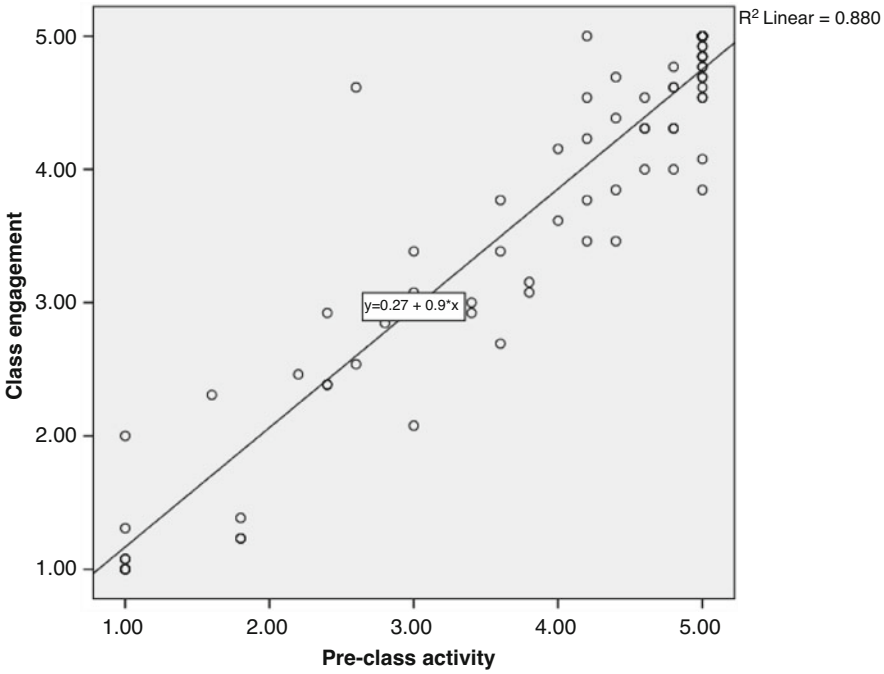


Fig. 2 Correlation between pre-class activity and class engagement in cycle 1

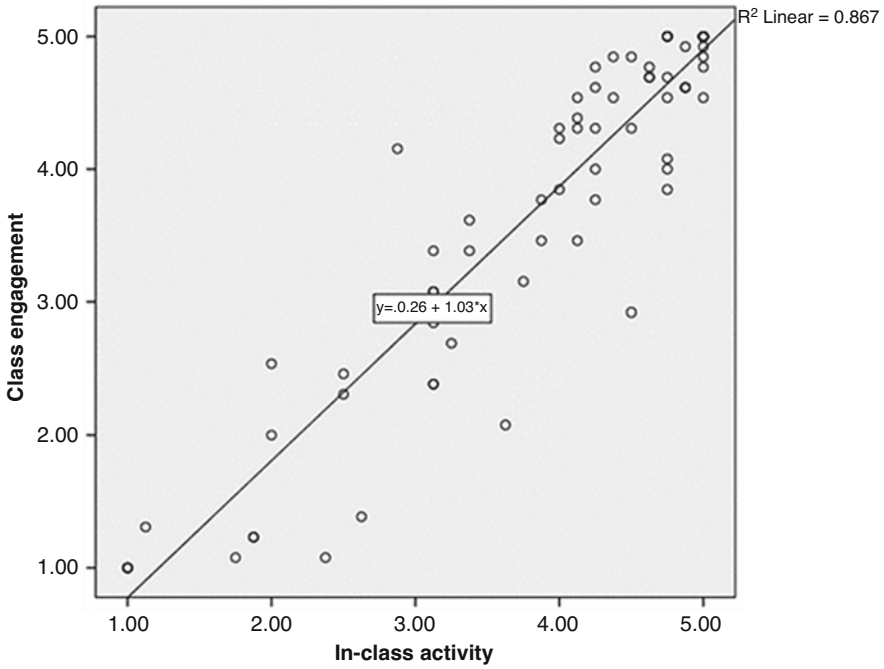


Fig. 3 Correlation between in-class activity and class engagement in cycle 1

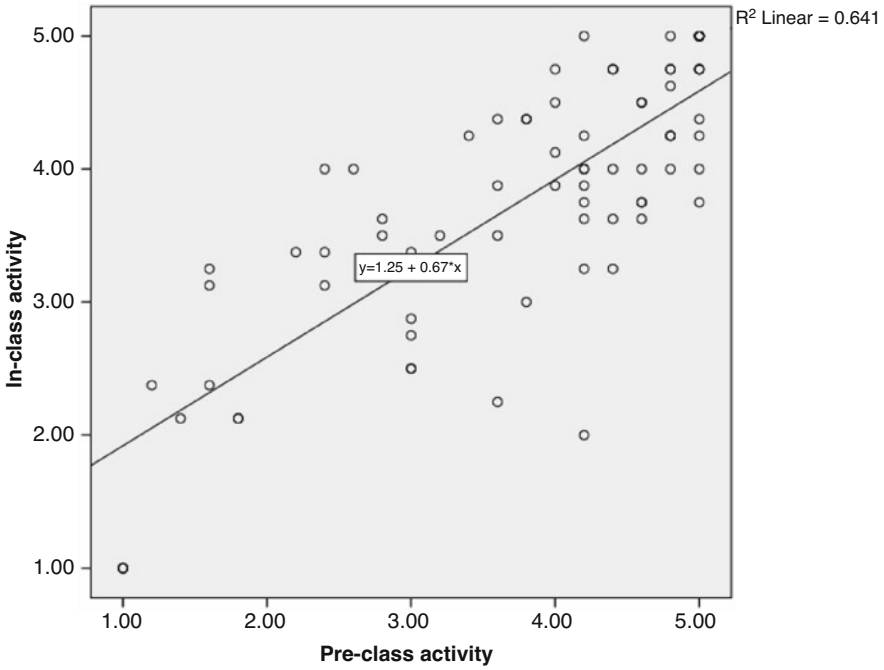


Fig. 4 Correlation between pre-class activity and in-class activity in cycle 2

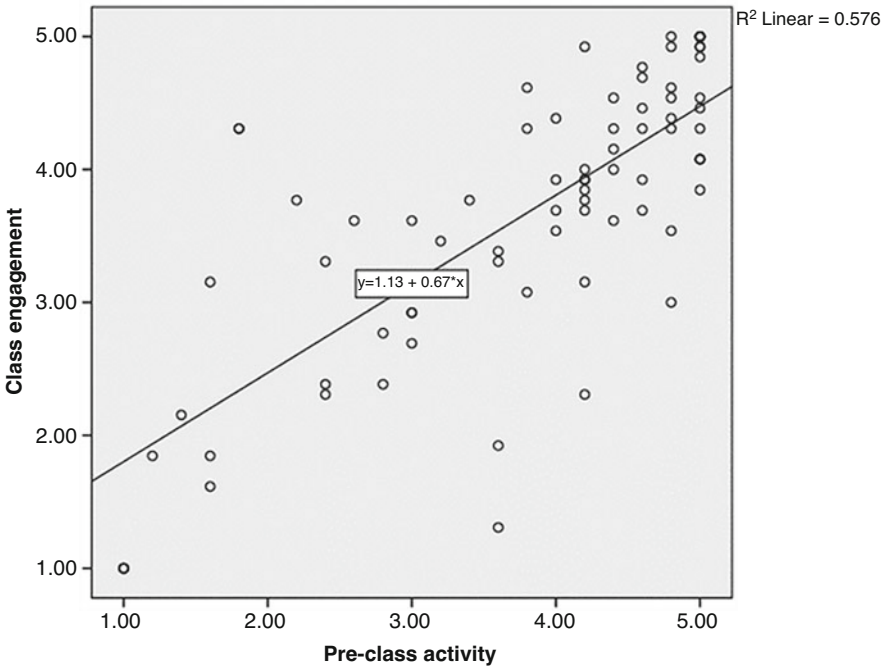


Fig. 5 Correlation between pre-class activity and class engagement in cycle 2

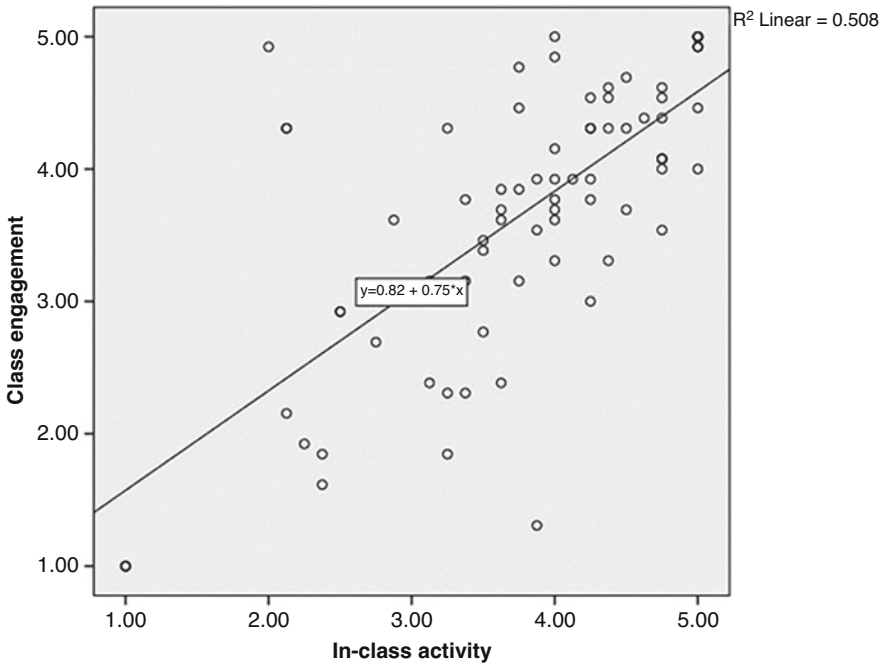


Fig. 6 Correlation between in-class activity and class engagement in cycle 2

6 Observation Checklist Analysis

Observation checklist has been quantitatively analyzed based on percentages that were recorded during the observation. In cycle 1, Appendix 1.1 has indicated that high percentage ranged between 80% and 90% of students' cohesiveness and involvement, respectively. This high percentage reflects students' attitudes toward the implemented change in the teaching practice, which increased their enjoyment of class work to 80%. In the flipped classroom in cycle 1, students were freely selecting their groups and questions to solve which highly influenced their individualization to 80%. Interestingly, the intervention in cycle 1 helps to increase students' responsibility and independency as their interactions with the instructor had been recorded only at 20%.

In comparison to cycle 2, students' interactions with each other had been decreased to 50%, and they were asking me more questions which increased the instructor's interactions with them to 50% as indicated in Appendix 1.2. Almost half of the students were not asking their group's members for clarification, which increased the instructor's responsibility in checking each student's understanding level. This decreased the efficiency of each student's work, especially low-ability students as they need to wait for their turn so the instructor can give them intensive feedback on their mistakes to be able to proceed the rest of the work. As a result, the implemented intervention in cycle 2 has negatively influenced individualization category, and each student's ability in finishing his/her task on time has decreased to 50% in comparison to 80% of individualization in cycle 2. Moreover, it has been noticed that students were less satisfied with the applied intervention in cycle 2, and class enjoyment thus was decreased to 60% in comparison to 80% in cycle 1. However, students' participation was reasonable as 70% of the students were involved and participated inside the classroom as they were working based on the instructor's clarification of the instructions.

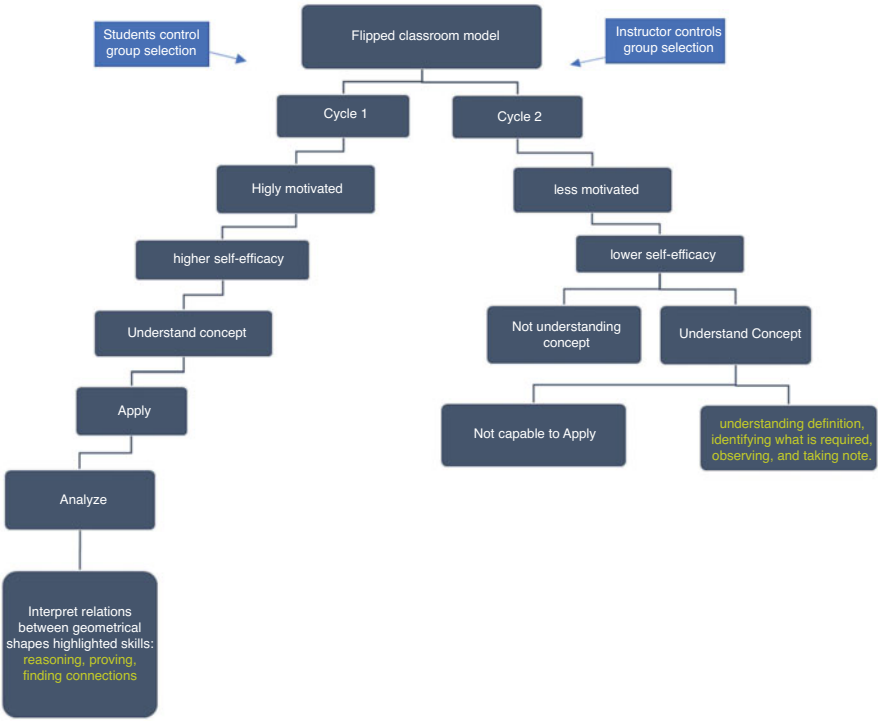
7 Oral Test Analysis

Oral test was qualitatively analyzed to be able to categorize students' answers into suitable generated themes. The teaching practice that has been implemented in cycle 1 was found to positively improve students' achievement to 80% in most of the test's questions. In Appendix 2.1, high level of analyzing skills had been reported in the first question including reasoning, proving, solving, differentiating, and figuring out. These skills illustrate the effectiveness of the implemented change in cycle 1 on increasing students' confidence level in answering and elaborating the question. Students were also able to solve the difficult and hardest question when it had been explained to them. In comparison to cycle 2 as shown in Appendix 2.2, 50% of the students were only able to explain how to solve difficult question, and some of them had difficulty in answering the hardest questions. The reason was that the implemented intervention in cycle 2 was not effective in increasing student's self-

efficacy, which negatively affected their performance in answering the questions. Particularly, 60% of the students reported skills that they had mastered in cycle 2 such as understanding definition, identifying what is required, finding, observing, and taking notes. They had not mentioned the essential skills that are needed to interpret relations between geometrical shapes. As a result of analyzing this test, generated themes have been created from students' answers. The generated theme from responses in cycle 2 was understanding concept, whereas the theme of cycle 1 was analyzing concept. These themes help to create a mind map that highlights the link between the implemented teaching practice in each cycle and student's engagement.

As demonstrated in the mind map above, the implemented practice in cycle 1 highly motivated the students to be involved, be engaged, and interact with each other, which highly improved their achievement in interpreting relations between geometrical shapes. However, the intervention in cycle 2 decreased students' motivation to engage and interact with each other, which highly decreased their self-efficacy in improving their interpreting skills.

8 Discussion



The above data analysis helps in answering the research question and understanding the effects of pre-class assignment on improving students' engagement. In particular, students were found to be active in the learning environment when change had been implemented in cycle 1. Research had highlighted the benefits of collaborative learning practice (Prince, 2004) and technology (Bergmann & Sams, 2012) in the flipped classroom environment. Changing the teaching practice from traditional lecturing to flipped learning model which was supported by innovative technology has improved students' engagement with the content. As a result, their performance has been improved in interpreting relations between geometrical shapes. Biggs and Tang (2011) have stated that the best learning climate emerged when students have the freedom to move and make decision of their learning. The minimum intervention in cycle 1 has encouraged students to take higher control of their learning, and this increased their motivation and confidence in the learning environment.

However, controlling student's group selection in cycle 2 was necessary to assure forming of mixed-ability groups. This developed intervention was not better than the implemented intervention in cycle 1. The findings have clearly verified that controlling groups' selection negatively affects students' engagement with each other and with the content. Accordingly, this hinders students from improving their skills to reach higher level of intended learning outcomes, interpreting relations between geometrical shapes as shown in the mind map above. When change has been implemented in cycle 2 and placed higher control on students' cooperative learning, students' self-determination has been diminished. According to self-determination theory (SDT; Ryan & Deci, 2008), students feel more self-determined when they experience fewer external forces in specific learning situation. The theory consolidates three basic psychological needs including competence, relatedness, and autonomy. Students' motivation to learn is promoted when the implemented teaching practice provides students with opportunities to feel competent in their own ability and relatedness to peer and teachers and be autonomous in making decision. Through progressing in cycle 2, it appears that taking away student's autonomy of making decision about group selection resulted in moving them away from their friends, and this had decreased their relatedness in the assigned group. According to SDT, complete modification in cycle 2 was less useful to the students as it decreased their motivation to learn because two of their basic psychological needs have not been fulfilled including relatedness and autonomy. Thus, giving students the freedom to select their groups is believed to be one of the strengths in the implemented practice in cycle 1, which helps in developing an effective learning environment. Also, continuing implementation of appropriate learning technology (recorded video) strengthens the practice in both cycles. However, using the free trial of FlashBack recording software is one of the difficulties that had been faced when carrying out this research as the software was free for only 1 month, which placed extreme pressure in managing to record all the lectures within 1 month. Providing students with inadequate guidance and support of group working skills worked also as another limitation in the research that must be improved in future implementation.

9 Conclusion

To conclude, this research has examined the effect of pre-class assignment on improving students' engagement when interpreting relations between geometrical shapes. The major issue in the teaching practice before implementing the cycles was students' passive engagement. The findings have showed that flipped learning model helped in increasing students' engagement with the mathematical content as well as with their instructor and peers inside the classroom. In particular, using pre-class video assignment as an aspect of flipped learning model has effectively influenced students' engagement when implemented with cooperative learning. However, cooperative learning must be practiced based on students' decision to increase students' motivation and autonomy as applied in cycle 1. Developing high control on students' learning was not effective in improving their engagement as occurred in cycle 2. As a result, training the students to be active learners in group working and to take control of their learning will promote flipped classroom success (McNally et al., 2016). Thus, a future plan to implement flipped classroom with adjustment in the next academic year is recommended. Firstly, provide workshop for the students at the beginning of the year before implementing flipped model to train them how to get maximum benefits from pre-class assignment, especially students with weak learning skills, as suggested by McNally and his colleagues. Secondly, assign grade for pre-class assignment to increase students' motivation to do the pre-class assignment before coming to the lecture. Lastly, sharing this study's outcomes with colleagues in the university is a future plan to promote the practice of flipped learning model and to come up with new implication that improves this model.

References

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. International Society for Technology. in Education.

Biggs, J., & Tang, C. (2011). *Teaching for quality learning at university* (4th ed.). McGrow Hill Education & Open University Press.

Bishop, J. L., & Verleger, M. A. (2013). The flipped classroom: A survey of the research. In G. A. Atlanta (Ed.), *Paper presented at the 120th American Society of Engineering Education Annual Conference & exposition* (pp. 1–18). Scientific Research.

Clark, K. R. (2015). The effects of the flipped model of instruction on student engagement and performance in the secondary mathematics classroom. *Journal of Educators Online, 12*(1), 91–115.

Creswell, J. W. (2009). Mixed methods procedures. *Research design: Qualitative, quantitative, and mixed methods approaches, 3*, 203–225.

Fraser, B. J., Treagust, D. F., & Dennis, N. C. (1986). Development of an instrument for assessing classroom psychosocial environment at universities and colleges. *Studies in Higher Education, 11*(1), 43–54.

McLaughlin, J. E., Roth, M. T., Glatt, D. M., Gharkholonarehe, N., Davidson, C. A., Griffin, L. M., & Mumper, R. J. (2014). The flipped classroom: A course redesign to foster learning and engagement in a health professions school. *Academic Medicine, 89*(2), 236–243.

McNally, B., Chipperfield, J., Dorsett, P., Del Fabbro, L., Frommolt, V., Goetz, S., Lewohl, J., Molineux, M., Pearson, A., Reddan, G., & Roiko, A. (2016). Flipped classroom experiences: Student preferences and flip strategy in a higher education context. *Higher Education, 73*(2), 281–298.

Midgley, C., Maehr, M. L., Hruda, L. Z., Anderman, E., Anderman, L., Freeman, K. E., & Urdan, T. (2000). *Manual for the patterns of adaptive learning scales*. University of Michigan.

Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education, 93*(3), 223–231.

Ryan, R. M., & Deci, E. L. (2008). Self-determination theory and the role of basic psychological needs in personality and the organization of behavior. In O. P. John, R. W. Robbins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 654–678). Guilford Press.

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement, 66*, 701–716.

Schaufeli, W. B., Salanova, M., Gonzalez-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A confirmative analytic approach. *Journal of Happiness Studies, 3*, 71–92.

Vygotsky, L. S. (1980). *Mind in society: The development of higher psychological processes*. Harvard university press.

Part II
Digital Learning, Innovation and Sustainable Operations

Impact of ICT-Enabled Teaching at Higher Education Level: From Faculty Perspective

Lijo P. Thomas and Ritesh Chaudary

1 Introduction

Information and communications technology (ICT) has emerged as a powerful tool during the pandemic situation and has revolutionized teaching pedagogies in the education sector. ICT has made the teaching-learning process very immersive and demands more dedication and participation from the teachers in higher educational institution. This developing digital technology holds the possibility of implausible innovation and development of society. As education is the key to the success of a nation, embracing digital technology can take a long way in this era of artificial intelligence. In recent years, technology has enhanced the participation of individuals in social, political, and economic dimensions of life (Nishijima et al., 2017). It can serve a vital role in the growth of all countries (Wardhani et al., 2018) and is even more important for developing countries, for which technology is also being considered as a source to attain the United Nations' Sustainable Development Goals (SDGs) (United Nations, 2021). This scenario has also forced educational scientists to explore the myriad possibilities of ICT tools to improve the teaching-learning processes. However, to have a robust teaching-learning experience, higher educational institutions should integrate ICT in a systemic and adroit manner. In countries like India, the digital divide is very prevalent, and this has been referred to as a major issue in the twenty-first century by Rogers (2016). These inequalities will pave the way for forbidden education in rural areas and the digital gap existing among teachers as well as students.

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There was also a massive shift from the didactic, teacher-centered teaching to a more learner-centered pedagogy (Trepule et al. 2015). There is substantial room for creativity, collaborative learning, critical thinking, and problem-solving using various tools, which provides enormous opportunities for educators to convey their knowledge to the learners.

While debating on new learning environments, it should be kept in mind that there is the necessity of developing competencies among faculty for the usage of information and communication technologies. With the widespread usage of the internet and open-source learning materials, faculty must abide by the professional ethics to collaborate digital technologies in their teaching routine. Pedagogical innovations, promoted as participatory learning, are expected to offer more possibilities to move to a world of customized education (Aljaraideh & Al Bataineh, 2019).

2 Literature Survey

The information age is gaining acceptance among society from a wider perspective, and it is developing at a fast pace. One of the fields which were left out in this race was education. Traditional teaching method gains prominence in society. There are sufficient literatures available with the authors pointing out the advantages, challenges, and future scope. XIN XU et al. (2019) have discussed the demand for smart campus online teaching. Various factors were considered, and the researchers have highlighted the most essential requirement of the data network for ICT-enabled teaching and learning. The concerns related to the increased amount of data have been addressed by Jay Liebowitz (Liebowitz, 2017; Rogers, 2016). There are many studies conducted by researchers on technological enhancements rendered to teachers at the higher education level. Various frameworks were designed by investigating on different parameters like intended curriculum based on targets defined by the national education system and implementation of this framework at classroom levels, and attainment levels were measured by analyzing learning outcomes. Key areas to be focused on implementing ICT education in higher education, its challenges, tools and techniques to be used, efficacy of ICT in education, and role of innovation through ICT were discussed in detail by various researchers using enormous case studies. ICT-enabled teaching-learning aims to make an impact on educational practices throughout the world. The main challenge is the reachability and infrastructure. Massive open online courses (MOOCs) have been one of the trending educational initiatives. A study was conducted by Vasiliki Vlachou et al. (2020), wherein the challenges of MOOC were described. A detailed study on the usage of ICT was examined by Fahm A.O. and Azeez (Fahm et al., 2022) and has revealed that technology will be the key parameter for the integration of ICT-enabled teaching-learning pedagogical methods in higher educational institutions.

3 Research Methodology

A questionnaire was designed and distributed to the target group of respondents. The questionnaire was intended precisely to address research objectives concerning faculty's perception of the use of ICT tools. Participants were selected from different types of higher educational institutions like state universities, private universities, private colleges, autonomous colleges, and government colleges. The survey questionnaire consisted of 4 sections and 30 independent variables. The sections of the questionnaire included personal details, experience with ICT tools for teaching, ICT access for teaching, support for teachers on ICT usage, challenges in using ICT tools for teaching and learning, teachers' skills in using ICT, their opinion on ICT usage, and its influence on students' learning outcome. 250 faculties from various institutions across South India participated in this survey to express their view on various issues pertaining to ICT in their respective institutions.

- The vital parameters investigated are the following:
- Willingness and confidence level of faculty to shift to ICT-enabled teaching-learning.
- Impact of ICT-enabled tools for student progression and achievement.
- To what extent do faculty incorporate ICT tools in teaching and learning in the classroom.

3.1 Scope and Delimitation

- The study was limited to the faculty of higher education in South India.
- It is delimited to the confidence level of faculty to impart ICT learning at higher education level.

4 Materials and Methods

4.1 Materials

To gather data from the sample group, a standardized confidence scale was developed and distributed through Google Forms. The tool had 3-point scales to mark their perception.

To move further with the crucial individual parameters, the role of ICT was also investigated in the academic achievement of the student and whether it is going to affect classroom management positively. This is discussed in Sect. 5.

4.2 Method

4.2.1 Sample

The sampling design adopted for the study used a purposive sample from different higher education institutions in South India. The respondents were from different streams of study like engineering, science, humanities, commerce, and management. Data were collected using the questionnaires circulated using the Google Forms (Fig. 1). Since the respondents were from technical and nontechnical background, closed-ended questions like "agree" and "disagree" and few open-ended questions which gave the freedom of expression were incorporated.

- The survey intended to measure the confidence of faculty towards ICT.
- A descriptive survey method was used where various parameters were distributed among respondents and their response was gathered.

5 Results and Discussion

The objective of this work was to analyze the aptitude and attitude of faculty towards ICT education in India. Analysis has also pointed out the challenges faced by faculty and institutions to accommodate digitization towards new pedagogical aspects.

	A	B	C	D	E	F	G	H	I	J
1	To which District does your college belongs ? Name of the District	To which State does your College belongs ? Name the State	My Discipline/Department	The use of computer technology in the classroom Increases academic achievement .	It is effective because I believe I can impleme nt it	ICT in teaching/ learning makes classroo m manage	It is a valuable instructio nal tool and is required for my	It is too costly in terms of resource s, time and effort.	Makes teachers feel more compete nt as educator	Gives teachers the opportun ity to be learning facilitato
2	Bengaluru	Karnataka	Commerce/Managemer	Strongly Agree	Agree	Agree	Strongly A	Agree	Strongly A	Strongly A
3	Bangalore	Karnataka	Arts/Humanities	Strongly Agree	Agree	Agree	Agree	Disagree	Agree	Agree
4	Bangalore	Karnataka	Arts/Humanities	Agree	Agree	Disagree	Agree	Disagree	Agree	Agree
5	Bangalore	Karnataka	Arts/Humanities	Agree	Agree	Agree	Strongly A	Agree	Agree	Agree
6	Bangalore	Karnataka	Arts/Humanities	Agree	Agree	Disagree	Strongly A	Agree	Agree	Agree
7	Bengaluru	Karnataka	Computer Science/Com	Strongly Agree	Agree	Agree	Strongly A	Strongly A	Strongly A	Strongly A
8	Chennai	Tamilnadu	Pure Science=Chemistn	Disagree	Disagree	Strongly A	Strongly A	Agree	Agree	Agree
9	Bangalore	Karnataka	Engineering (other than	Strongly Agree	Strongly A	Disagree	Strongly A	Disagree	Strongly A	Strongly A
10	Bangalore Urban	Karnataka	Arts/Humanities	Strongly Agree	Agree	Strongly A	Strongly A	Disagree	Agree	Agree
11	Calicut	Kerala	Commerce/Managemer	Strongly Agree	Strongly A	Disagree	Strongly A	Agree	Strongly A	Agree

Fig. 1 Sample response of the data collected

5.1 Impact of ICT-Enabled Teaching in Higher Education

The two important factors, academic achievement and classroom management, with respect to ICT are summarized in Table 1.

Figure 2 represents the impact of ICT on academic achievement. The respondents were faculty members and management teams from various colleges and universities. 95% favored for the positive impact. The reason stated was the widespread networking across the globe and ease of delivering the content. Students were also encouraged to explore beyond the book. With regard to classroom management, 35% had anxiety, and 65% stated that ICT is not going to bother them in managing the class.

The respondents were also asked to express their views on the effectiveness of ICT on students of all abilities, i.e., slow/average/fast learners. 76% of respondents agreed that ICT tools can be efficiently utilized by all categories of students (positive response, Fig. 3).

The results in Fig. 3 also reveal that the majority of the faculty members are confident on the various learning tools, which are effective in motivating and engaging all categories of students.

Table 1 Important factors

Category	ICT and academic achievement	ICT and classroom management
Agree	95	38
Disagree	5	62

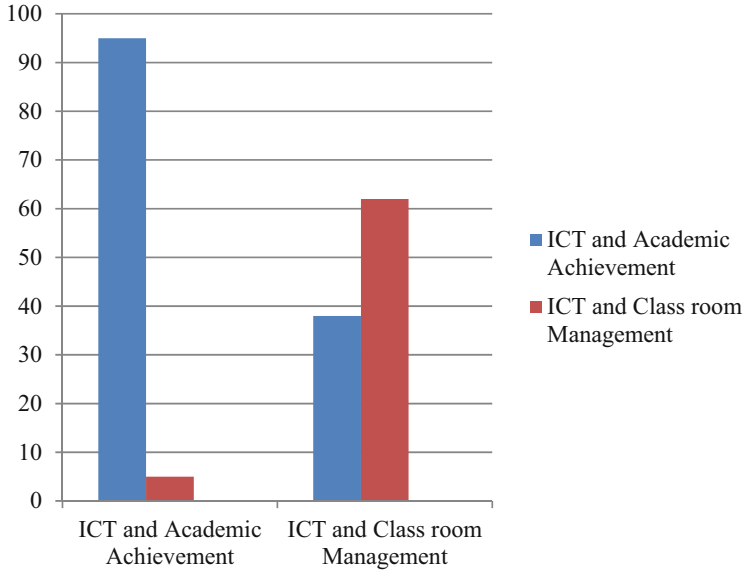


Fig. 2 Academic achievement and classroom management

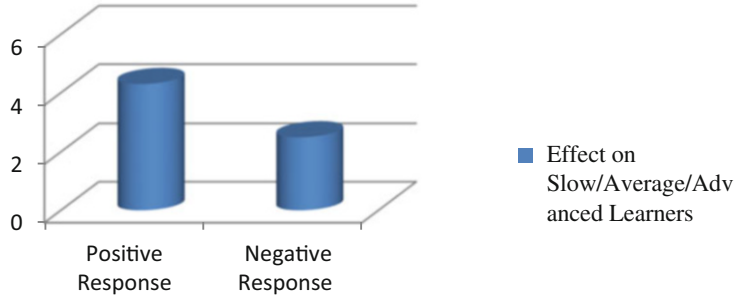
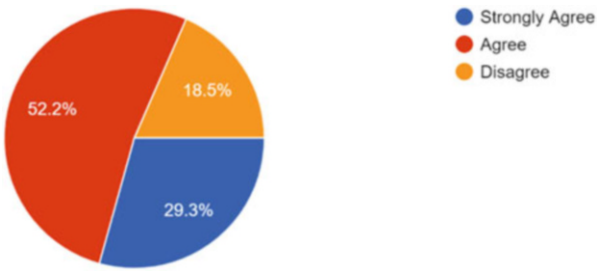


Fig. 3 Effect on slow/average/advanced learners

Fig. 4. Technology as part of Home Environment



Most of the academic fraternity felt that technology should be part of the student's home environment (strongly agree 52% and agree 29% in Fig. 4). It also proposes the need of encouraging technological gadgets at home. This will be a challenge for students from rural areas and underprivileged backgrounds. With the motto of "Education to All" by the government, the concerned authorities have to look into the infrastructure and technological growth in villages and rural areas.

5.2 Confidence Level of Faculty in Implementing ICT at Higher Education Level

There are a lot of key factors involved in integrating a new technology that influences the teaching community. There are external factors and internal factors like limited availability and accessibility of network connections, educational institutions with limited facilities, lack of time, lack of competency, and lack of perception of usefulness. This study has analyzed these factors and identified the degree to which ICT would enhance their performance. It is found that the majority of faculty are having a positive attitude towards this shift in teaching methodology Alt (2018).

Skillful and flexible faculty can adapt to the changes to ensure quality teaching and exploit the transformative power of this hybrid education. One of the major parameters of this study was to explore the aptitude and expertise of faculty towards

Table 2 Faculty confidence on ICT

	Agree	Disagree
Is effective and can be implemented successfully	92.4	7.6
Is a valuable instructional tool and is required for my career as a higher education professional	97.2	2.8
Makes teachers feel more competent as educators	90.4	9.6
Allows teachers to be learning facilitators instead of information providers	95.5	4.5
Eases the pressure on me as a teacher	65.9	34.1
Integrating computer technologies in teaching activities	98	2
Using ICT tools for tests/assignments/publishing results	82.8	17.2

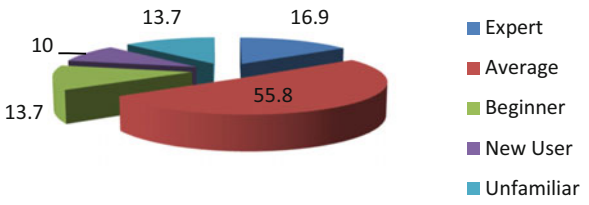


Fig 5 Faculty expertise level

blended learning, which serves as major feedback for policymakers. The following factors (Table 2) have been identified as key elements to faculty's perceived usefulness of ICT tools:

From the given table, it is very clear that the teaching fraternity is eager to embrace the technology and is confident of implementing it successfully. They feel that it is very much required for their career up-gradation, which is evident from their responses. Though they are not experts (Fig. 5- 17% are experts and 56% are average) in this digital technology, they are confident of adapting it and learning it for the sake of smart education systems, which is evident from Fig. 5.

The majority of the participants felt the need of integrating technology into the curriculum for the growth and adaptability of students. The pervasive insight among the respondents was to use ICTs to create a better teaching-learning environment. Many countries are working on the challenges involved and also on overcoming these barriers (Adarkwah, 2021; Mtebe and Raisamo 2014).

6 Conclusion

The growing availability of new technologies in an ever more digitalized world has expanded thrust in practically all scopes of life, making technology-related skills a crucial proficiency not only in specialized settings. Higher education institutions have taken the lead to impart education through information and communication technology for future generations. With National Education Policy 2020, the future of education is taking a new dimension and ICT education is gaining popularity.

Faculty confidence, skill, and aptitude is a prerequisite for the effective implementation of the new education system. Shifting from a traditional to a digitized knowledge sharing system needs a lot of planning and rework which is going to affect the future stakeholders. This research work has placed major emphasis on imparting education through technological enhancement and can serve as the baseline for policymakers for subsequent analysis for professional development of various stakeholders.

References

Adarkwah, M. A. (2021). "I'm not against online teaching, but what about us?": ICT in Ghana post Covid-19. *Education and Information Technologies, 26*(2), 1665–1685.

Aljaraideh, Y., & Al Bataineh, K. (2019). Jordanian Students' barriers of utilizing online learning: A survey study. *International Education Studies, 12*(5), 99–108.

Alt, D. (2018). Science teachers' conceptions of teaching and learning, ICT efficacy, ICT professional development and ICT practices enacted in their classrooms. *Teaching and Teacher Education, 73*, 141–150.

Fahm, A. G. O., et al. (2022). *ICT enabled Almajiri education in Nigeria: Challenges and prospects* (pp. 1–35). Education and Information Technologies.

Liebowitz, J. (2017). Thoughts on recent trends and future research perspectives in big data and analytics in higher education. In B. Kei Daniel (Ed.), *Big data and learning analytics in higher education*. Springer. https://doi.org/10.1007/978-3-319-06520-5_2

Mtebe, J. S., & Raisamo, R. (2014). Investigating perceived barriers to the use of open educational resources in higher education in Tanzania. *The International Review of Research in Open and Distance Learning, 15*(2), 43–66.

Nishijima, M., Ivanauskas, T. M., & Sarti, F. M. (2017). Evolution and determinants of digital divide in Brazil (2005–2013). *Telecommunications Policy, 41*(1), 12–24.

Rogers, S. E. (2016). Bridging the 21st century digital divide. *TechTrends, 60*(3), 197–199.

Trepule, E., Tereseviciene, M., & Rutkiene, A. (2015). Didactic approach of introducing technology enhanced learning (TEL) curriculum in higher education. *Procedia-Social and Behavioral Sciences, 191*, 848–852.

Vlachou, V., Tselios, D., & Aspridis, G. (2020). Studying ICT teachers' experiences and perceptions of MOOCs. *International Journal of Technology Enhanced Learning, 12*(3), 275–289.

Wardhani, B., Dugis, V., & Saad, M. S. (2018). On the digital divide: Role of the University of the South Pacific in enhancing education in the Pacific countries. *World transactions on engineering and technology education, 16*(1), 36–41.

Xu, X., et al. (2019). "research on key technologies of smart campus teaching platform based on 5G network." IEEE. *Access, 7*, 20664–20675.

Innovative Practices, Digital Education, and Technological Integration in Higher Education System in India

S. Manjunath and R. Leelavathi

1 Introduction

Every learner has major concerns about the availability and quality of the higher education system. The growth of digital technology is altering how education systems are shaped, shared, and accessible globally. India has also made significant progress in the application of digitalization in many facets of higher education. The Ministry of Human Resource Development's (MHRD) Department of Higher Education has launched numerous projects to use digital technology to raise the standard and availability of higher education and to create improved tools for assessing and accrediting academic institutions. Digital education is one of the answers provided by technology to enhance learning outcomes, access, and quality. Innovative technology has a strong sense of authenticity and works well; it considerably fosters learners' enthusiasm and interest in their studies as well as their involvement in class activities, self-improvement, and social communication abilities and improves communication between teacher and learner. As a result, both the quality of higher education and its availability to a wide range of learners, in addition to the country's educators' professional development, are aided.

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2 Background of the Study

Innovative practices technology and the higher education system offer a strong sense of authenticity and Proficiency, which considerably encourages students' passion and enthusiasm in their academics as well as their involvement in class activities. Learners' positive thinking and communication abilities in social practice have been especially motivated by innovative techniques in technology teaching. Innovative methods enhance instruction, maximize time in the classroom, and essentially increase class productivity. An environment is created for language education through innovative approaches. This approach improves class structure while also bringing life and interest to the classroom. Innovative methods have unique qualities like visibility and energy.

There are many advantages to digital education, including mobility, accessibility, and a need for fewer physical infrastructure facilities, fewer prices, and more freedom. However, that does not mean that it does not contain flaws. According to the latest study report, 60% of learners who had just switched to a virtual education platform discovered the experience to be monotonous and found it difficult to stay motivated to concentrate during class. Innovative practices have a strong sense of authenticity and job well, which considerably encourages students' passion and enthusiasm in their academics as well as their involvement in class activities. Learners' positive thinking and communication abilities in social practice have been especially motivated by innovative techniques in technology teaching.

Systematizing a good online educational program requires the proper integration of technology. The efficient utilization of information and communication technology (ICT) not only benefits students' pleasure but also enables people to achieve their goals. Therefore, it is crucial to create professional development programs to give instructors the skills they need to incorporate information and communication technology into their educational practices. Numerous studies have shown that using information and communication technology in education has become essential for satisfying the requirements of students in the information society (Martins et al., 2019) (Table 1).

Table 1 Indian education policy development

Year	Indian education policy development
2005	National Curriculum Framework
2008	National Scheme for Incentives to Girls for Secondary Education
2015	Rashtriya Madhyamik Shiksha Abhiyan
2018	Rashtriya Avishkar Abhiyan (2018)
2019	National Education Policy (2019)

3 Review of Literature (Fig. 1)

Van Braak et al. (2004)**,** in their article discussed on the capacity to use a variety of electronic devices, enhance one's technological competency. Students and educators must positively practice this and remove the obstacles that prevent numerous learners from accomplishing victory. Consequently, it is today required for each nation to establish an extra mechanically progressive teaching field in the upcoming years. The **Development of Human Resources Ministries** released a draught of the amended National Education Policy for comment. If completely implemented, the new strategy will change how the public education system is governed, update the RTE Act, and have an impact on a variety of other crucial areas. The **National Council for Educational Research and Training** (NCERT), an additional project that has the chance to significantly enhance procedures in education and classrooms around the country, also has promised a full assessment of the 2005 National Education Policy. The discussion is on advanced pedagogical practices and effective teaching practices, which include recognizing the connections among a variety of cutting-edge techniques and resources as well as the theories, procedures, or expertise of their field. Utilizing both course-specific software and more general tools, they should choose tools that are suitable for creative practices and will assist them in achieving the stated learning goals. Recognize the potential of creative practice materials in terms of their effect on students' presenting abilities as well as their function in stimulating students' thoughts and expanding their knowledge in a subject.

The Right of Children to Free and Compulsory Education (RTE) Act of 2009 as well as the Sarva **Shiksha Abhiyan (SSA) in 2001** were all significant Indian Government efforts, which promoted a stronger focus on concerns of availability, inclusivity, and educational quality. The average number of years the working-age population (those over 25) spent in education increased from 4.18 in 2000 to 6.5 in 2017. India too has committed itself to the accomplishment of the Sustainable Development Goals by launching numerous recent large-scale and expensive projects to aid in the accomplishment of those targets. India's educational system is now at a critical turning point. For all of this, educators need to be prepared to handle the impending difficulties in strict classroom environments. Moving along a new and unexplored route requires overcoming fears, taking chances, and being ready to fail. Nevertheless, there are numerous methods that instructors might progressively try to bring creativity into the classroom when they think outside the box. The acceptance

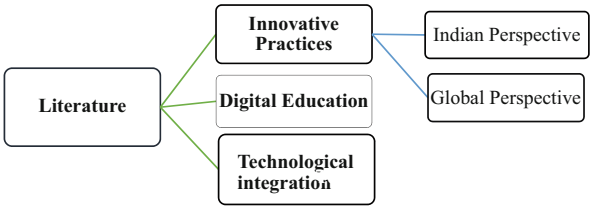


Fig. 1 Sorting of review of literature

and application of the appropriate methodology that has been tried and demonstrated to aid in the complete growth of the individual can close the gap between academic goals and present teaching practice. Whatever succeeds and who benefits in terms of development and growth could provide guidelines to teaching practitioners regarding how to change or refresh their instruction to achieve desired outcomes. Proof of impact has become a key element of the teaching practice. Even while academic institutions may have implemented new educational technical equipment (such as portable devices), the way that learning and instruction are done has not always changed as a result.

A thorough study of the literature reveals that research has been undertaken in the past on the influence of educator capacities on innovation adoption. Studies have also been done on the government initiatives accountable for the effective adoption of new practices. Few researchers looked at the association between student achievement and creativity from a worldwide perspective.

4 Research Problem

The learners' capacity to understand is impacted by the teacher's inability to include cutting-edge techniques like audio/visual elements into the regular classroom pattern. Because of legislative interventions, nongovernment organizations and corporate social responsibility initiatives in introducing innovative teaching techniques are not very successful in working with government schools. Due to lack of adequate rules, regulations, special classes, assistance-based learning valuation, etc., innovative learning could not be implemented properly.

5 The Objective of the Study

- To examine the current status of innovative practices employed in the higher education system
- To scrutinize the accountable factors influencing digital education in higher education systems
- To analyze the technological integration in higher education systems in India

6 Methodology

The study includes the analysis of various innovative practices, digital education, and technological integration in the higher education system with special reference to India. The study used a descriptive research technique to collect the data effectively from the respondents. The researcher analyzed the collected data by

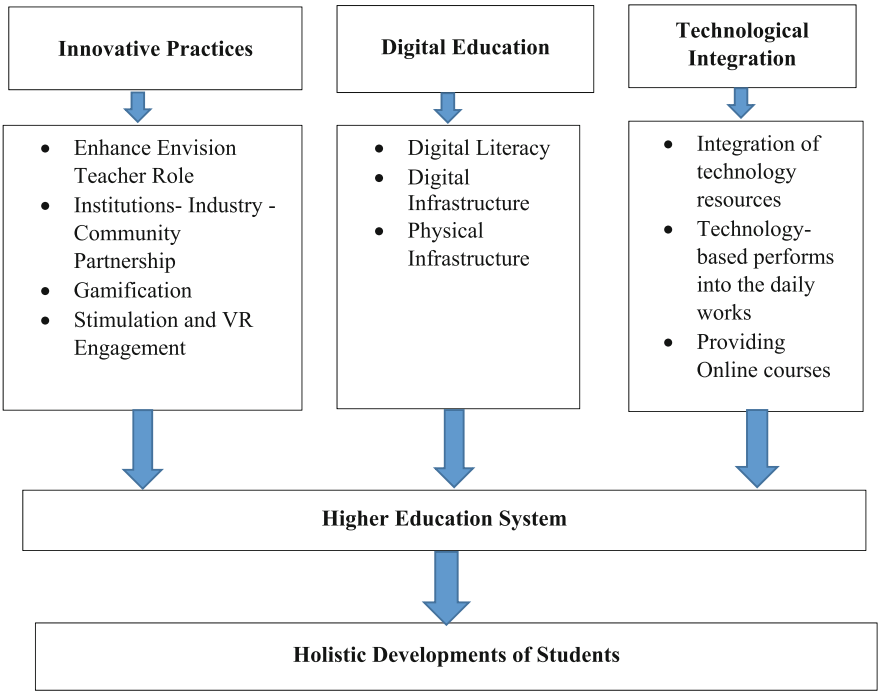


Fig. 2 Theoretical model for higher education system in India

administering a structured questionnaire to the sample unit that includes teachers' profiles, higher education system, innovative practices, collaborations, refreshment courses offered through online, academic-related performance, etc. to check the reliability of the collected data of the pilot study conducted. The pilot study's results reveal that the data is adequate for analysis (Fig. 2).

7 Data Analysis and Discussion (Tables 2 and 3)

The above tables show that the data is reliable. The value is more than 0.70, which indicates that the collected data is better to proceed with further analysis (Tables 4 and 5).

The correlation between two particular variables is displayed for each cell of the table. For instance, the underlined cell below demonstrates that "innovative practices" and "digital education" correlate by 0.81, indicating a very significant positive association. Higher exam scores are directly correlated with more study time (Fig. 3).

The innovative practices, digital education, and technological integration in the higher education system in Indian SEM disclosed an exceptional fit with the analyzed data (CFI = 1.01, RMESA = 0.04, GFI = 0.92, NFI = 0.91). The selected

Table 2 Sample adequacy test result

KMO and Bartlett's test		
Kaiser-Meyer-Olkin measure of sampling adequacy		0.866
Bartlett's test of sphericity	Approx. chi-square	2842.484
	Df	110
	Sig.	0.000

Table 3 Reliability

Variable name	Cronbach's alpha
Innovative practices	0.81
Digital education	0.81
Technological integration	0.89

Table 4 Demographic landscape of the respondents

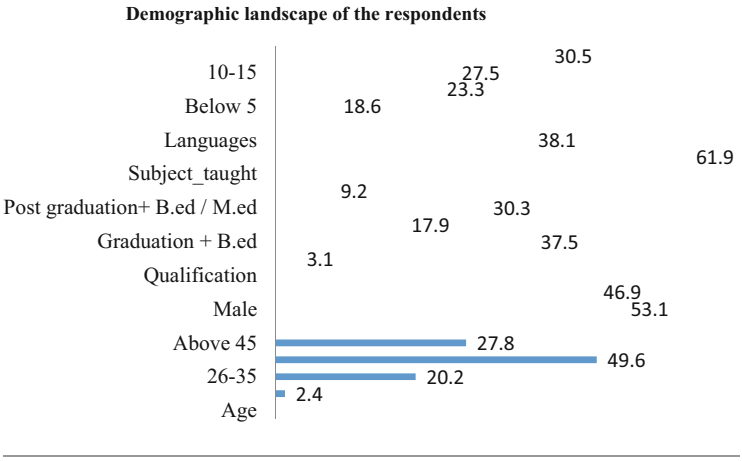


Table 5 Correlation analysis

	Innovative practices	Digital education	Technological integration
Innovative practices	**1.00**	0.81	0.32
Digital education	0.81	**1.00**	**0.07**
Technological integration	0.32	0.07	**1.00**

latent variables (innovative practices, digital education, technological integration, higher education system) were well signified by the manifest variables (holistic developments of students). The model results specify that the latent variables have a direct influence on other variables ($p = 0.011$).

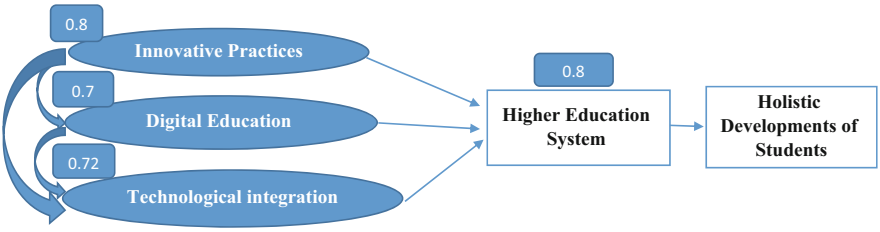
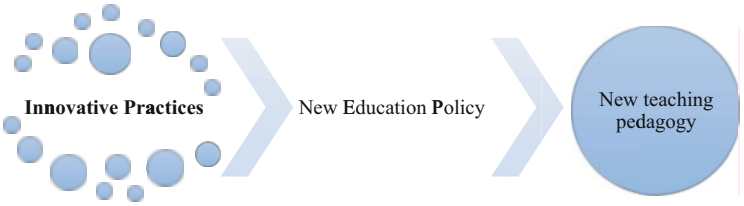


Fig. 3 SEM model: innovative practices, digital education, and technological integration in higher education system in India

7.1 Innovative Practices Adopted in Higher Education System

This research covers the future generation of education and learning, which includes new education policy, enhanced envision of teacher roles, new teaching pedagogy, etc. The future generation of learning is greatly squeezed by technology education, which also has a significant influence on higher education. Once more, the level of novelty here is absurdly low when compared to the opportunity and need, but many universities are testing out different teaching methods in place of lectures, such as project-based learning for college students, inquiry-based learning, aforementioned competency-based learning, scenario-based learning, and more.



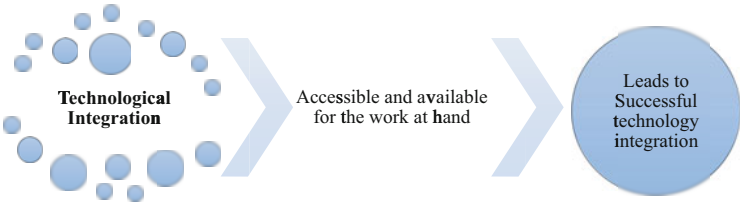
7.2 Digital Education

This study discovered that in the industrialized world, learners currently enrolled in higher education have unparalleled access to online-based tools and technologies, and they are likely to have contributed to online activities during their learning careers. Universities and colleges are under more and more burden to offer adaptable learning environments and access to resources. This is particularly noticeable in the computer lab, where students used to have access to software packages during scheduled periods on dedicated, standalone PCs. While highlighting deeply ingrained inequalities at the individual, institutional, and system levels, the researcher identified the numerous and overlapping factors that contribute to an

institution's ability to realize the potential of digital education in terms of access, learning, and collaboration. Digital technologies are pervasive in education, and conventional evaluations are still used as evaluation tools although they are insufficient for revealing a student's cognitive grasp and thinking. Digital-based evaluation methods incorporate digital tools as potent teaching tools while allowing students to demonstrate higher order abilities. Digital technology can aid in investigation learning, which is crucial for creating a thorough mental grasp of the subject matter.

7.3 Technological Integration

This study's result emphasizes on the fact that we are now living in an information society as a result of the rapid growth of technology, which has had a significant impact on our educational system. Utilizing technological resources, such as PCs, smartphones, laptops, image sensors, social media networks, and tablets, in routine practices and management of an institution is technological integration. Technology integration is successfully done. Successful technology integration occurs when the utilization of tech is frequent, visible, accessible, and available for the job at hand, complementing the instructional objectives and helping the students effectively achieve their objectives.



7.4 *Advanced Pedagogical Practices and Effective Teaching Practices*

In several ways, employing cutting-edge learning approaches in the classroom indicates a passive acceptance that there is space for improvement. Therefore, creative education systems begin with a development attitude. Academicians note areas for development. Teachers fully commit to investigating and formulating more effective teaching methods for our pupils.

This section pays special attention to well-liked, cutting-edge teaching approaches that may promote higher student performance. Students' participation is frequently the emphasis of the tactics. After all, students who are proactively involved in their studies have become less likely to lose the class and are more likely to succeed in their educational pursuits. Ponder about just how one might use the following cutting-edge teaching strategies in the curriculum to increase students' motivation. Creativity in education should always consider how it might improve the performance of students. The objective of education is to foster learning. Humans employ strategies that promote knowledge. Humans can consistently and efficiently benefit students by letting students experiment with different approaches through an iterative procedure.

7.4.1 Gamification

The term "gamification" is a trendy one that has long been employed in the field of education and learning. Gamification is a collection of tasks and procedures for problem-solving that make use of the features of game components.

- It is entertaining, and it is fun.
- It is simpler for students to remember information.
- It induces a shift in behavior.
- It causes conflict between students, both online and offline.
- It fosters acknowledgment—commend them with tangible rewards or virtual rewards, badges, or degrees.

7.4.2 Blended Learning

Blended learning provides students more control over the timing, location, course, and speed of their education by combining in-person and Web-based learning opportunities. To discover everything you need to know about blended learning, see our previous post. The flipped classroom is fascinating because it offers both classroom teaching experience and qualified opportunities for learning. The approach is not all-or-nothing. However, just as it is for students in the real world, technology is an important part of blended learning. Due to blended learning's

versatility, students can choose their preferred learning style more freely. For example, they may decide to take online courses with lectures and complete their coursework while watching lectures at home online.

7.4.3 Jigsaw

Some other way of effective teaching is jigsaw puzzles. Jigsaw puzzles primarily critically present the chance for pupils to instruct another learner.

7.4.4 Virtual Learning

A level of learning that is improved by using technology and/or the Web both within and beyond the premises of the academic company is known as virtual learning. Virtual platforms are where teaching is most frequently conducted. The learning activities take place online; therefore, the instructor and students are geographically apart.

8 Conclusion

The higher education system in India has seen a paradigm shift in the last half a decade. Looking at the current scenario, availability of technology has enabled students and teachers to flip the conventional classroom method of learning. All education companies have adapted the technological integration and made the ease of availability of various streams of education. Digitalization has made higher education so flexible, and accessible, with changes in exam patterns, helping in achieving possible career progression. More certification courses are offered through the online portals and tech-enabled courses for building the career. Technological innovation, digital education, and tech integration have got an interwoven significance, and it leads to the significant development of learners' careers. On setting the concluding remarks, the government has played a pivotal role in supporting the higher education system through the operation of MHRD and schemes to promote multidisciplinary learning.

References

Martins, P., Ferreira, M. J., Soares, F., & Pinho, A. (2019). The Role of Information and Communication Technology in Higher Education: A Study of Students' Perception. In Proceedings of the 2019 14th Iberian Conference on Information Systems and Technologies (CISTI) (pp. 1–6). IEEE.

Van Braak, J., Tondeur, J., & Valcke, M. (2004). Explaining different types of computer use among primary school teachers. *European journal of psychology of education, 19*, 407.

ML-Based Prediction of Ideal Discipline for UG Students: A Sustainable Educational Perspective

Mohammad Aftab Alam Khan, Mohammad Aljebali, Mustafa Youldash, Atta-ur-Rahman, Abdulrahman Aljallal, Mehwash Farooqui, Hussam Ziad, and Ahmad Jabali

1 Introduction

In many renowned universities around the globe, like Imam Abdulrahman Bin Faisal University (IAU), Dammam, KSA, students spend 1 year in a preparatory program (PYP). After successful completion, the students choose the appropriate college/discipline mainly based on their PYP grades and their interest. This might be a tough decision for the students that can affect their academic life and life in general. Especially if the student has no idea what field he likes or has many options to pick from, and if he makes a wrong decision, it may end up wasting not only his time and resources but also the university's reputation. Moreover, it may affect the student's self-confidence and psychological state. Therefore, current research aims to investigate machine learning (ML) to predict/suggest the right discipline/college for the PYP passed student. Further, different colleges at the university may have their merit list based on the available seats for the new session to accommodate the new intake appropriately. To assist in this regard, for the users/students, we proposed and developed a Web-based system that accepts input from students or counselors who help students. The system is graphical user interface based and easy to use that

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does not require any earlier experience in machine learning, which provides the user with a unique and useful experience. The study aims to help increase the quality of the university education experience and reduce failed or transfer student rates.

The rest of the chapter is organized as follows: Section 2 contains a review of the related state-of-the-art literature on success prediction systems, and Sect. 3 presents the proposed model of the study. Section 4 presents the results of the study, while Sect. 5 concludes the chapter.

2 Literature Review

In this study (Ezz & Elshenawy, 2020), they took the students' performance and behavior in the preparatory year and then tried to decide which path is most suitable for them to choose in the future. To tackle this proposed idea, the researchers used an adaptive recommendation system that predicts the best education specialization for a student in the university preparatory year. The data has 1841 student records between 2012 and 2018. The dataset is formed of two main segments: preparatory year data and final-year grades for multiple departments; multiple machine learning algorithms were used such as support vector machine (SVM), quadratic discriminant analysis (QDA), K-nearest neighbors (KNN), linear regression (LR), and random forest (RF). The best algorithm changes depending on which department it is applied to. For instance, the QDA algorithm had the best F-measure of 0.91 for the urban department, while the RF algorithm was best for the mechanical department with an F-measure of 0.77. Per the study in (Alshaikh et al., 2021), in Saudi Arabia, most colleges require new students to go through a preparatory year to advance in their academic careers at the university. Many issues can occur if students fail or feel unsatisfied with their specialization. For example, it can cause delays and waste of time and resources for both the students and the universities in which they are studying. That is why this study is tackling this problem and offering a solution to this issue through a recommender system; this research is from King Abdulaziz University in Saudi Arabia, which has multiple colleges, but unfortunately, the number of students in the dataset is 960, and it is spilled to 20% for testing and 80% for training. K-fold cross-validation is applied twice to achieve higher accuracy. Even though the second technique is computationally expensive, it is possible due to the smaller size of the data. They use K-nearest neighbor with cross-validation applied to the data, and the highest achieved accuracy is 74.8%.

The study in (Alsayed et al., 2021; Rahman, 2013) states that the main problem we face in a lot of research is the number of records in each data. In this study, the database has a total of 216 records and 19 features, and the aim is predicting student study fields as a classification problem. The methodology in the paper is to use multiple algorithms to predict a suitable field of specialization before the student admits to the undergraduate level based on many factors. The decision tree (DT) classifier predicts the target class based on simple decision rules. ExtraTrees classifier (ETC) in an ensemble uses the results from the DT, RF also uses multiple

DTs to solve complexities, GBC produces strong models, and lastly, SVM predicts the final predictive result. They use various ML approaches, decision tree, ExtraTrees classifier, random forest classifier, gradient boosting classifier, and support vector machine; two chosen algorithms with the best accuracy are random forest classifier with 75% and gradient boosting classifier with 61%.

Authors in (Mueen et al., 2016) presented a data mining approach to overall enhance the teaching and learning experience for university students based on various factors including academic factors such as grades as well as human factors such as parents' jobs, income, and preferred time for the study in the degree program. They have investigated the Apriori algorithm and found some promising results.

Similarly, a study was conducted to predict students' academic performance. They used three classifiers, NB, ANN, and DT, and compared their results. The classifiers were applied to a database containing 38 characteristics/attributes of 60 university students in two courses. The database also contained 41 successful students and 19 failed student cases. The results concluded that the NB algorithm obtained the highest accuracy among the classifiers, which reached 86% (Noha Hassan Osman, 2017).

Similarly, in their study, authors aimed to discover some of the dominant patterns affecting the academic performance of students of the faculty of education in the academic data for the year 1438 Hijra. An applied study was conducted in the field of knowledge discovery (data extraction) by investigating the Apriori algorithm. This study found that the Apriori algorithm helped to find patterns that could give important indicators among the percentage of students in the secondary stage: degree, assessment, choice of major, and cumulative average in two semesters for college graduates from the data of students admitted in the first semester of the academic year 1437 AH (Rahman & Dash, 2017a).

Rahman and Dash (2017) conducted a study to uncover the trends of students through the information collected at the time of admission. The Apriori algorithm was used to expose the correlation between the academic background of students in the field of specialization and graduation, as well as their residential address, and their performance in the field of computer science. The database used included data from 3500 students at an institute in Pakistan. The findings suggested that students who had a previous relationship in the field of computers performed better than those who had no previous relationship in the field of computers. Students living in rural areas earned good grades in all disciplines. Guidelines can be offered to new students on this basis (Jain et al., 2017).

Awasthi et al. also noted a study to examine the impact of beyond knowledge, gender on academic adaptation, and academic performance outcomes for undergraduate students. The study sample consisted of (522) male undergraduate and postgraduate students. The researchers used the beyond knowledge awareness list prepared by Shrew and Denison in 1994 and the Academic Adaptation Scale prepared by Anderson and others in 2016. The results of the study revealed that there were no differences between the genders in certain skills, beyond knowledge and academic performance. Also, the study revealed a positive correlation between beyond knowledge and academic performance (Rahman et al., 2018a).

Table 1 Summary of the literature review accuracies

Models	Accuracy (%)
Quadratic discriminant analysis	91
Random forest	77
K-nearest neighbor	74.8
Gradient boosting	61
Naïve Bayes	86

Another study proposed a machine learning-based education data mining technique to discover students' study preferences. The data was collected by designing a questionnaire consisting of 38 questions covering many aspects. The results were summarized as the model can help institutes to introduce educational technologies and timetables to their students according to their regions and educational backgrounds. To extract the correlation rules, Apriori algorithm and K-mean clustering algorithms were applied (Rahman & Dash, 2017b).

In this study (Adekitan & Noma-Osaghae, 2019), it was intended to examine the relationship between the university admission requirements for first-year students and their academic performance using their GPA and academic degree. This study was done on a dataset that included data of 1145 students from universities in Nigeria. Data were also analyzed and extracted using six algorithms on KNIME and Orange. Both KNIME and Orange achieved close results with an average accuracy of 50.23% and 51.9%, respectively. The results indicated that the admission criteria do not clearly explain the rate of students in the first year. In addition, the study concluded that academic factors have a non-severe effect on predicting students' performance, and it also recommended adding academic factors.

Table 1 presents the obtained accuracies of the research in the literature review.

3 Proposed Model

Our predictive system's main goal is to provide the admin and student with the most suitable college based on preparatory year data by using machine learning techniques. The system will include two main users (administrator, student). As such, each user has unique respective access to the various interfaces of the system.

Firstly, the administrator is the user that handles all the backend development processes, which include the modification of the system parameters and code as well as authorizing registered users to access the system. The instructor's role will include privileges to add the information of the students as a file into the system to apply the prediction on each student record. Lastly, the student will be able to review the result of the recommended specialization that is most suitable for them. That is the outcome of the proposed system.

The main task for the admin is updating the pre-trained model and contact with the data source. The data have information from different colleges; we divided our

data using tenfold cross-validation, all of them from preparatory year and undergraduate years from 2018 to 2021. The number folds is chosen based on various trials, and it was found as the most appropriate one in terms of accuracy. One of the issues we try to avoid is overfitting, which made us use cross-validation on the data, so we can be sure that the model is not overfitting.

Lastly, the model will present the result to either the admin or the students, which is a recommendation of the best suited college for the respective student which marks the end of the system.

3.1 Method, Tools, and Techniques

At first, the model was having a mediocre performance due to imbalanced target classes; we solved this issue by resampling the data using synthetic minority oversampling technique (SMOTE) approach using SMOTEENN library in Python. Furthermore, to ensure that the model is not overfitting/underfitting, we used tenfold cross-validation technique, which will help assess how well the model performs when presented with new data points. We also used a confusion matrix, log loss, etc. Figure 1 presents the idea of the SMOTE to balance the imbalanced classes available in the dataset. It takes into account two things, namely majority class samples and minority class samples, and produces the augmented synthetic samples.

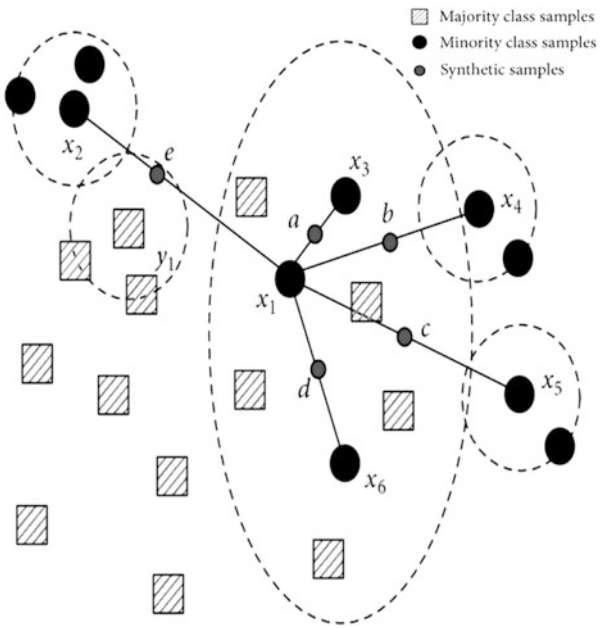

Fig. 1 Working of SMOTE

3.2 System Architecture

The first step is to find the data source that will be used. This includes searching for the data and cleaning it. Once the data source is found, it is important to decide how the data will be stored and accessed by the model. This includes selecting proper database technology and proper storage formats such as CSV or XLSX. Now, it is time to design the actual model itself. This involves selecting a proper algorithm or a set of algorithms that can best learn from the data sources found earlier.

Finally, once all these components have been selected, the next step is to design an overall system architecture for the machine learning model. This involves deciding how all these components will interact with each other to create a cohesive whole that can effectively learn from its environment. Common components in this type of architecture include Web servers for serving up results from models, databases for storing training data, and APIs for interacting with external services.

3.3 Quality Control

We used a voting classifier with five machine learning models, to ensure the prediction quality. The model with the highest accuracy by far is an ensemble technique called ExtraTrees classifier, which is very similar to the random forest classifier but constructs the decision tree differently. Table 2 shows a comparison between ExtraTrees classifier and random forest classifier in terms of the splits and bootstrapping.

Finally, we evaluated the model's performance using metrics such as accuracy, precision, recall, and F1 score, which help understand how accurately the model is performing.

3.4 Web Application

We have built a Web application using Streamlit (2023) and Django (2023) to ease authentication, authorization, and an easy-to-use prediction system. There are two types of users, the regular user (such as a student or academic supervisor) who will be able to enter the required data and predict their ideal college, and the admin who can upload the data as a CSV, XLSX, or XLS file, and after processing, the file is passed to the admin as a downloadable file in the desired format. Figure 2 shows a

Table 2 ExtraTrees vs. random forest

	Split	Bootstrapping
ExtraTrees	Random split	No
Random forest	Best split	Yes

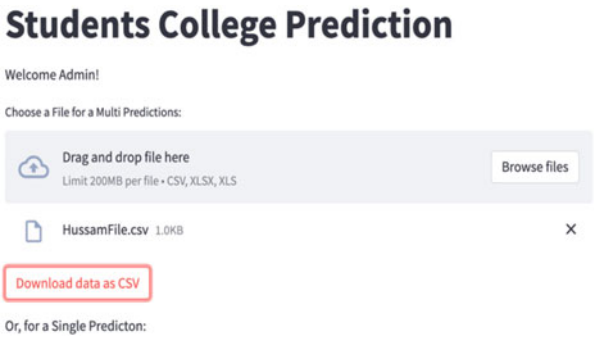

Fig. 2 Web app: admin view

Table 3 Summary of result accuracies

Models	Accuracy (%)
ExtraTrees classifier	95
K-nearest neighbor	94
Bagging with K-nearest neighbor	94
Random forest	93
Bagging with Random forest	92

graphical user interface to show how the admin can upload the input file and then download the result file as predicted outcomes.

4 Result

After using a voting classifier with five machine learning models, the result is as follows: a bagging classifier with random forest being a parameter with 92% accuracy, a random forest with 93% accuracy, a bagging classifier with K-nearest neighbors being a parameter, and a K-nearest neighbor algorithm with 94% accuracy. Finally, an ExtraTrees classifier with 95% accuracy achieves the highest accuracy (Table 3).

5 Conclusion

In general, there are many problems in learning environments. When it comes to choosing a college to dedicate your life to studying, choosing the right college is not easy and requires a lot of thought and research to select the best choice. On the other hand, choosing the wrong college can cause enormous stress and delays in a student's academic life. This is an undesirable outcome that we aim to address in our project by building a machine learning model that can predict the most suitable college for a student using the data of the earlier preparatory year. Research can help

improve the learning environment for many generations to come and provide a healthier academic life for all students who need it, and it also helps academic supervisors with new ways to help the student and raise the average grades of students, which will certainly be reflected in their psychological comfort and happiness and their satisfaction with themselves.

In the proposed study, we investigated a machine learning framework called Streamlit and, in addition, a backend admin control panel (Django), to ensure authentication, authorization, and performance of the site. We expect the proposed study to have a significant impact on university-level students and to help increase the quality of the university's sustainable education experience. Moreover, it may also help the university's higher educational bodies and experts to investigate the possible shortcomings of the students in their preparatory year and to address them on time. Further, it may also be helpful to set the merit for the respective colleges in the university based on the possible incoming number of students and increase/decrease the number of accepted students and the sections accordingly. Consequently, the recipient college may manage its resources like faculty, classrooms, and labs to accommodate the possible intake.

In the future, we intend to use various other approaches for further enhancement of the results, such as deep learning, transfer learning, and federated learning models along with the investigation of human factors as well (Gollapalli et al., 2022; Rahman, 2019a, 2019b, 2020; Alqarni & Rahman, 2023; AlKhulaifi et al., 2022; Rahman et al., 2016, 2018b, 2018c, 2019, 2021a, 2021b, 2021c, 2022a, 2022b, 2022c, 2022d, 2022e, 2022f; Khan et al., 2020, 2023; Nasir et al., 2022a, 2022b; Alhaidari et al., 2020, 2021, 2022; Ibrahim et al., 2022; Dilawari et al., 2021; Zagrouba et al., 2021; Naseem et al., 2013, 2020; Musleh et al., 2019; Ahmad et al., 2019, 2020; Alotaibi et al., 2021, 2022; Zaman et al., 2020, 2021; Alnajrani et al., 2022; Ahmed et al., 2021, 2022; Atta-ur-Rahman et al., 2014; Rahman & Alhaidari, 2018, 2019; Ghazal et al., 2022; Mahmud et al., 2020; Rehman et al., 2020; Naqvi et al., 2021).

References

Adekitan, A. I., & Noma-Osaghae, E. (2019). Data mining approach to predicting the performance of first year students in a university using the admission requirements. *Education and Information Technologies, 24*(2), 1527–1543.

Ahmad, M., Farooq, U., Rahman, A., Alqatari, A., Dash, S., & Luhach, A. K. (2019). Investigating TYPE constraint for frequent pattern mining. *Journal of Discrete Mathematical Sciences and Cryptography, 22*(4), 605–626.

Ahmad, M., Qadir, M. A., Rahman, A., et al. (2020). Enhanced query processing over semantic cache for cloud based relational databases. *Journal of Ambient Intelligence and Humanized Computing, 14*, 5853.

Ahmed, M. I. B., Rahman, A., Farooqui, M., Alamoudi, F., Baageel, R., & Alqarni, A. (2021). Early identification of COVID-19 using dynamic fuzzy rule based system. *Mathematical Modelling of Engineering Problems, 8*(5), 805–812.

Ahmed, M. I. B., Alotaibi, S., Atta-ur-Rahman, et al. (2022). A review on machine learning approaches in identification of pediatric epilepsy. *SN Computer Science, 3*, 437.

Alhaidari, F., Rahman, A., & Zagrouba, R. (2020). Cloud of things: Architecture, applications and challenges. *Journal of Ambient Intelligence and Humanized Computing, 14*, 5957.

Alhaidari, F., Almotiri, S. H., Ghamdi, M. A., Khan, M. A., Rehman, A., Abbas, S., Khan, K. M., & Rahman, A. (2021). Intelligent software-defined network for cognitive routing optimization using deep extreme learning machine approach. *Computers, Materials and Continua, 67*(1), 1269–1285.

Alhaidari, F., Shaib, N., Alsafi, M., Alharby, H., Alawami, M., Aljindan, R., Rahman, A., & Zagrouba, R. (2022). ZeVigilante: Detecting zero-day malware using machine learning and sandboxing analysis techniques. *Computational Intelligence and Neuroscience*, 1615528, 15 pages.

AlKhulaifi, D., AlQahtani, M., AlSadeq, Z., Rahman, A., & Musleh, D. (2022). An overview of self-adaptive differential evolution algorithms with mutation strategy. *Mathematical Modelling of Engineering Problems, 9*(4), 1017–1024.

Alnajrani, B., Alghamdi, A., Alotaibi, M., Aldawod, S., Rahman, A., & Nabil, M. (2022). A novel approach to Wikipedia references classification. *ICIC Express Letters: Part B, 13*(12), 1321–1330.

Alotaibi, S. M., Rahman, A., Basheer, M. I., & Khan, M. A. (2021). Ensemble machine learning based identification of pediatric epilepsy. *Computers, Materials and Continua, 68*(1), 149–165.

Alotaibi, A., Rahman, A., Alhaza, R., Alkhalifa, W., Alhajjaj, N., Alharthi, A., AlQahtani, M., & AlKhulaifi, D. (2022). Spam and sentiment detection in Arabic tweets using MarBert model. *Mathematical Modelling of Engineering Problems, 9*(6), 1574–1582.

Alqarni, A., & Rahman, A. (2023). Arabic tweets-based sentiment analysis to investigate the impact of COVID-19 in KSA: A deep learning approach. *Big Data and Cognitive Computing., 7*(1), 16.

Alsayed, A. O., et al. (2021). Selection of the right undergraduate major by students using supervised learning techniques. *Applied Sciences (Switzerland), 11*(22), 10639. https://doi.org/10.3390/app112210639

Alshaikh, K., Bahurmuz, N., Torabah, O., Alzahrani, S., Alshingiti, Z., & Meccawy, M. (2021). Using recommender systems for matching students with suitable specialization: An exploratory study at King Abdulaziz University. *International Journal of Emerging Technologies in Learning, 16*(3), 316–324. https://doi.org/10.3991/ijet.v16i03.17829

Atta-ur-Rahman, Q. I., Malik, A. N., & Naseem, M. T. (2014). Dynamic resource allocation for OFDM systems using differential evolution and fuzzy rule base system. *Journal of Intelligent and Fuzzy Systems, 26*(4), 2035–2046.

Dilawari, A., Khan, M. U. G., Al-Otaibi, Y. D., Rehman, Z., Rahman, A., & Nam, Y. (2021). Natural language description of videos for smart surveillance. *Applied Sciences, 11*(9), 3730.

Django. (2023). Retrieved January 17, 2023, from https://www.djangoproject.com/.

Ezz, M., & Elshenawy, A. (2020). Adaptive recommendation system using machine learning algorithms for predicting student's best academic program. *Education and Information Technologies, 25*(4), 2733. https://doi.org/10.1007/s10639-019-10049-7

Ghazal, T. M., Al Hamadi, H., Nasir, M. U., Atta-ur-Rahman, Gollapalli, M., Zubair, M., Khan, M. A., & Yeun, C. Y. (2022). Supervised machine learning empowered multifactorial genetic inheritance disorder prediction. *Computational Intelligence and Neuroscience, 2022*, 1051388, 10 pages.

Gollapalli, M., Rahman, A., Musleh, D., Ibrahim, N., et al. (2022). A neuro-fuzzy approach to road traffic congestion prediction. *Computers, Materials and Continua, 73*(1), 295–310.

Ibrahim, N. M., Gabr, D. G. I., Rahman, A., Dash, S., & Nayyar, A. (2022). A deep learning approach to intelligent fruit identification and family classification. *Multimedia Tools and Applications, 81*, 27783.

Jain, D., Tiwari, G. K., & Awasthi, I. D. 2017 Impact of metacognitive awareness on academic adjustment and academic outcome of the students. *International Journal of Indian Psychology, 5*(1).

Khan, M. A., Abbas, S., Atta, A., Ditta, A., Alquhayz, H., Khan, M. F., Rahman, A., & Naqvi, R. A. (2020). Intelligent cloud-based heart disease prediction system empowered with supervised machine learning. *Computers, Materials and Continua, 65*(1), 139–151.

Khan, M. A. A., et al. (2023). WeScribe: An intelligent meeting transcriber and analyzer application. In P. K. Singh, S. T. Wierzchoń, S. Tanwar, J. J. P. C. Rodrigues, & M. Ganzha (Eds.), *Proceedings of third international conference on computing, communications, and cybersecurity* (Lecture notes in networks and systems) (Vol. 421, pp. 755–766). Springer.

Mahmud, M., Rahman, A., Lee, M., & Choi, J. Y. (2020). Evolutionary-based image encryption using RNA codons truth table. *Optics and Laser Technology, 121*, 105818.

Mueen, A., Zafar, B., & Manzoor, U. (2016). Modeling and predicting students' academic performance using data mining techniques. *International Journal of Modern Education and Computer Science, 8*(11), 36–42.

Musleh, D., Ahmed, R., Rahman, A., & Al-Haidari, F. (2019). A novel approach to Arabic Keyphrase extraction. *ICIC Express Letters B, 10*(10), 875–884.

Naqvi, R. A., Mushtaq, M. F., Mian, N. A., Khan, M. A., Rahman, A., Umair, M., et al. (2021). Coronavirus: A "mild" virus turned deadly infection. *Computers, Materials and Continua, 67*(2), 2631–2646.

Naseem, M. T., Qureshi, I. M., Cheema, T. A., & Rahman, A. (2013). Hash based medical image authentication and recovery using chaos and residue number system. *Journal of Basic and Applied Scientific Research, 3*(6), 488–495.

Naseem, M. T., Qureshi, I. M., Rahman, A., & Muzaffar, M. Z. (2020). Robust and fragile watermarking for medical images using redundant residue number system and chaos. *Neural Network World, 30*(3), 177–192.

Nasir, M. U., Khan, S., Mehmood, S., Khan, M. A., et al. (2022a). IoMT-based osteosarcoma cancer detection in histopathology images using transfer learning empowered with blockchain, fog computing, and edge computing. *Sensors, 22*(14), 5444.

Nasir, M. U., Zubair, M., Ghazal, T. M., Khan, M. F., Ahmad, M., Rahman, A.-u., Hamadi, H. A., Khan, M. A., & Mansoor, W. (2022b). Kidney cancer prediction empowered with blockchain security using transfer learning. *Sensors, 22*(19), 7483.

Noha Hassan Osman D. S. E. F. (2017). Discovery some of the influencing patterns in the academic performance of the students of the Faculty of Education using the Association rules technique. Case study: Faculty of Education, Afif. *International Journal of Scientific Research and Education*, *5*(6), 6571–6576.

Rahman, A. (2013). Teacher assessment and profiling using fuzzy rule-based system and Apriori algorithm. *International Journal of Computer Applications, 65*(5), 22–28.

Rahman, A. (2019a). Memetic computing based numerical solution to Troesch problem. *Journal of Intelligent and Fuzzy Systems, 36*(6), 1–10.

Rahman, A. (2019b). Optimum information embedding in digital watermarking. *Journal of Intelligent and Fuzzy Systems, 37*(1), 553–564.

Rahman, A. (2020). GRBF-NN based ambient aware real-time adaptive communication in DVB-S2. *Journal of Ambient Intelligence and Humanized Computing, 14*, 5929.

Rahman, A., & Alhaidari, F. (2018). Querying RDF data. *Journal of Theoretical and Applied Information Technology, 26*(22), 7599–7614.

Rahman, A., & Alhaidari, F. (2019). The digital library and the archiving system for educational institutes. *Pakistan Journal of Information Management and Libraries, 20*(1), 94–117.

Rahman, A., & Dash, S. (2017a). Data mining for student's trends analysis using Apriori algorithm. *International Journal of Control Theory and Applications, 10*(April), 107–115.

Rahman, A., & Dash, S. (2017b). Big data analysis for teacher recommendation using data mining techniques. *International Journal of Control Theory and Applications, 10*(18), 95–105.

Rahman, A., Azam, M., & Zaman, G. (2016). Performance comparison of product codes and cubic product codes using FRBS for robust watermarking. *International Journal of Computer Information Systems and Industrial Management Applications, 8*(1), 57–66.

Rahman, A., Sultan, K., Aldhafferi, N., & Alqahtani, A. (2018a). Educational data mining for enhanced teaching and learning. *Journal of Theoretical and Applied Information Technology, 96*(14), 4417–4427.

Rahman, A., Sultan, K., Dash, S., & Khan, M. A. (2018b). Management of resource usage in mobile cloud computing. *International Journal of Pure and Applied Mathematics, 119*(16), 255–261.

Rahman, A., Mahmud, M., Sultan, K., Aldhafferi, N., Alqahtani, A., & Musleh, D. (2018c). Medical image watermarking for fragility and robustness: A chaos, ECC and RRNS based approach. *Journal of Medical Imaging and Health Informatics, 8*(6), 1192–1200.

Rahman, A., Dash, S., Luhach, A. K., Chilamkurti, N., Baek, S., & Nam, Y. (2019). A neuro-fuzzy approach for user behavior classification and prediction. *Journal of Cloud Computing, 8*, 17.

Rahman, A., Dash, S., & Luhach, A. K. (2021a). Dynamic MODCOD and power allocation in DVB-S2: A hybrid intelligent approach. *Telecommunication Systems, 76*, 49–61.

Rahman, A., Dash, S., Ahmad, M., & Iqbal, T. (2021b). Mobile cloud computing: A green perspective. In: *Intelligent systems*, vol 185, Lecture notes in networks and systems book series (LNNS), pp. 523–533.

Rahman, A., Sultan, K., Naseer, I., Majeed, R., Musleh, D., et al. (2021c). Supervised machine learning-based prediction of COVID-19. *Computers, Materials and Continua, 69*(1), 21–34. https://doi.org/10.32604/cmc.2021.013453

Rahman, A., Musleh, D., Nabil, M., Alubaidan, H., Gollapalli, M., Krishnasamy, G., Almoqbil, D., Khan, M. A. A., Farooqui, M., Ahmed, M. I. B., Ahmed, M. S., & Mahmud, M. (2022a). Assessment of information extraction techniques, models and systems. *Mathematical Modelling of Engineering Problems, 9*(3), 683–696.

Rahman, A., Ahmed, M., Zaman, G., Iqbal, T., Khan, M. A. A., Farooqui, M., et al. (2022b). Geo-spatial disease clustering for public health decision making. *Informatica, 46*(6), 21–32.

Rahman, A., Asif, R. N., Sultan, K., Alsaif, S. A., Abbas, S., Khan, M. A., & Mosavi, A. (2022c). ECG classification for detecting ECG arrhythmia empowered with deep learning approaches. *Computational Intelligence and Neuroscience, 2022*, 6852845, 12 pages.

Rahman, A., Nasir, M. U., Gollapalli, M., Alsaif, S. A., Almadhor, A. S., Mehmood, S., Khan, M. A., & Mosavi, A. (2022d). IoMT-based mitochondrial and multifactorial genetic inheritance disorder prediction using machine learning. *Computational Intelligence and Neuroscience, 2022*, 2650742, 8 pages.

Rahman, A., Alqahtani, A., Aldhafferi, N., Nasir, M. U., Khan, M. F., Khan, M. A., & Mosavi, A. (2022e). Histopathologic oral cancer prediction using oral squamous cell carcinoma biopsy empowered with transfer learning. *Sensors, 22*(10), 3833.

Rahman, A., Abbas, S., Gollapalli, M., Ahmed, R., Aftab, S., et al. (2022f). Rainfall prediction system using machine learning fusion for smart cities. *Sensors, 22*(9), 1–15.

Rehman, A., Athar, A., Khan, M. A., Abbas, S., Fatima, A., Rahman, A., & Saeed, A. (2020). Modelling, simulation, and optimization of diabetes type II prediction using deep extreme learning machine. *Journal of Ambient Intelligence and Smart Environments, 12*(2), 125–138.

Streamlit. (2023). Retrieved January 17, 2023, from https://streamlit.io/.

Zagrouba, R., Khan, M. A., Rahman, A., Saleem, M. A., Mushtaq, M. F., et al. (2021). Modelling and simulation of covid-19 outbreak prediction using supervised machine learning. *Computers, Materials and Continua, 66*(3), 2397–2407.

Zaman, G., Mahdin, H., Hussain, K., & Rahman, A. (2020). Information extraction from semi and unstructured data sources: A systematic literature review. *ICIC Express Letters, 14*(6), 593–603.

Zaman, G., Mahdin, H., Hussain, K., Rahman, A., Abawajy, J., & Mostafa, S. A. (2021). An ontological framework for information extraction from diverse scientific sources. *IEEE Access, 9*, 42111–42124.

Strength of Technological Experience as Power Sources of Leadership and Job Creativity: The Case of Jordanian Banks

Tareq Abuorabi and Hussein Albanna

1 Introduction

True creativity requires a combination of knowledge and a set of skills that go beyond pure technical expertise. The ability to think outside the box, be able to collaborate with others, and come up with innovative ideas is essential for any creative endeavor.

Organizational creativity is considered one of the important topics at the present time, as it has a positive and distinctive impact when talking about competitiveness. Robbins and Judge (2008) called for the need to move away from the traditional and old methods and work on the need to go to think and work in creative ways.

The strength of experience is demonstrated by a person's response to or submission to another person, and the reason for this response or submission is because the other person has sufficient experience and distinguished skills, as well as high and accurate knowledge in the various aspects of work, and this person is aware of what other people know and that they are superior in terms of knowledge and information in the field of work. Then we can say that the other person has sufficient experience and distinguished skills (Reiley & Jacobs, 2016).

The amount of information has expanded, and people now have access to a wider range of knowledge as a consequence of technical and scientific advancement, social media, and modern methods of communication. Therefore, conventional power is no

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longer adequate to sway the actions of subordinates. This is what prompted the manager or leader to utilize his or her own experiences to shape the conduct of subordinates.

2 Theoretical Background

A person gains experience by taking part in a particular event or situation, and as this action or situation is repeated, it leads to a deepening of this experience, giving it spontaneity and greater depth. Experience is a general term, and the concept of knowledge, skill, or ability of observation is reduced to it, but it is expressed in a spontaneous, instinctive, and deep way. Additionally, experience is often referred to as empirical knowledge by philosophers since it is connected to procedural/empirical knowledge or understanding of how to perform something.

Regarding authority sources, concluded that the strongest and most reliable sort of authority was experienced, and its link to pleasure and performance was close. In addition, in the literature review for the different leadership power source classifications, most researchers indicate that the power of the experience (personal) is one of the major factors that have an effect on leadership power (Table 1):

Table 1 Different classifications of sources of leadership power

Author(s)	Classifications
Weber (1954)	– Authority of legitimacy – Authority of position – Authority of personal
Peabody (1962)	– Authority of legitimacy – Authority of competence – Authority of personal
Bass (1960), Yukl and Falbe (1991)	– Position power – Personal power
	– Reward power – Coercive power – Legitimate power – Referent power – Expert power
Pettigrew (1972)	One of the sources of power that has been acknowledged in literary theories for a long time is the power of possessing the information that people need to carry out their actions, and this study is one of the few empirical studies on the power of information
	It was pointed out here that charisma involves a perception by others that a person who possesses charisma is an extraordinary person who is distinguished from others and can be trusted to lead a group or organization

[a] This classification was considered one of the most acceptable classifications of power and was considered broader than the classification of Bass

The power of experience is the response of a person or his obedience to another person, and the reason for this response or obedience is because the other person possesses sufficient experience and distinguished skills, and he also possesses high and accurate knowledge in the various aspects of work, and this person is aware of what others possess of knowledge and information or he is superior to them in skills and information in the field of work, and then we can say that experience becomes a source of power, as the power of experience is the power of personality (Reiley & Jacobs, 2016).

As a result of technological and scientific progress, social media, and modern means of communication, the amount of information has increased and the knowledge available to individuals has varied. As a result, traditional power is no longer sufficient to influence the behavior of subordinates. This is what made the manager or leader use the power of experience and personal experiences to influence the behavior of subordinates. It is for the subordinates to be convinced and confident in what the leader says and to comply with his orders.

Jaradat et al. (2014) illustrated that there are three types of experience:

1. Associational expertise: It is the knowledge that people reach by knowing the relationships between the different inputs and outputs of a particular thing.
2. Motor skill expertise: Here, experience relies on physical rather than mental movements.
3. Theoretical expertise: It is the expertise that is in-depth in a specific field, as it allows one to solve previously unsolved problems.

Experience is a general term, and the concept of knowledge, skill, or ability of observation is reduced to it, but it is expressed in a spontaneous, instinctive, and deep way, and a person obtains experience by participating in a specific event or situation, and with the repetition of this action or situation, it leads to deepening this experience and giving it spontaneity and greater depth. Experience is also associated with procedural knowledge, that is, knowing how to do something.

The concept of creativity has preoccupied many researchers throughout the ages, and many writers (Sternberg, 2001; Lee, 2005; Nussbaum, 2005; De Jong & Vermeulen, 2006; Baregheh et al., 2009; Kim, 2011; Anderson et al., 2014) have striven to provide a comprehensive definition of it and a clear explanation of the difference between the innovation concept and creativity. But we can say that creativity is authoring and generating new ideas, while the term innovation means that new ideas are transformed into reality; that is, it means the practical application of creativity, as ideas are not new, but their practical application is innovation.

The current era is characterized by rapid cognitive developments and technological revolution, and this has led to the emergence of many crises and problems facing contemporary business organizations, and in order for organizations to face these crises and work to find appropriate solutions, they must find unique creative ways, means, and methods, which requires them to enhance creativity, by searching for creative people and providing appropriate modern means to encourage creativity.

The organizational environment plays an important role in the creativity and progress of organizations and increasing their creative outputs that work to develop

what they offer to the community in terms of products and services and respond quickly to the renewed needs of customers in light of the intense competition by other organizations, but the ability of these organizations differs according to their ability to provide the environment and the conditions that contribute to encouraging and increasing the level of creativity; creativity is the outcome of the interaction of the organization's environment and the general environment. The following are the most important factors and variables of the organizational environment that encourage and stimulate creativity (Shneiderman et al., 2006):

- The organization should have a special strategy for creativity, which should be clear and declared.
- The organizational structure provides flexibility and adaptation between the different departments and units in the organization and has a positive effect on creativity because it contains a low degree of division of vertical, central, and formal differentiation.
- The work of individuals within work teams contributes greatly to the generation of creative ideas if compared to individual work.
- Creativity requires a leadership that believes in, encourages, and supports creativity.
- The culture of the organization affects the creative process. The culture of accepting mistakes, facing failure, and encouraging and stimulating new ideas is one of the factors affecting the creative thinking of all individuals in the organization.
- Investing in human resource is important to the process of development and progress, and this requires continuous training as a means of acquiring skills and knowledge and developing creative capabilities.
- Reward and motivate creativity.
- Technological innovation, as one of the components of comprehensive creative management, is an important factor in supporting organizations that are always eager to compete in the markets, and because they operate in a business environment that is witnessing rapid changes and intense competition, it has forced them to focus on technological innovation as a basis for survival and continuity. The term technological innovation was used in the modern sense for the first time by the economist Joseph Schumpeter in 1939 when he said: "Technological innovation is the change that is created or necessary." It is defined as converting an idea into a ready-to-sell product, and this product either is new or has been subject to improvements, design, or improvement of production processes.
- The findings later revealed that microenterprises in both nations use the principles of work meaning, enthusiasm for work, and trust more substantially, fostering an atmosphere that encourages innovation (Chen & Huang, 2022).

3 Research Methodology

To accomplish the objectives of the study, a questionnaire was developed, distributed, and then gathered. Interviews with Jordanian bank managers were undertaken (13 banks). Managers' ages (18.4% of the study sample) were under 30 years, while 34% of the sample cases were between the ages of 31 and 40 years, 28% were between the ages of 40 and 50 years, and the rest were over the age of 50. The experience category of 15 years or more was the largest, with a percentage of 49.5%, followed by the percentage of those whose experience ranged between 11 and 15 years (38.8%), followed by the percentage of those whose experience ranged between 11 and 15 years, amounting to 10.7%, and finally percentage of those with less than 5 years of experience.

4 Results

The stability of the tool was verified using the Cronbach alpha equation for internal consistency, through application on the survey sample, and its value was reached for the experience dimension (0.962) (Table 2).

The strength of technical expertise as one of the sources of leadership strength has an impact on job innovation in Jordanian banks, as the calculated value of t was 6.207 and the value of beta was 0.314, which are two statistically significant values at the level $0.05 \geq \alpha$, and through the value (β). The "nonnormative regression coefficient" of 0.295 indicates the amount of increase in the dependent variable (functional creativity) as a result of the increase in the use of the power of technical expertise, meaning that the increase in the use of the power of technical expertise by leaders by one unit leads to an increase in job creativity among employees in Jordanian banks by 76% (Table 3).

The value of its beta coefficient is $\beta = 0.47$; what reinforces this effect is the calculated T value $= 8.737$, which is greater than its tabular value of 1.96, and at a significant level (Sig $= 0.00$). Moreover, the value of $F = 22.175$, which is greater than its tabular value and significant at the level of significance ($\alpha \leq 0.05$), also represents the significance of this model at a degree of freedom (4/264), and the value of $R^2 = 0.551$ indicates that the strength of technical expertise has It interpreted (55.1%) of the change in the mental image, and the correlation coefficient

Table 2 Multiple regression analysis to test the effect of the technological experience power as one of the sources of leadership strength on job creativity in Jordanian banks

Independent variable	β	Std. error	Beta	Scheduled t	Sig.
Constant	1.067	0.147		7.283	0.000
Technological experience	0.076	0.048	0.830	27.064	0.000[a]

[a] At level $\alpha \leq 0.05$

Table 3 Test of technological experience power impact on job creativity

	Model summary		ANOVA			Coefficients				
Dependent variable	R	R^2	Calculated F	F Sig.	df	Independent variables	Std. error	Beta	T	T Sig.
Technological experience power	0.551	0.501	22.175	0.00[a]	264/4	Job creativity	0.007	0.047	8.737	0.00[a]

F scheduled = 2.37, T scheduled = 1.96

[a] At level $\alpha \leq 0.05$

was $R = 50.1\%$, which indicates that there is a strong relationship between the strength of technical expertise and job creativity.

5 Conclusions and Recommendations

The study concluded that there is a positive effect of the strength of experience as an independent variable on job creativity in Jordanian banks and that the strength of experience explains a high percentage of the variation in job innovation in Jordanian banks. Spreading job creativity in the work environment needs managers who believe in the need for development and modernization in the work environment with the introduction of updates and modern technologies in administrative work, in line with the objectives, values, and policies of those banks, and this matter requires managers who are experienced and able to influence employees.

The researchers' recommendation is to conduct studies on the subject of technical expertise as one of the sources of leadership power on job creativity among employees in establishments other than banks and to compare the results with this study.

For banks, the study recommends to provide the necessary explanatory guides and instructions to explain the mechanisms of dealing with electronic tools, so that everything new and updated is published for the purposes of creating comprehensive awareness for all employees. Work to promote the adoption of electronic collaborative tools that eliminate bureaucracy in completing tasks. Hold training programs and workshops to familiarize employees with the various technical and digital knowledge management processes and their importance in facilitating work procedures and increasing productivity.

6 Limitations and Future Studies

In order to better understand the scope of the project and its potential for success, future studies can help to anticipate any potential challenges and obstacles, allowing for more informed decisions in the present through spotting the light on banks in other countries and other organizations. Technological experience is also important, as the right technology can not only enhance the quality of a project, but also make it more efficient and cost-effective. Finally, job creativity is essential in order to make projects stand out and ensure that they stay competitive in today's ever-evolving market. With these considerations in mind, any project or goal can be better planned and better executed.

References

Anderson, N., Potočnik, K., & Zhou, J. (2014). Innovation and creativity in organizations: a state-of-the-science review and prospective commentary. *Journal of Management, 40*(5), 1297–1333.

Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management Decision, 47*(8), 1323–1339.

Bass, B. M. (1960). *Leadership, psychology, and organizational behavior*. Harper.

Chen, S., & Huang, W. (2022). Innovation input-output and output-lagged input relationships of the next-generation information industry in China. *Information Processing and Management, 59*(6), 103066. https://doi.org/10.1016/j.ipm.2022.103066

De Jong, J. P. J., & Vermeulen, P. A. M. (2006). Determinants of product innovation in small firms: A comparison across industries. *International Small Business Journal, 24*(6), 587–609. https://doi.org/10.1177/0266242606069268

Jaradat, N., Al-Ma'ani, A., & Al-Saleh, A. (2014). *Knowledge management*. Philadelphia University, Ethraa for Publishing and Distribution, University Library, Sharjah.

Kim, K. H. (2011). The creativity crisis: The decrease in creative thinking scores on the Torrance tests of creative thinking. *Creativity Research Journal, 23*(4), 285–295.

Lee, K. H. (2005). The relationship between creative thinking ability and creative personality of preschoolers. *International Education Journal, 6*, 194–199.

Nussbaum, B. (2005). Get creative: How to build innovative companies. *Business Week* (pp. 60–68).

Peabody, R. (1962). Perceptions of organizational authority: A comparative analysis. *Administrative Science Quarterly, 6*, 463–482.

Pettigrew, A. M. (1972). Information control as a power resource. *Sociology, 6*(2), 187–204. https://doi.org/10.1177/003803857200600202

Reiley, P. J., & Jacobs, R. R. (2016). Ethics matter: Moderating leaders' power use and followers' citizenship behaviors. *Journal of Business Ethics, 134*(1), 69–81.

Robbins, S. P., & Judge, T. A. (2008). *Organizational behavior* (17th ed.). Pearson International.

Shneiderman, B., Fischer, G., Czerwinski, M., Resnick, M., Myers, B., Candy, L., Edmonds, E., Eisenberg, M., Giaccardi, E., Hewett, T., Jennings, P., Kules, B., Nakakoji, K., Nunamaker, J., Pausch, R., Selker, T., & Sylvan, E. (2006 May). Creativity support tools: Report from a U.S. National Science Foundation Sponsored Workshop, vol. 20, pp. 61.

Sternberg, R. J. (2001). Developing successful intelligence in all children: Adding creative and practical abilities to analytic thinking. *CEIC Review, 10*(4), 4–6.

Weber, M. (1954). *Max Weber on law in economy and society*. Harvard University Press.

Yukl, G., & Falbe, C. (1991). Importance of different power sources in downward and lateral relations. *Journal of Applied Psychology, 76*(3), 416–423.

Technology Integration and Digital Transformation in Post-COVID-19 Hybrid Education

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1 Introduction

The COVID-19 pandemic has uniquely challenged education and everyone involved. One can distinguish four stages of response, from educational institutions to the COVID-19 pandemic, which involved adopting both remote and online/distance learning: (a) speedy conversion of traditional to remote/online teaching and learning, (b) (re)introducing basics, (c) prolonged change during continual confusion, and (d) emergence of the "new normal" (Barbour et al., 2020).

This last post-COVID-19 stage presents challenging and diverse experiences related to the adoption and impact of online learning. Whatever the appearance and the format of the "new normal" emerging hybrid models, educators need to be aware, educated, and up to date about the changing nature of their roles, dynamic nature of their students' characteristics, current technology trends and technologies, and technology integration models transforming the student digital learning experience. Some of the models and their inherent characteristics of post-COVID-19 hybrid education are briefly described here.

This chapter examines the rapidly changing role of educators; prescribed technology standards for students, educators, and education leaders; and some basic characteristics of the student generations currently in education. The discussion moves to various popular types of technology integration in education and then frameworks of technology integration. The chapter concludes with a note on the return to the new "normal" post-COVID-19 where the focus should be on systematic

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planning for online learning as opposed to the confusing (and often failed) emergency remote teaching attempts at the beginning of the COVID-19 pandemic.

2 The Changing Role of the Postmodern Educator

Post-COVID-19 hybrid education models are inextricably digital. It is vital to understand the role of the postmodern educator in this context. Educators of today and tomorrow emerge as digital facilitators. Digital facilitation is a means of assisting learning with digital technologies and tools. Both the digitization trend and the unexpected pandemic, which forced people towards online and virtual communication, contributed significantly to the development of this new, both effective and sustainable, approach to collaboration. Postmodern educators also need unique skills and attributes addressing the issues of technology use in teaching and learning. In this context, the ISTE Standards are addressing the use of technology in teaching and learning. It is also critical for educators to understand the unique characteristics of the current student generations, namely Gen Z and Gen Alpha, as both digital technologies and the pandemic shift to online learning have been shaping these two generations in unique ways and very different to our traditional modes of teaching and learning.

2.1 ISTE Standards

The International Society for Technology in Education (ISTE) Standards provide a road map for everyone involved in the education practice, such as educators, education leaders, and students, but also provide an insight to their potential and required attribute profile, for a successful and sustainable technology integration and digital transformation (iste.org, 2022).

2.1.1 ISTE Standards for Educators

The ISTE Standards for Educators help them enhance their practice, encourage collaboration, challenge traditional thinking, and empower their students to become independent learners. Educators are expected to be (a) lifelong learners and learning from others; (b) leaders seeking every possible opportunity to empower their students and improve learning outcomes; (c) digital citizens participating in the digital world; (d) collaborators sharing experiences and ideas; (e) designers of learner-driven learning experiences; (f) digital facilitators using technology for improving learning; and (g) analysts who can understand and use teaching practice data to support student learning (iste.org, 2022).

2.1.2 ISTE Standards for Education Leaders

The ISTE Standards for Education Leaders guide education management leaders in the digital age learning to support educators and students. Education leaders are expected to be (a) advocates of equity and digital citizenship; (b) visionary planners who can strategize using technology to transform learning; (c) empowering leaders who understand and use technology to create a culture of innovation; (d) systems designers building teams and information systems to support learning; and (e) connected learners who promote continuous professional development and lifelong learning (iste.org, 2022).

2.1.3 ISTE Standards for Students

The ISTE Standards for Students describe the essential skills and knowledge they need to survive and succeed in the global, interconnected, and constantly changing world. Students are expected to be (a) empowered learners leveraging technology; (b) digital citizens following safe, legal, and ethical behavior online; (c) knowledge constructors using a variety of resources and digital tools; (d) innovative designers identifying problems and providing solutions; (e) computational thinkers developing and employing learning strategies for problem-solving; (f) creative communicators using a variety of tools and platforms; and (g) global collaborators working efficiently in teams at local and global levels (iste.org, 2022).

2.2 A New Generation of Students

2.2.1 Generation Z

Generation Z (Gen Z) is one of the student groups born between 1995 and 2010. Members of this generation are (a) social, spending over 7 h a day socializing with family and friends; (b) multitaskers preferring to work on multiple screens and bored of linear tasks; (c) entrepreneurs, desiring their independent work environments; (d) educated and lifelong learners; (e) philanthropists caring for the world; (f) digital natives who spend more than 15 h a week on their phones; (g) interactive, constantly improving their people management skills; (h) tech-savvy who believe that they can do anything with technology; (i) less focused with an attention span of 8 s; and (j) cautious with their expenses (Edwards, 2017; Pichler et al., 2021).

2.2.2 Generation Alpha

Generation Alpha (Gen Alpha) is the current preschoolers and kindergarteners. They are logged on and linked up, and technologically literate, also known as “digital

natives" (Parker & Igielnik, 2020). Gen Alpha will be the most networked generation although they consume considerably less time talking to their friends in person (Schawbel, 2017).

Their characteristics are unique: they are post-milestone, post-linear, postliterate, and post-logical (Godfrey, 2019). The transition between life stages for Gen Alpha is fluid and varies according to multiple life-shaping experiences; in this sense, their profile shares characteristics of Gen Z and other generations and can also be broken down to smaller groups (post-milestone). Their lives do not follow a traditional order of events, one that would have them transition from education to a career, and then retirement; rather they can occupy redesigned and reinvented roles as their life progresses (post-linear). Their communication style is multimodal, using digital communication as an interactive medium for discovery and linking to online content. In this context, when texting and using online chat, they do not apply correct spelling and grammar rules (post-literate). Participation, and not reason, is their new logic of viewing the word, trusting more user-generated opinion to experts (post-logical) (Godfrey, 2019; McCrindle, 2021).

2.2.3 Teaching and Engaging Gen Z and Gen A

Teaching and engaging them in post-COVID-19 context require a new mindset that understands and transcends their minds. Godfrey (2019) suggests four interconnected approaches when to effectively engage them: be real, relevant, responsive, and relational. In practice, these students are seeking understanding and respect of their different lifestyle (real); they understand better content and communication that is visual and entertaining (relevant); they require interest, quality instruction, involvement, and inspiration from their teachers (responsive); and they like openness in communication which involves kinesthetic, practical, and hands-on learning experiences (relational) (Godfrey, 2019; McCrindle, 2021).

3 Types of Technology Integration

The term technology integration refers to the numerous uses of technology resources such as computer systems, mobile technology such as smartphones and tablets, digital cameras, social media platforms and networks, software applications, and the Internet in day-to-day classroom environments, including virtual classrooms, and in the administration of services of a school. Technology integration in education aims to use technology resources to transform and enhance student learning by creating teaching experiences based on differentiated instruction in an inclusive environment addressing the needs of all learners. Technology integration is successfully achieved when the use of technology is systematic and transparent, available and accessible, and most importantly aiming to support the curriculum goals and student learning outcomes (drexel.edu, 2022).

The current section focuses on outlining some of the most important technology integration theoretical models and technologies for education that are currently (and will be in the future) transforming the student digital learning experience: the hybrid/HyFlex classroom, blended learning, project-based learning, game-based learning and gamification, extended reality (XR) technologies, and content curation.

3.1 Hybrid Classrooms

The hybrid classroom model, also known as a HyFlex classroom, consists of a flexible teaching and learning environment where one group of learners are present in the physical classroom and another group of learners join the class virtually. Student performance in hybrid classrooms can sometimes rival the traditional one but can also present student engagement and performance problems due to distraction and technical issues.

The pandemic breakout signaled the urgent need for introducing a set of flexible alternative teaching models to those offered by the traditional classroom. The post-COVID-19 period also requires educational institutions to continue and increase their efforts to bond the gap between physically and virtually present students and to offer educators the training and the means to employ high-quality technology tools and creative and innovative teaching methodologies.

Hybrid learning allows for students to spend time in the classroom and time learning from outside the classroom. Hybrid learning has, among others, the obvious benefits of selective occupancy of campus spaces and social distancing, offering flexibility for students to attend classes either physical or online and allowing for a more equitable learning environment.

Hybrid classrooms require specific strategies to keep both in-person and online students engaged. Some of these strategies include using chat, discussion boards, and group projects. Using chat can assist in creating an inclusive and engaging hybrid environment that allows students to openly communicate and exchange ideas and productively generate new insights. Asynchronous discussion boards for weekly reflections can generate participation and cooperation among in-person and online students. Group projects can also create opportunities for student collaboration and productive teamwork (Sedlovskaya, 2021).

3.2 Blended Learning Model

The blended learning teaching methodology provides a guide for the integration of technology and related digital technologies into traditional teacher-centered teaching models, offering students flexible solution for customized learning experiences. Blended learning can be better expressed with the following equation: F(ace)-2-F

(ace) + real-time (synchronous) discussions + at own pace (asynchronous) interactions = enhanced online teaching and learning environment (Quigley, 2019).

There are various blended learning models, each one with different approaches to teaching and learning. The model allows for students to have some agency over time (when), space (where they learn), pace (speed and rate of learning), and path (way in which they learn). There are four basic models of blended learning: (a) rotation model, where students rotate through two stations (a distance learning station/dedicated computer lab) on a fixed schedule; this model can be implemented in four different ways: station rotation, lab rotation, flipped classroom, and individual rotation; (b) flex model, in which instructors provide support to students working through course content; (c) a la carte model, a mix of online and face-to-face courses; and (d) enriched virtual model, where students engage in the course content online and attend occasional physical (f-2-f) sessions with their teacher (education.microsoft.com, 2022).

3.3 Project-Based Learning (PBL)

Project-based learning consists of a teaching methodology incorporating technology tools, and it involves a group of students engaging in the 4Cs of the twenty-first-century education skills (critical thinking, collaboration, creativity, and communication skills) (Battelle For Kids, 2022) to acquire new knowledge and skills by working over a long period of time to research and come up with solutions to an authentic, complex question or problem. The gold standard PBL model ensures that students are engaging in quality project-based learning by promoting a research-informed model which defines (a) seven essential project design elements and (b) seven project-based teaching practices, guiding students and educational institutions to what should be doing, learning, and experiencing in a good project (pblworks.org, 2022).

3.4 Game-Based Learning (GBL) and Gamification

In education, game-based learning (GBL) and gamification are aiming to transform the traditional content delivery into an improved and active learning experience. Game-based learning does not always involve digital games. When designing a game, care is taken in the process that both covering the subject matter and prioritizing game play are equally balanced. Gamification techniques vary, but what they have in common is the use of game elements that have been proven to have positive effects on students. Gaming is considered effective for learning environments as it advances student motivation, player engagement, adaptivity, and graceful failure without real-life consequences (Plass et al., 2015; Krath et al., 2021).

Game design for learning incorporates various sets of elements in order to be successful, such as game mechanics, visually pleasing aesthetics, narrative content, a system of incentive, music, and specific skills. Quality gamification learning is defined by three experiences: (a) the student can collect rewards of badges and achievements and achieve a status by completing the game play tasks; (b) gamification promotes self-directed learning by offering renewable status and privileges; and (Andoniou, 2022c) gamification helps students in learning how to set goals and take responsibility of their own actions. Gamification empowers students and leads in constructing skills for independent learning and self-discipline (McCarthy, 2021).

Huang and Soman (2013) defined a five-step process for applying gamification to an educational environment: (a) understanding your target audience and how the game fits in the learning outcomes; (b) making a decision of the type of instruction to be followed when delivering the game; (c) identifying "pain points" (factors that prevent learning advancement); (d) identifying resources to build the game; and (e) selecting which game mechanics to apply in the design and implementing the gamification strategies (Huang & Soman, 2013; Saleem et al., 2022).

3.5 Extended Reality (XR)

The term extended reality (XR) encompasses all current (VR, AR, MR) and related immersive technologies that can offer the experience of the physical world in computer-generated environments. Virtual reality (VR) is an entirely digital environment, an enclosed synthetic experience with no sense of the physical world. In a virtual reality environment, VR headsets can re-create sound, image, and video in a 360-degree view of an artificial world, which generate one's physical presence in a simulated digital environment (immersion). With augmented reality (AR), one can experience the physical world with a digital information overlay. The physical world remains central to the experience, superimposed by and enhanced by computer-generated virtual content such as images, text, and animation or video, thus providing a composite view of the two environments. Merged reality (MR) (also referred to as hybrid reality) fuses the physical and the virtual worlds producing new visual representations, where it is possible to interact and manipulate coexisting physical and digital objects (Marr, 2019).

Recent advances in all these technologies and related software applications have opened up the way for the easier development of teaching and learning content in education and their integration in school curricula. Extended reality technologies are anticipated to transform learning, making it more active and engaging and more relevant to the technological realities the learners are experiencing in their lives outside the school environment. They can create more immersive experience for students by virtually transporting them to different places and times, enable virtual field trips by embarking on immersive simulated experiences to unlimited destinations, simulate hands-on learning experiences which are physically difficult or

impossible to be realized, and in general enhance lifelong learning experiences in immersive environments (Marr, 2021).

3.6 Content Curation

Digital curation is a practice that allows teachers and students to research and collect resources from any subject field to meet the learning needs of today's learners. The process challenges educators to become critically conscious about his or her own knowledge but also to voice their selection for curated materials to the wider community. Digital curation selectively collects research data and maintains, preserves, and adds value to them, throughout the duration of its operation (Digital Curation Centre, 2021).

Digital curation practices include collection (research and gathering of resources), categorization (inspection and addition to categories), critiquing (refining), conceptualization (reorganization and building of linkages), and circulation (showcasing content) (Deschaine & Sharma, 2015; Higgins, 2008). See also Andoniou (2022a, 2022b, 2022c, 2022d) for examples of the application of the digital curation framework.

4 Frameworks of Technology Integration

Many frameworks exist on how to systematically implement, integrate, and assess a technology integration plan addressing teaching, learning, and curricular practices. The most important and effective models are briefly described here: RAT, PICRAT, SAMR, TPACK, and TIM.

4.1 RAT and PICRAT Models

The *RAT model* (replacement, amplification, transformation) is a framework used to assess how well technology is integrated in teaching, learning, and curricular practices. It can also be a useful tool to access the level of technology integration in an educational setting (Hughes, 2022).

To assess digital technology integration and its contribution to learning, the model assesses technology integration and impact instructional methods, student learning processes, and curriculum goals, at three levels: (a) replacement, of established practices, processes, or aims; (b) amplification, of efficiency, effectiveness, and productivity of practices, processes, or aims; and (c) transformation, of instruction, learning, or curriculum in authentic and innovative ways (Hughes et al., 2006; Hughes, 2022).

The *PICRAT model* is based on the RAT model, which describes the instructor's use of technology, with the addition of three PIC (passive, interactive, creative) levels referring to the relationship between student and the use of a technology in a specific educational situation. Instructor use of and student attitude towards technology are combined on the PICRAT matrix to create profiles indicating the level of technology used and further technology integration actions. An instructor can be seen to use technology to replace, amplify, and transform the experience of the lesson. Student relationship to technology can be seen as passive, interactive, and creative (Kimmons et al., 2020).

4.2 SAMR Model

The *SAMR model* (substitution, augmentation, modification, redefinition) aims to offer support and guide educators on how to employ technology means for designing, developing, and integrating digital learning experiences. The digital transformation of learning experiences using SAMR anticipates to increase the levels of student achievement. This is achieved in two stages during two phases: (a) enhancement: includes substitution, where a more traditional teaching tool or method is substituted with a technology tool, and, augmentation, by which a traditional tool or method is substituted but with significant enhancements to the learning experience, and (b) transformation, starting with modification, which is neither a replacement nor an enhancement, rather an actual change to the learning design and outcomes, and ending with redefinition, where the integrated technology redefines tasks and activities into their digital versions and transforms a student's experience (Puentedura, 2013; Fastiggi, 2014; Arantes, 2022).

4.3 TPACK Model

The *Technological Pedagogical Content Knowledge (TPACK)* identifies the complex, multifaceted, and situated nature of teacher knowledge required to successfully integrate technology in their teaching. Seven components of teacher knowledge in this context are defined. Three areas are the basic components of this knowledge: (a) *pedagogical knowledge (PK)* is the deep knowledge about teaching methodologies, teaching processes, and practices; (b) *technology knowledge (TK)* is about the various ways of utilizing technology tools and resources; and (c) *content knowledge (CK)* is the actual subject matter to be learned. Each one of these areas of knowledge can be combined to form three areas: *technological pedagogical knowledge (TPK), technological content knowledge (TCK),* and *pedagogical content knowledge (PCK)*. The intersection of these last three areas is the ideal knowledge an instructor should have to successfully integrate technology in teaching, that is, *the*

technological pedagogical content knowledge (TPACK) (Mishra & Koehler, 2006; Paidican & Arredondo, 2022).

4.4 Technology Integration Matrix (TIM)

The *Technology Integration Matrix (TIM)* describes how to use technology to transform learning. The TIM models connect five inter-reliant features of meaningful learning settings: (a) active, that is, actively engaged in the use of technology tools; (b) collaborative, technology tools that are used to increase collaboration among learners; (c) constructive, refers to the use of technology to create meaningful connections between new information and prior knowledge; (d) authentic, technology that is used to develop associations between learning and the real world; and (e) goal directed, that is, the use of technology to enable setting goals, planning, monitoring, and assessment. In the TIM matrix, these learning environments are aligned with five levels of technology integration: (a) entry (basic use); (b) adoption (conventional and procedural use); (c) adaptation (exploration and independent use); (d) infusion (provision of context and technology tools); and (e) transformation (encouragement of innovative use). Combining the five features of meaningful learning environments and the five levels of technology integration gives a large matrix of 25 alternative situations, where technology can possibly be integrated (Florida Center for Instructional Technology, 2019; van Wyk & Moodley, 2022).

5 Conclusion

The post-COVID-19 "new normal" consists of a dynamic period of change and transformation, with technology certainly having emerged into the educational practice and destined to alter the nature of education for years to come. All those involved in this process of digital transformation (educators, education managers, and students) find themselves with new demands for increased academic performance and outcomes. Numerous technology integration models, educational technologies, and learning applications exist that promise to offer a successful response to rising social disruptions and global emergencies and which can additionally enhance the student digital learning experience.

If there is one thing that the recent COVID-19 pandemic taught us, that is the importance of understanding the nature of digital transformation of learning as well as the issues involved in the planning and implementation of technology integration in e-learning/online education. With that in mind, this chapter concludes with an important distinction regarding successful technology integration, which has often been overlooked during the COVID-19 pandemic period, difference between emergency remote teaching, and effective planning for online learning. Emergency remote teaching refers to the temporary urgent attempt of educational institutions

to create conditions of adequate access to teaching support applying responses similar to those in an emergency situation or crisis. It is not about re-creating a functional and long-lasting learning ecosystem (Hodges et al., 2020). Effective planning for online learning on the other side is a systematic and long-term design process, characterized by the systematic review of various design decisions and the effect on the quality of teaching and learning. It is this systematic review process that has been absent in most of these emergency alterations, and it is exactly this distinction that any post-COVID-19 hybrid education model needs to consider. An effective planning for online learning should include the examination and possible upgrade of technological infrastructure, research and purchase of current best technology solutions, improvement of learning environments, production of documentation and media resources for training purposes, upskilling of teaching and professional staff, assessment and evaluation, and consideration of alternative models of implementation.

References

Andoniou, C. (2022a). *Technoliterati v.3.1: Education, ICTs, digital life*. Retrieved from https://www.scoop.it/topic/ware-z-house-v-2-0-1

Andoniou, C. (2022b). *Ware[z]house v.2.1: e-Education teaching and learning resources and tools*. Retrieved from https://www.scoop.it/topic/technoliterati-v-3-1

Andoniou, C. (2022c). *digisapiens v.1.0. Humans, cyber humans, machines*. Retrieved from https://www.scoop.it/topic/digisapiens-v-1

Andoniou, C. (2022d). *Disinfected: Memoirs of the coronial generation*. Retrieved from https://www.scoop.it/topic/dis-infected

Arantes, J. (2022). The SAMR model as a framework for scaffolding online chat: A theoretical discussion of the SAMR model as a research method during these "interesting" times. *Qualitative Research Journal., 22*, 294.

Barbour, M., et al. (2020). *Understanding pandemic pedagogy: Differences between emergency remote, remote, and online teaching*. Retrieved from https://vtechworks.lib.vt.edu/bitstream/handle/10919/101905/understanding-pandemic-pedagogy.pdf.

Battelle for Kids. (2022). *Framework for 21st century learning*. Retrieved from http://www.battelleforkids.org/networks/p21

Deschaine, M. E., & Sharma, S. A. (2015). The five Cs of digital curation: Supporting twenty-first century teaching and learning. *InSight: A Journal of Scholarly Teaching, 10*, 19–24.

Digital Curation Centre. (2021). *What is digital curation?* Retrieved from https://www.dcc.ac.uk/about/digital-curation

drexel.edu. (2022). *How to use technology in the classroom: Benefits and effects.* Retrieved from https://drexel.edu/soe/resources/student-teaching/advice/how-to-use-technology-in-the-classroom/

education.microsoft.com. (2022). *Teach forward: Best strategies for hybrid, remote, and blended learning*. Retrieved from https://education.microsoft.com/en-us/course/e98793cb/1

Edwards, A. (2017). *The next generation: Generation Z.* Retrieved from http://blog.peopleguru.com/the-next-generation-generation-z

Fastiggi, M. (2014). *The SAMR model*. Retrieved from https://technologyforlearners.com/the-samr-model/

Florida Center for Instructional Technology. (2019). *TIM: The technology integration matrix.* Retrieved from https://fcit.usf.edu/matrix/

Godfrey, M. (2019). *Generation Z and Gen Alpha: The latest generations*. Retrieved from https://michael-godfrey.medium.com/generation-z-and-gen-alpha-the-latest-generations-16ac1e42e496

Higgins, S. (2008). The DCC curation lifecycle model. *International Journal of Digital Curation, 1*(3), 134–140.

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *EDUCAUSE Review*, *3*. Retrieved from https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remoteteaching-and-online-learning

Huang, W. H. Y., & Soman, D. (2013). A practitioner's guide to gamification of education. Retrieved from https://mybrainware.com/wp-content/uploads/2017/11/Gamification-in-Education-Huang.pdf

Hughes, J. E. (2022). Replacement, amplification, and transformation: The R.A.T. model. Retrieved from https://techedges.org/r-a-t-model/

Hughes, J., Thomas, R., & Scharber, C. (2006). Assessing technology integration: The RAT—replacement, amplification, and transformation—framework. In C. Crawford, et al. (Eds.), Proceedings of society for information technology & teacher education international conference 2006. Chesapeake: Association for the Advancement of Computing in Education.

iste.org. (2022). *The ISTE standards*. Retrieved from https://iste.org/iste-standards

Kimmons, R., Graham, C. R., & West, R. E. (2020). The PICRAT model for technology integration in teacher preparation. *Contemporary Issues in Technology and Teacher Education*, *20*(1).

Krath, J., Schürmann, L., & Von Korflesch, H. F. (2021). Revealing the theoretical basis of gamification: A systematic review and analysis of theory in research on gamification, serious games and game-based learning. *Computers in Human Behavior, 125*, 106963.

Marr, B. (2019). *What is extended reality technology? A simple explanation for anyone*. Retrieved from https://www.forbes.com/sites/bernardmarr/2019/08/12/what-is-extended-reality-technology-a-simple-explanation-for-anyone/

Marr, B. (2021). *Extended reality in education: The 5 ways VR and AR will change the way we learn at school, at work and in our personal lives*. Retrieved from https://www.forbes.com/sites/bernardmarr/2021/04/19/extended-reality-in-education-the-5-ways-vr-and-ar-will-change-the-way-we-learn-at-school-at-work-and-in-our-personal-lives/

McCarthy, J. (2021). *Using gamification to ignite student learning*. Retrieved from https://www.edutopia.org/article/using-gamification-ignite-student-learning

McCrindle, M. (2021). *Generation alpha*. Hachette UK.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teachers' knowledge. *Teachers College Record, 108*(6), 1017–1054.

Paidican, M. A., & Arredondo, P. A. (2022). The technological-pedagogical knowledge for in-service teachers in primary education: A systematic literature review. *Contemporary Educational Technology, 14*(3), ep370.

Parker, K., & Igielnik, R. (2020). *On the cusp of adulthood and facing an uncertain future: what we know about Gen Z so far*. Retrieved from https://www.pewresearch.org/social-trends/2020/05/14/on-the-cusp-of-adulthood-and-facing-an-uncertain-future-what-we-know-about-gen-z-so-far-2/

pblworks.org. (2022). *What is PBL?* Retrieved from https://www.pblworks.org/what-is-pbl

Pichler, S., Kohli, C., & Granitz, N. (2021). DITTO for Gen Z: A framework for leveraging the uniqueness of the new generation. *Business Horizons, 64*(5), 599–610.

Plass, J. L., Homer, B. D., & Kinzer, C. K. (2015). Foundations of game-based learning. *Educational Psychologist, 50*(4), 258–283.

Puentedura, R. R. (2013). *SAMR: Getting to transformation*. Retrieved from http://www.hippasus.com/rrpweblog/archives/2013/04/16/SAMRGettingToTransformation.pdf.

Quigley, B. (2019). *What is blended learning?* Retrieved from https://www.learnupon.com/blog/what-is-blended-learning/

Saleem, A. N., Noori, N. M., & Ozdamli, F. (2022). Gamification applications in E-learning: A literature review. *Technology, Knowledge and Learning, 27*(1), 139–159.

Schawbel, D. (2017). *5 predictions for Generation alpha*. Retrieved from https://danschawbel.com/blog/5-predictions-for-generation-alpha/

Sedlovskaya, A. (2021). *3 strategies for creating inclusive, engaged hybrid classrooms.* Retrieved from https://www.hbsp.harvard.edu/inspiring-minds/3-strategies-for-creating-inclusive-engaged-hybrid-classrooms

van Wyk, M., & Moodley, K. (2022). Promote learning survival skills through technology integration in course design. *International Journal of Mobile and Blended Learning, 14*(1), 1–17.

Digital Product and Marketing Innovations for the Greater Good: Evolution, Emergent Challenges, and Potential Research Paths

Waleed A. Aziz

1 Introduction

Digital technology has enabled firms to compete in radically new ways, leading to the emergence of "born-digital" or "digital-native" businesses that serve a large customer base globally due to near-zero reproduction and distribution costs.

Freemium digital information products (like Google's search engine, Facebook's social media platform, and YouTube's entertainment platform) are one kind of inclusive digital innovation (e.g., mobile phone-based banking services). Except in cases where a company or government deliberately imposes restrictions, the market for many digital information products (e.g., transaction platforms, social media platforms, entertainment platforms, and gaming platforms) is likely to be worldwide and all-encompassing in today's interconnected world. To reach a large and diverse customer base, businesses selling digital information products must develop and use global marketing strategies.

2 Literature Review

There is a growing body of literature exploring questions related to the development and implementation of digital technologies, the acceptance of these technologies by businesses and consumers, and their impact on society. Articles on digital marketing, digital social media and mobile marketing, digital marketing, digital economics

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(Goldfarb & Tucker, 2019), and digital transformation provide a synthesis and critique of prior research and propose directions for future research. The digital innovation life cycle consists of three distinct phases: digitization, digitalization, and digital transformation.

This chapter delves into digital product innovations and digital marketing innovations, focusing on direct and mediated communications, marketing channels, and promotion and distribution mix components. It presents an overview of the field's development and current condition, emphasizes particular challenges and the trajectory of the field, and recommends possibilities for future study.

Chen and Srinivasan's study uses a composite of digital technologies and applications to quantify a company's digital activities, and provide insights into digital technologies and product and marketing developments.

3 Research Significance

Our emphasis on digital advances in the product, promotion, and distribution parts of the marketing mix is based in large part on the fact that these responsibilities map directly onto those of the marketing function inside most firms. In addition to their primary functions of communicating and delivering value, a company's marketing innovations as marketing activities generate value, as seen in Fig. 1. Some important intangible assets that affect a company's market value include brand and channel equity. They result from a company's dedication to the marketing mix's promotion and distribution aspects. Consumers' propensity to pay a premium for a branded product over an identical, unbranded product is another manifestation of the value-creating function of marketing communications (advertising). Moreover, return on marketing investments (e.g., return on a firm's investments in marketing communications and marketing channels) implies value creation through value communication and value delivery, an issue of primary concern to marketing practitioners and a significant focus of marketing research.

Firms' marketing efforts in the promotion and distribution mix are value generators, creating value for the company, society, and end customers. However, there is a dearth of research on digital innovations for the greater good, such as the promise and potential of digital technologies for the common good (Table 1).

3.1 Contributions to Society from the Digital Realm

3.1.1 Digital Innovation and Societal Marketing:

A new product, method, practice, and enhancement to an existing one that generates economic benefit for the innovative enterprise and environmental and social value for society are all examples of innovations for the greater good (IGG). Digital

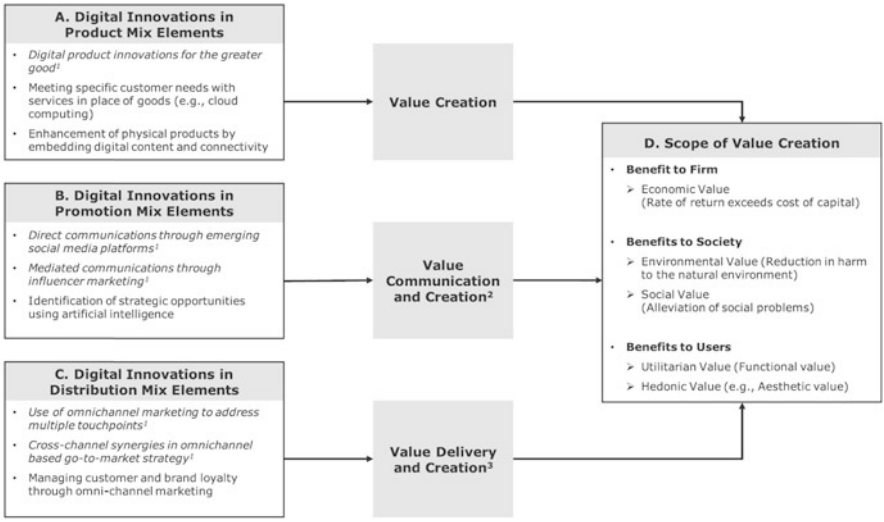

Fig. 1 Innovations in digital product development and marketing in a global economy. [1] This chapter covers digital advances in italics. Digital advancements are used as examples. [2] Investments in a firm's promotion mix provide value in addition to value communication (e.g., market-based relational assets such as brand equity and intellectual assets such as market knowledge and marketing knowledge). [3] A business's investments in distribution mix aspects also provide value for the firm (e.g., market-based relational assets such as channel equity and intellectual assets such as market knowledge and marketing knowledge)

innovation for the greater good (digital IGG) is a new product, process, or practice based on digital technology or an improvement on an existing product, process, or practice, which generates financial benefit for the innovating enterprise and environmental and social value for society. Shared value innovation is an invention that helps businesses and society; their suggested definitions of IGG and digital IGG are consistent with this idea. Technology that can modify, reproduce, retrieve, store, and transfer data in digital form is what "digital technologies" means in the proposed concept of digital IGG.

3.2 Development of the Discipline

Over the last quarter century, businesses have been urged to focus on environmental and social performance as well as economic success. The "triple bottom line" encourages companies to consider how their actions affect more than just their bottom line (people). The sustainable society must balance ecological, economic, and social goals (i.e., providing systems of governance that propagate the values people want to live by). Robinson and Tinker define economic necessity as ensuring that all members of the society have a minimum acceptable level of material well-being, rather than focusing on business viability.

Table 1 Analysis of typical studies on the topic of product and marketing developments enabled by digital technology

Concentrating on digital innovations in technology, product development, and ad campaigns	Value-driven: emphasis on creating, sharing, and/or delivering value			Organizational and consumer outcomes	Focus on results: social impact	Selective comments and contributions
Over the last two decades, digital technologies have come to play a different function in businesses. Increased emphasis has been placed on them as key contributors to marketing data	Yes	Yes	No	The advent of DSMM marketing—a combination of digital, social, and mobile channels—has revolutionized how companies and customers interact	N/A	Expanded marketing intelligence production and analysis for processing clients' expressions are made possible by digital technology
A company's digital transformation may be broken down into three distinct phases: digitization, digitalization, and digital transformation	Yes	No	No	New digital technologies may impact a company's cost structure by substituting high-priced people with virtual agents during service delivery, streamlining logistical streams, and decreasing supply chain costs using AI and blockchain	N/A	A company's capacity to undergo digital transformation determines its success
The downstream journey of consumers is affected by the global and cultural variances in how digital technologies are used	No	Yes	Yes	Depending on the nature of the customer's trip, businesses may emphasize certain aspects and features of the journey more or less	N/A	The effect of different cultures on technological advancements is substantial. The examination of client journeys now takes a global perspective

(continued)

Table 1 (continued)

Concentrating on digital innovations in technology, product development, and ad campaigns	Value-driven: emphasis on creating, sharing, and/or delivering value			Organizational and consumer outcomes	Focus on results: social impact	Selective comments and contributions
Based on their degree of strategic development, businesses' approaches to social media marketing fall into one of the four categories: social commerce, social content, social monitoring, and social customer relationship management	Yes	Yes	No	By utilizing social media, businesses can bring their customers closer together and give them a voice in developing new products and services	Co-creation is becoming increasingly widespread as digital technologies improve interconnection, including society in the value creation process	Marketing intelligence may be used to get an edge via the conceptualization of social media
This research examines the main functions of omnichannel marketing, social media, and direct/mediated communication in the context of developing and disseminating digital innovations for the public benefit. A broader definition of value production is examined, including not only monetary but also ecological and social benefits	Yes	Yes	Yes	*Results in terms of the economy:* When a company innovates digital products with the greater good in mind, everyone wins (a rate of return greater than the cost of capital)	*Environmental and societal outcomes*: People everywhere get rewards from environmentally beneficial technology Innovations for the common good often target the subsets of society that are worst hit by a certain social issue (such as poverty, starvation, or lack of access to healthcare)	*Global perspective:* The research presented here sheds light on three main areas: (a) digital innovations and the generation, transmission, and reception of value; (b) digital product innovations and digital marketing innovations; and (c) digital innovations for the common good and the generation of economic, environmental, and social value. Most digital inventions are born worldwide and inclusive because the

(continued)

Table 1 (continued)

Concentrating on digital innovations in technology, product development, and ad campaigns	Value-driven: emphasis on creating, sharing, and/or delivering value			Organizational and consumer outcomes	Focus on results: social impact	Selective comments and contributions
						economics of digital information goods are such that they benefit everyone (i.e., serve a large customer base spanning high-, middle-, and low-income markets and market segments)

3.3 Trends in the Discipline and Future Concerns

3.3.1 Socially Beneficial Digital Technology Developments

Tools and solutions for the UN's 17 Sustainable Development Goals' social issues (SDGs). The AI for Social Good (AI4SG) movement aims to create interdisciplinary partnerships around AI applications toward SDGs. The author proposes guidelines for AI researchers and application-domain experts to collaborate, highlights existing AI4SG projects, and identifies new AI4SG application opportunities. G1: Realistic AI expectations. Simplicity works. G3: AI applications must be accessible and ethical. Chui et al. (2018) found that current AI capabilities may help address some of the the UN's SDGs' most pressing social issues, benefiting hundreds of millions of people in developed and developing nations.

3.4 Trends for Potential Studies

3.4.1 Perspectives on Innovation with a Focus on the Common Good: Causes and Effects

Understanding and explaining variations in business predisposition and resource commitments to IGGs (e.g., within and between industries and different types of country markets) could be a fertile territory for future research. In this context, the

term "greater good innovation orientation" (GGIO) refers to the percentage of a company's innovation budget allocated toward IGGs. Questions regarding a company's GGIO that make sense to investigate are those that follow the lines of inquiry into research concentrating on various organizational orientation constructs like entrepreneurial orientation, learning orientation, market orientation, and strategic orientation:

RQ1. *When it comes to innovation, what are the primary causes and effects of companies' focus on the greater good inside and beyond the company?*
RQ2. *What are the most important moderators and mediators of the links between a company's greater good innovation orientation and its causes? What factors act as moderators or mediators when it comes to the connections between a company's greater good innovation orientation and its results?*

3.4.2 Collaborations for Incredible Innovations and Social Betterment

While an increasing number of for-profit legacy corporations have made large resource commitments to IGGs, nongovernmental organizations have historically prioritized social issues (NGOs). For-profit corporations and NGOs collaborate in IGG due to the latter's broad understanding of social issues and perceived validity in social innovation. Such reasons suggest researching IGG cooperation between for-profit and nonprofit organizations.

RQ3. *When should for-profit corporations partner with nonprofits to create for the public good?*

3.4.3 Substantive Social Issues Have Inspired New Approaches to Solve Them

If all other factors are equal, businesses will prioritize IGGs that have the ability to address societal issues that are relevant to the products they sell, the customers they service, and the infrastructure they have available to them (assets and capabilities). It is possible, though maybe counterintuitive, that businesses will seek IGGs to address societal issues that have little to do with their core competencies, customer base, or resources. Based on these principles, the following research questions are proposed:

RQ4. *How can companies use synergies between their conventional operations and socially responsible innovations?*
RQ5. *When and why do businesses try to improve society* via *innovations that have nothing to do with their current products, customer base, or competitive advantages?*

Social Media Direct and Via Intermediaries' Communications

- A definitional analysis of influencer marketing and artificial intelligence:
  Using people who have disproportionate sway over a large group of customers (e.g., due to their social standing, expert knowledge, or degree of social connection) to promote products and services, often through social media, is known as "influencer marketing." "Systems having the capacity to accurately understand external input, to learn from such data, and to apply those learnings to fulfill specified objectives and tasks via flexible adaptation" is how we describe artificial intelligence (Haenlein & Kaplan, 2019).
- A rise of the influencer marketing concept:
  Recent research has sought to utilize growing consumer-firm involvement through multichannel interactions, marketer/firm-generated content and sentiment, and scheduling material to target consumers.
- Experiential marketing and the use of influencers:
  Even though marketing academics have begun studying "influencer marketing," more research is needed on how digital technologies have changed the structures of new social media platforms, resulting in specific information flows and processing. The next step in studying how new technologies like Twitch and TikTok affect marketing strategies is to learn what information is shared and how. Twitch users watch 106 min of content daily, more than other social media users. That is much more than people spend on Facebook (58 min), Instagram (53 min), and Twitter (3 min). This review focuses on Twitch, but it shares structural and information flow traits with other new digital platforms like TikTok and Instagram Stories. New media users do not share information.
- Improvements in society fostered by new forms of digital marketing:
  Understanding how digital advances may be utilized to market for the greater good is crucial for marketing research and practice as they continue to transform how organizations engage with customers. One of the most pressing issues in marketing today is how to build more accurate profiles of target consumers. Another is a better understanding of how those profiles translate into distinct demand patterns in various countries. Accurately assessing the demands of BOP consumers and estimating demand for a commodity or service across different categories of consumers are two of the largest obstacles for companies when interacting with BOP customers. In light of the predicted continued growth in social media use among these demographics, the development of influencer marketing offers a potential answer to these challenges. When influencers build a brand via content, they attract fans with similar tastes (Eastin & Lee, 2020).

Empirical Studies on Influencer Marketing

We can show many sides online, which increases authenticity and fan engagement. Platform features allow for many ways to interact with people. Influencers can benefit from a platform's many stages. Facebook, a long-standing "pay-to-play"

site, makes it hard to see your content without paid promotion. TikTok's infancy allows for a lot of flexibility. TikTok's meteoric rise may be due to its users' ability to gain notoriety that they can take to other services. Influencer marketing's new challenges necessitate research into the following:

RQ6. *How can digital platforms use AI to deter strategic user activity that aims to increase their influence level?*
RQ7. *Because conventional measurements of social influence may be skewed by deliberate action, how should companies make their influencer selection decisions?*
RQ8. *How can businesses and opinion leaders create cross-platform strategies that consider each platform's distinctive cultures?*

- Benefiting society by using microcelebrities as marketing spokespeople:
  Influencer marketing has the potential to help nonprofit organizations raise awareness and shape public opinion on societal issues, and a member of the U.S. House of Representatives has integrated her broadcasting with Twitch influencers.

RQ9. *When it comes to influencing public opinion, how can governments and nonprofit NGOs use influencer marketing?*
RQ10. *Do customers at the bottom of the market (economic) pyramid connect with social media platforms and influencers differently than those at the top?*
RQ11. *How to encourage customers in BOP marketplaces to actively participate with businesses and communities online? How may digital influencers be used to encourage customers in BOP marketplaces to use digital services and products more actively with businesses and communities?*

Omnichannel marketing

- Description
  The following summarizes several conceptualizations and definitions of omnichannel marketing proposed in the literature. Some focus on distribution channels, while others include consumer touchpoints and distribution channels. Management of multiple distribution and communication channels (owned, paid, and earned) should be done for greater alignment with customers' searching, purchasing, and support behavior across channels (Cui et al., 2021).
- New developments and future directions in the field:

3.4.4 Customer Involvement and Marketing in an Omnichannel World

According to studies on multichannel marketing, consumers are more likely to explore showrooms than buy in today's retail environment. Consumers research online and on mobile devices as well as in-store to learn more about products and

find the best pricing and discounts. Consumer participation in marketing campaigns has risen to the forefront as conventional and digital advertising has become more intertwined. Sales via catalog channels are impacted more than those made over the Internet when a physical shop opens.

3.4.5 Contributing to Healthcare Improvement Via Omnichannel Interaction

New developments in healthcare indicate a shift toward an omnichannel approach to patient care. One of them is using various channels of communication and healthcare delivery based on digital technology. Big changes are on the horizon for the use of AI-powered apps as a communication channel through which patients can easily monitor and control their treatments from the comfort of home with the help of features like virtual assistants, symptom-checking tools, alerting tools, remote monitoring, and drone delivery of medical supplies.

3.4.6 Product Management and Exchange

Businesses must increasingly understand how omnichannel strategy affects customer and brand loyalty. Businesses can use big data to map customers' offline and online activities to predict where they are in the buying process. Digital shop-in shops help companies compete with online intermediaries' private labels. Brand managers must also match digital intermediaries' private label brands' prices. These trends highlight the need to study how manufacturers can best use multichannel, brand, and price strategies to compete with digital intermediaries.

RQ12. *When competing with digital platforms held by private label companies, which brand tactics and loyalty management programs used by incumbent manufacturer brands are most likely to be more successful, and why?*

- Omnichannel and cutting-edge technology:
  Marketers need a well-thought-out pricing strategy to encourage multichannel buying and communicate with consumers efficiently across channels, and an investigation into how customers' search and multichannel purchase choices are influenced by discounts and marketing messages.

RQ13. *How should businesses track the impact of Wi-Fi and geotagging-enabled mobile marketing on customers' omnichannel behavior engagement?*

RQ14. *When it comes to customer retention, brand loyalty, and profits, how do a voice-based search and VR/AR consumer interaction affect multichannel behavior?*

- Effective omnichannel marketing for nonprofits:
  Omnichannel marketing in nonprofits is understudied (such as government agencies and NGOs). Several government and nongovernment organizations

work to reduce poverty and hunger, provide basic sanitation, and improve the poor's health and well-being (NGOs). Through industry trade associations and social influencer sponsors, these groups can communicate, grow, and recruit collaborative partners. Omnichannel structural arrangements' data support systems can also help monitor and assess stakeholder impacts across channels. This may help business models focus on social goals and resources. Four new research suggest that volunteer marketers may boost startup activity in developing and underserved economies (Anderson et al., 2021). Government and NGO digital platforms may increase consumer awareness and market interaction. Real-time mobile messaging may help micro-businesses and low-income customers access the market. Thus, the question is:

RQ15. *When solving social problems, how can for-profit businesses, government agencies, and NGOs use omnichannel marketing?*

4 Research Conclusion

As very well known, we cannot compare marketing to Euclidean geometry, with its rigid set of notions and assumptions. On the contrary, marketing is one of the most dynamic areas of management today. The market poses new difficulties on a regular basis, and businesses have to adapt. So, it should come as no surprise that novel approaches to advertising are always being developed to fulfill the ever-evolving market demands the ever-changing macro-environment in which firms compete and, thus, the ever-changing nature of marketing is borne out by the proliferation of new marketing terms over the past quarter century, including (a) e-commerce, Internet marketing, and interactive marketing in the 1990s; (b) mobile commerce and mobile marketing in the 2000s; and (c) social media marketing and social media strategy in the 2010s. This chapter follows suit by examining (a) digital product innovations that serve the greater good and (b) digital marketing innovations that facilitate direct and mediated contacts through social media platforms and omnichannel marketing. The chapter discusses the history and present status of various fields of research, delves into pressing concerns and the future of the discipline, and provides suggestions for where it should go from here. It provides brief overviews of the motivation for the questions as well as a summary table of the proposed questions for future research in the Web Appendix, broken down into sections on (a) digital product innovations for the greater good, (b) digital marketing innovations in communications, and (c) digital marketing innovations in channels.

References

Anderson, S. J., Chandy, R., & Zia, B. (2018). Pathways to profits: The impact of marketing vs. finance skills on business performance. *Management Science, 64*(12), 5559–5583.

Anderson, S. J., Chintagunta, P., Germann, F., & Vilcassim, N. (2021). Do marketers matter for entrepreneurs? Evidence from a field experiment in Uganda. *Journal of Marketing, 85*(3), 78–96.

Baker, K. (2009). Understanding the dialectic relationship between intra and inter-organizational cooperation. In J. Salmons & L. Wilson (Eds.), *Handbook of electronic collaboration and organizational synergy* (pp. 695–709). Information Science Reference.

Chui, M., Harryson, M., Manyika, J., Roberts, R., Chung, R., Nel, P., & van Heteren, A. (2018). *Applying artificial intelligence for social good*. McKinsey Global Institute.

Cui, T. H., Ghose, A., Halaburda, H., Iyengar, R., Pauwels, K., Sriram, S., et al. (2021). Informational challenges in Omnichannel marketing: Remedies and future research. *Journal of Marketing, 85*(1), 103–120.

Eastin, M. S., & Lee, J. A. (2020). Attitudes toward advertisements and brands. In J. Van Den Bulck (Ed.), *The international encyclopedia of media psychology*. Wiley.

Goldfarb, A., & Tucker, C. (2019). Digital economics. *Journal of Economic Literature, 57*(1), 3–43.

Haenlein, M., & Kaplan, A. W. (2019). A brief history of artificial intelligence: On the past, present, and future of artificial intelligence. *California Management Review, 61*(4), 5–14.

Measurement in Innovation Management: A Literature Review

Ahmad Alheet, Yacoub Hamdan, and Ahmad Yousef Areiqat

1 Introduction

The business climate is ever-evolving. As a result, businesses strive to increase their competitiveness and performance. In this context, organizations benefit from economic growth, competitiveness, and prosperity when innovation creates new or significantly improved products or services. Companies gain a competitive advantage from innovations, according to some authors.

Innovation management is a mechanism that makes it possible to formalize the innovation process. It helps businesses systematically generate new ideas, methods, and products, which positively impacts the performance of small, medium, and large companies.

As a result, innovation management is crucial to an organization's continued existence. The administration of development processes includes exercises, instruments (Băjenescu, 2018; Al-Salahat, 2022), and, for the most part, answering a design that relates to assets, abilities, information, innovation, the board, and business.

Assume that an organization plans to accomplish an upper hand by creating development. According to Dereli (2015), in that case, it must have a practical implementation of innovation management, which necessitates the creation of an administrative structure to support its innovations and the definition of strategies. Companies can use their strategy to be successful or unsuccessful, so it is essential to set up ways to measure and analyze innovation management and figure out what needs to be improved to get the desired results. However, even though there are a

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few related studies on innovation management, some authors agree that more research needs to be done on this topic (Mir et al., 2016; Patra & Roy, 2023). The authors have confirmed that the current study's hypothesis is based on the existence of a small number of studies measuring innovation management.

Researchers in various social sciences, including economics, finance, management, and entrepreneurship, now focus on poverty alleviation. In recent decades, faster and more widespread economic growth has made it possible for many people to escape poverty, bringing the percentage of people living in extreme poverty down to less than 10% of the world's population. Nonetheless, it is progressively sure specific that while certain nations and locales have seen an emotional improvement in neediness, there are different spots with enormous quantities of individuals still in poverty that can significantly profit from neediness-easing endeavors. Economists and management researchers increasingly recognize that entrepreneurship may be a significant component of the global solution to poverty. A related focus is on how entrepreneurship and creating new businesses can reduce poverty. However, a better understanding of linking the aforementioned critical issues with the current platform, network/digital, and sharing economies and finding new methods and solutions to reduce poverty in contemporary political, economic, and global contexts is still needed (Adeosun & Owolabi, 2023).

2 The Definition of the Research Question

Three research questions (RQs) were established to accomplish the goal of the study:

Q1. How have the publications on measuring innovation management changed over time? This inquiry aims to ascertain the kinds of research utilized for these studies and how the number of publications related to the measure of innovation management has fluctuated.
Q2. How does collecting publications contribute to measuring innovation management? It is anticipated that some innovation management measurement will be mentioned in a model, framework, methodology, or analysis.
Q3. What business types and sizes are represented in the publications? The objective is to determine which industrial sectors and company sizes have received the most research.

3 Collection of Studies

The population, intervention, comparison, and outcome (PICO) strategy was used to create the search string. We decided to take into account two aspects of the PICO to expand the scope of our search:

1. The populace: a collection of elements that can be changed; "innovation management" was the keyword used in the mapping.
2. Outcomes: information anticipated for mapping from the research; all of this information necessitates a measurement procedure. As a result, the keywords considered were measurement, value, impact, or metrics.

The following libraries were used to execute the search string, which was "innovation management" AND "measurement" OR "value" OR "measure" OR "impact" OR "metrics": Web of Science, EBSCOhost, Emerald, ProQuest, IEEE Xplore, and ScienceDirect.

4 Selection of the Studies

A three-stage process was used to select the primary studies. Inclusion criteria (IC), exclusion criteria (EC), and study validation were used during the stages.

The following order of definition and application of the exclusion criteria (EC) was followed during the initial stage:

EC1. Studies presented at research conferences or published in indexed journals.
EC2. Studies published after 2007 taking into account that the first edition of the UNE 166002 standard was published in 2006 (CTN 166—Actividades de investigación, 2014).
EC3. Concentrates on those that are in dialects other than English, Portuguese or Spanish.
EC4. Copy studies.

Applying inclusion criteria (IC) in the following order completes the second stage:

IC1. Accepted studies include those whose titles and keywords are associated with research questions.
IC2. Whose summaries are included in the analyses. The purpose of this study is connected to either the introduction or the conclusion.

Validating the primary studies to answer the research questions was the third stage. The following were the commands in which the quality assessment criteria (QAC) were used:

QAC1. Does the study discuss subjects connected to the research questions?
QAC2. Do the study's findings contribute to answering the research questions?
QAC3. Does the study include a clear statement of the research's goals?
QAC4. Does the study employ an appropriate research approach?
QAC5. Do the ends address the reasons for the examination?
QAC6. Was the review exposed to a thorough survey?

Two thousand eighty studies were found when the search string was executed. One thousand seventy-two studies were obtained during the first stage, and 17 primary studies were obtained during the second stage. After the third stage, the studies were ratified because they received quality assessment scores more significant than three.

5 Conclusions and Future Work

The chapter aimed to determine what other researchers have done to measure innovation management. There was a rise in the count of publications on the size of innovation management in Q1, indicating interest in the topic. According to Q3, these publications are unique to the need and context in which they were developed, and this is the manufacturing industry as of Q2.

Even though interest in innovation management is well known worldwide, the findings suggest that only a few studies have been conducted on the subject. There has been a rise in publications and a variety of research on the topic. There are some measurement contributions, but they only apply to specific industries or company sizes. The skills developed at the height of innovation management were related to performance, effectiveness, competitiveness, and improvement, among other sector- and company-specific factors.

According to the findings, applications for innovation and entrepreneurship have significantly increased over the past few years. The systematic literature review identifies critical aspects related to innovation and firm performance. In the end, we provide promising areas with potential for future applications of innovation and entrepreneurship, such as defining the factors that lead to developing new business models.

In ongoing works, a few information regions will be created to make a model, a strategy, or a system for estimating the development of executives. In addition, situations in which existing contributions are put to use can occur in settings that either add to or enhance the outcomes.

The authors recommend to make intellectual property rights more secure for small and medium-sized businesses, making better use of intellectual property in business strategies, making it possible for firms to declare independence, and giving them more opportunities to participate actively in property technology and international standards.

References

Adeosun, O. T., & Owolabi, T. (2023). Owner-manager businesses and youth employee perceptions. *Journal of Business and Socio-economic Development, 3*(2), 97–117. https://doi.org/10.1108/JBSED-03-2021-0032

Al-Salahat, S. (2022). Endowment and blockchain technology: Investment and finance from the Sharia perspective. *Journal of College of Sharia and Islamic Studies*, *41*(1). https://doi.org/10.29117/jcsis.2023.0349.

Băjenescu, T. M. (2018) *FAIMA Business and Management Journal; Bucharest*, *6*(4): 13–27.

CTN 166—Actividades de investigación, desarrollo tecnológico e innovación (I+D+i). (2014). UNE 166002:2014. Retrieved May 24, 2018, from https://www.aenor.es/aenor/normas/normas/fichanorma.asp?tipo=N&codigo=N0052892&PDF=Si#.WwduXEgvzIU

Dereli, D. D. (2015). Innovation management in global competition and competitive advantage. *Procedia—Social and Behavioral Sciences, 195*, 1365–1370. https://doi.org/10.1016/j.sbspro.2015.06.323

Mir, M., Casadesús, M., & Petnji, L. H. (2016). The impact of standardized innovation management systems on innovation capability and business performance: An empirical study. *Journal of Engineering and Technology Management, 41*(June), 26–44.

Patra, G., & Roy, R. K. (2023). Business sustainability and growth in journey of industry 4.0—A case study. In A. Nayyar, M. Naved, & R. Rameshwar (Eds.), *New horizons for industry 4.0 in modern business. Contributions to Environmental Sciences & Innovative Business Technology*. Springer. https://doi.org/10.1007/978-3-031-20443-2_2

Accelerating Gender Equality for Sustainable Development: A Case Study of Dakshina Kannada District, India

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1 Introduction

Mainstreaming the gender approach is vital for the implementation of the United Nations 2030 Agenda (Rosche, 2016). According to the Sustainable Development Goals (SDGs) of the UNO, the empowerment of women and girls and gender equality represent the fifth goal (SDG 5), and it details the modus operandi for the attainment of the goal (Anderson et al., 2022). The data on the assessment of selected SDGs confirms the significant achievement after the adoption of the 1995 Beijing Declaration and Platform for Action in pursuit of gender equality and women empowerment in a certain region (Eden & Wagstaff, 2021). The review of the literature reveals that women empowerment is an indispensable tool for the development of poverty alleviation, and the development of women shall have a positive cascading impact on the entire economy. The importance of equality between men and women is highlighted as one of the eight millennium goals of the United Nations. Gender equality has been acclaimed as central to achieving the remaining seven goals (Chaiyanukij, 2004). Yet gender discrimination—including gender-based violence, financial prejudice, reproductive health disparities, and harmful customs—continues to be the most widespread and intractable shape of

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discrimination. Since the inception of civilization, there has been mass evidence that women are being seen as inferior to men. Each country has a gloomy history of the unfair treatment of women, regardless of their degree of progress and civilization. This fact has prodded women to hindsight their position in society, and it even has driven women around the world to be rebellious to attain the status they possess today.

India, a country known for its diversified culture and tradition, traditionally honors women with the status of goddess. Women represent half of India's inhabitants but have not gained proportionally from the national economic well-being (Derbyshire, 2012). Even though the Constitution of India accords equal rights for women with men, and protects women's and girls' civil rights, in practical life, the policies have had very little effect. Crimes against women and girl children in India are found on an alarming rise. According to the Indian "National Crime Record Bureau" (NCRB), a total of 4,28,278 instances of "crimes against women" were filed nationwide in 2021, with a higher rate of criminality (per one lakh population) of 64.5% (National Crime Records Bureau, 2022). Similarly, as per the latest government report for 2022, India recorded 31,677 cases of rape, an average of 86 per day, while approximately 49 instances of criminality against women were registered each hour in the country (Fig. 1). Moreover, around 96% of rapes in India are committed by individuals familiar to victims (National Crime Record Bureau, 2021).

The unpaid care work* (*care work refers to childcare, care of elderly and ill at home, and performing household activities) carried out by women is despised worldwide and is not part of the national accounts or considered for gross domestic product (GDP). However, ironically, the unpaid women workforce supports a sustainable economy. Substantively, the huge unpaid and unrecognized contribution of women is estimated to be 75% of global unpaid care work. Similarly, in India too, women carry out 10–12 times the unpaid care work of men. Women are unable to relinquish this part of the work and hence have restricted themselves from joining paid employment. Those who have opted for paid employment, unfortunately, are currently saddled with "multiple burdens." However, it is proven that the employment of women outside the house is an important contributor to their well-being and independence. It is often neglected that in developing countries, women make up almost half of the agricultural workforce—60% in Asia and African continents (Magar & Storer, 2009). Nevertheless, women possess less than 20% of global farmland. Women and girls are also identified as victims of 60% of global chronic hunger. Therefore, it is a highly prioritized task for society to consider and treat women with respect and develop empowerment programs that leads to more independence and liberty for women.

1.1 Study Objectives

The project was undertaken with the aim to strengthen the protection and empowerment of women and girls in 12 panchayats through sensitization and capacity building of elected members, community groups, and institutions and by

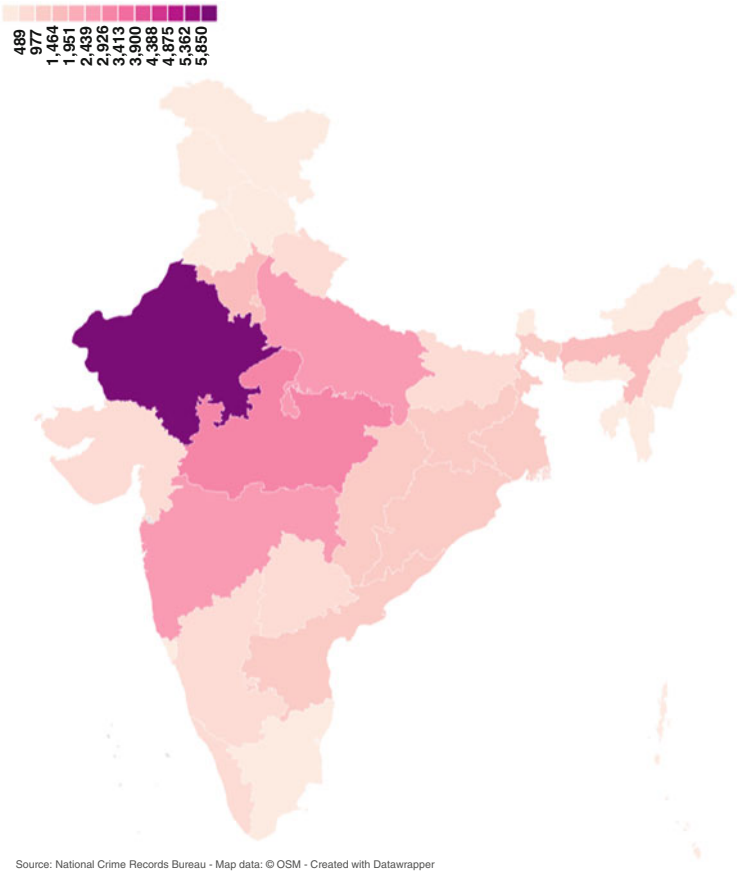


Fig. 1 Number of rape cases registered in India

establishing three-tier structures so as to ensure a protective environment even after the project period.

1.1.1 Specific Objective

Twelve panchayats in the target region have structures in place with improved capacity to protect girls and women against discrimination and violence. The project aimed at bringing about changes in the following indicators:

(a) No incidence of early pregnancy
(b) Reduction of malnourishment of girls and women from 55 to 10%
(c) Reduction of early marriages (before 21 years) among girls by 50%
(d) Increase in all target women's ownership of assets from 20 to 30%
(e) Increase in all target women's annual income from Rs. 7000/- to Rs. 15,000/-

2 Literature Review

The existing research notifies that, for example (Lippens et al., 2021; Albors-Garrigos et al., 2020), discrimination based on gender exists in many parts of the world and society. India has initiated and implemented a number of programs to prevent crime against women (Pande, 2018). Many emergency and response systems have been deployed by government agencies and forces to reach and rescue distressed women. All the states and union territories of India have initiated helplines, for example "181 Helpline," to rescue and protect women and girls from different types of violence and crimes. Similarly, "One Stop Centres" (OSCs) have been established to facilitate mental health and psychosocial care for needy women and to prevent cyberattack against women in social media and other online platforms. The Ministry of Home Affairs of the Government of India has initiated cybercrime prevention against women and children. The data shows that all these initiatives of the government have created many positive outcomes and support for many women from different parts of the country (Ruxton & van der Gaag, 2013).

India has also witnessed an array of programs and projects by the government to empower women and girls' well-being and economical and social standard (Milan et al., 2020). The Ministry of Women and Child Development has taken initiatives like Pradhan Mantri Matru Vandana Yojana (PMMVY) for pregnant women with the incentive of 65$ in three instalments, "Save the girl child, educate the girl child" program, and Scheme for Adolescent Girls to change the existing condition of women and girls, especially in rural India. Apart from the government, there are many nongovernment organizations (NGOs) also functioning across the country with different programs and projects to protect and bring equality and reduce gender discrimination in society. The current study is a case analysis of an NGO in the Indian state of Karnataka, located in the southern part of the country, which has implemented numerous empowerment programs to protect women and girls.

Despite all the challenges, it is noteworthy to mention that developing countries like India are on a mission to achieve SDGs, and they have started the implementation of programs at the grassroots level—villages. Since the majority of the Indian population resides in rural parts of the country, many remarkable activities have been taken up by NGOs and government agencies to make the life of women and girl children better. The further pages of this chapter provide description of one such case study, picked from the Dakshina Kannada district of Karnataka, India.

3 Operational Methods

3.1 Target Group

The project collected a sample of an NGO, which reached 17,200 people among 4282 marginalized families residing in 12 panchayats in Mangalore Taluk of

Dakshina Kannada district in Karnataka state. In India, there is a threefold system prevalent for the formulation and application of policies and procedures, viz. central level (national), state level, and grassroots level, the villages, which are referred to as panchayats. 1860 direct beneficiaries include 1500 members from community-based organizations (CBOs) (i.e., 750 women of 50 women SHGs, 150 men of 15 men groups; 600 youth/adolescents aged 14–18 years of 12 youth clubs from the general community) and 360 teenage boys and girls aged 12–14 years from educational institutions. 1412 intermediate multi-stakeholder beneficiaries include 210 members (PRIs) (12 are presidents from 12 panchayats and the rest 198 are ward members), 312 teachers of 32 government schools, 180 members of 32 SDMCs, 85 members of 3 civil society organizations (CSOs), 75 members of 4 nongovernment organizations (NGOs), and 550 members of 11 government departments, and there are 13,928 indirect beneficiaries.

3.2 Geographical Coverage

The area of study is in Dakshina Kannada district, which consists of 5 divisions and 354 villages and is populated by approximately 2,904,613.

3.3 Details of the Project Sponsors

Prajna Counselling Centre is a women and child-centered organization working especially on the issue of violence and discrimination against women, children, and other vulnerable sections in society. The organization has been collaborating with the Department of Women and Child Development, police, education, and health to pool the resources for providing legal support, counseling, shelter, rehabilitation, education, vocational skill enhancement, socio-economic empowerment, re-integration, and mainstreaming of women and children who are under difficult circumstances. Prajna has also been engaged in women and community development programs, which promote and strengthen women and grassroots-level groups to take up issues relating to development, basic amenities, and human rights violations at different levels. The chief functionary of Prajna is Prof. Hilda Rayappan, and it functions with 78 staff members of both genders. Since its establishment in 1987, it has successfully completed 39 projects aimed at women and child empowerment agenda. This Trust functions primarily in Dakshina Kannada district of Karnataka state, India, covering a population of roughly 2,904,613 as per the recent data. The current case study is funded and supported by a sponsored project by Karl Kübel Stiftung for Kind und Familie (KKS), Germany.

Karl Kübel Stiftung for Kind und Familie (KKS), Germany, is the private executing agency aiding Prajna Counselling Centre for this project. Since 2009, Prajna and KKS have been in partnership to implement development projects in

Dakshina Kannada district, Karnataka. The total team of Prajna is described in Annexure 1.

4 Results and Discussions

4.1 Demographic Description

A major chunk of its population is engaged in agriculture, which is basically a gamble since it all depends entirely on the monsoon. Rainfall is scanty and uncertain, and the water table is low. 10,795 (62%) families belong to the above poverty line, 6426 (37%) families live below poverty line, and 163 (1%) families live under Antyodaya (a scheme meant for providing government facilities for families living under severe poverty). In the targeted villages, 9 families live in thatched (grass) houses, 11,568 (66%) families stay in the tiled house, 5807 (33%) families live in RCC, and 1 family lives in a tent. 15,382 (88%) families live in their own house, 1062 (6%) families live in a rented house, 893 (5%) families live on government land, and 47 (1%) families live on private land.

4.2 Income

The monthly family income of the target groups ranges from Rs. 8000/- to Rs. 10,000/-. Women earn less than men. If men get Rs. 500/- per day, women get only Rs. 300/- for the same job.

4.3 Sanitization and Cleanliness

In 12 panchayats, 98 families out of 17,384 did not have a household toilet. Community toilets and open defecation are prevailing in four panchayats. There is no proper underground drainage facility in the majority of the villages. Eight panchayats do not have a system for proper solid waste management. The polluted and contaminated water has become a health hazard to the people causing an increase in waterborne diseases like diarrhea, malaria, dengue fever, and chikungunya.

4.4 Education Facilities

Twelve panchayats have moderate educational facilities with 21 lower primary schools, 12 higher primary schools, 12 high schools, and 3 pre-university colleges (11th and 12th), and 2 industrial training institutions. It is found that there are 12 school dropout children in the age group of 12–15 years in the targeted panchayat.

Due to the intervention of several schemes from the government like milk, medicine, midday meal, and also compulsory pass system till 9th std (age 14–15 years), there are fewer school dropouts in the project area. However, after reaching the age of 15 years, only 50% of girls continue their education versus 75% of boys, and after completing senior secondary education, only 25% of girls continue their university education compared to 50% of boys. This is because the colleges are far from their houses and the families are concerned about the girl's protection. At the same time, when both sons and daughters are to be sent far for higher education, families prefer to send only boys for higher education due to their poor financial situation.

4.5 Health

The families residing in 12 panchayats have very little access to medical treatment when they are ill. They receive poor health care. Of the 12 panchayats, 5 have primary health centers (PHCs) and seven subcenters, and two have community health center (CHC) and one government hospital. The healthcare services are inadequate. There is a lack of drugs and equipment in primary health centers. People suffer from common diseases like viral fever, vitamin A deficiency, diarrhea, malaria, dengue fever, TB, reproductive tract infection, and pregnancy-related diseases. The situation analysis of 12 panchayats in Mangalore taluk gives a bleak picture. Healthcare facilities are available only in 45% of area, while adequate facilities are available in 30% of health centers. 65% of the centers have no proper health equipment or staff.

4.6 Gender-Specific Discrimination

Female infant mortality is very high in most states of India. Despite governmental interference to stop the infant mortality and various laws that prohibit identification of the sex of the child before birth, there has been an increase in female infanticide leading to a steady decline in the number of girl children in India. The discrimination extends to the surviving girl children in the form of poor feeding, lack of immunization, unavailability of healthy and nutritious food, and unhygienic conditions. It is

estimated that 42.5% of children suffer due to malnutrition (Un report 2013). There is also great irony in this because NFHS-3 established that when mothers were undernourished, 54% of their children were stunted and 25% wasted. By starving millions of girls so that their brothers can eat marginally better, and by taking them out of school, we have condemned each new generation—boys and girls—to a fresh cycle of malnutrition.

Women do not receive adequate health care in their families when compared to men. The poor condition of women can be seen in availing nutritious food, and the prevalence of anemia and malnutrition among women, which is 41% for Karnataka. According to the information collected from the primary health center and Anganwadi supervisors, 55% of women in the target area are malnourished. Girls are discriminated against in other ways as well—less nurturing and play, less medical treatment if they fall sick, and less nutritional food. As a result, girls are far more susceptible than boys to disease and infections, leading to poor health. It is this lifelong discrimination in nurturing and care that is the real killer of girls, less visible and less dramatic, but as clearly lethal as female feticide and infanticide.

In the target area, women and girl children are usually ill-treated. For example, in a family, fresh nutritious foods are given more preferably to the male members, i.e., husband or son. But the women and girl children opt to consume the leftover food of the previous day. In terms of quantity, boys or male members consume more food than girls. Due to the lack of cleanliness in schools, children especially girls hesitate to use the toilet in schools and so girls consume less quantity of water, which in turn leads to urinary infection and its related ailments.

4.7 Women's Participation in Local Governance

All 12 panchayats have 98 women members (49%) out of 201 members. Only 3–10% of community women have participated in Gram Sabha, i.e., village meetings. A significant reason for the limited participation by women is closely related to gender inequality/discrimination. Cultural inhibitions and taboos have restricted their association with local governance. Many of the elected women representatives entering the public arena for the first time lack confidence, information, and knowledge about roles and responsibilities. Only 7 out of 98 women independently (without being supported by the male members of the family) influence local decision-making. Most women who got political representation do not have real power. Cast and gender discrimination is still prevalent, and the real power remains with the men of the village. Capacity enhancement training on legal protection to curb any form of discrimination as well as changing the patriarchal mindset through gender-sensitive education is needed to make the Panchayati Raj model successful.

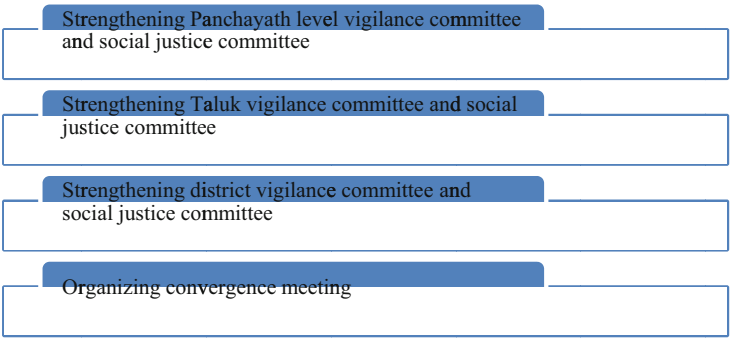
The position of women in society has not undergone any radical transformation despite constitutional provisions, enactment of laws, and implementation of development. The project was designed to create an enabling environment in which women can participate as equals in the social, economic, political, and cultural life

of the target community and discharge their responsibilities towards the family, society, and the nation. The project aims to involve men to ensure equal treatment for women from within the families throughout the community and the entire society. The project aims to raise public awareness and responsiveness to women's and girls' human rights violations through well-planned strategic interventions, engaging all relevant stakeholders in understanding their roles in preventing such behavior. Nowadays, with the interventions of both government and nongovernment actors, women in the targeted 12 panchayats have comparatively improved in terms of education, health status, and economic status also. But nothing can be enjoyed by women since they are not empowered and assertive to enjoy progress and development. Hence, empowerment becomes the priority along with economic intervention. Empowerment without economic independence and economic independence without empowerment will never be able to ensure their protection. Both empowerment and economic intervention should go hand in hand to ensure protection.

5 Activities of the Organization to Attain Sustainable Development Goal 5

The project was implemented in the community, involving both men and women using action-oriented strategies with structural and systematic interventions to establish, strengthen, and sustain the protection mechanisms in the family, community, school, and local governance to protect and promote the human rights of women and girls. The interventions done to increase gender sensitivity in 12 target panchayats are listed below.

Activities: Establishing sustainable structures with strategies, systems, and procedures



5.1 Sensitization of Target Communities/Panchayats and Capacity Building on Dealing with Gender-Based Discrimination and Violence

5.1.1 Training the Trainers (TOT)

The major work undertaken here was the training of the trainers for selected key actors (women, men, adolescents, youth, teachers, Anganwadi* (a childcare center in rural India is referred to as Anganwadi) workers, PRI, etc.). The program included:

(a) Orientation/sensitization programs on women empowerment in each panchayat
(b) 4 days Training of Trainers programme on women empowerment in each Panchayath
(c) 3 days of training of trainers program on women empowerment for selected 28 key actors
(d) Interaction meeting of key actors with women police officers on issues of trafficking, kidnapping, cheating, and abuse of girl children
(e) Review meetings of key actors once in 6 months

5.1.2 Awareness Campaigns (Street Theatre, Awareness Cinema, IEC Materials, Radio Programs, etc.)

(a) Sensitization/awareness program on gender discrimination, rights of girls and women, and violence against women among different target groups—CBOs, CSOs, PRIs, SDMCs, unions, associations, etc.
(b) Organizing awareness cinema to the target group of women and girls on women and girl child rights violation
(c) Street play training on:

1. The rights of women and girls
2. Violation of women and child rights
3. Types of abuse and exploitation of women and children
4. Legal provisions for the protection of women and girl children
5. Plans and strategies to sustain gender sensitivity at the village level

(d) Radio program on the protection of children and the rights of women

5.2 Establishment of Structures and Mechanisms at Panchayat, Taluk, and District Levels for the Protection of Girls and Women Against Discrimination and Violence

5.2.1 Training of Political Leaders, Panchayat Members, and Community Leaders on Mandatory Protection Structures

(a) Capacity-building training on vigilance committee and social justice committee for political leaders, panchayat members, and community leaders
(b) Restructuring of panchayat-, taluk-, and district-level vigilance committee
(c) Social justice committee and review of systems and procedures for the protection of girls and women against discrimination and violence

5.2.2 Establishing/Setting Up of Panchayat-Level Vigilance Committee and Social Justice Committee

(a) Reviewing the systems, policies, procedures, functions, and operations of panchayat-level vigilance committee and social justice committee
(b) Establishing/setting up of taluk-level vigilance committee and social justice committee

5.2.3 Reviewing the Systems, Policies, Procedures, Functions, and Operations of Taluk-Level Vigilance Committee and Social Justice Committee

(a) Establishing and setting up of district-level vigilance committee and social justice committee
(b) Reviewing the systems, policies, procedures, functions, and operations of district-level vigilance committee and social justice committee

5.3 Establishment of a Resource Center with a Helpline for Affected People in the Project Area (in Moodabidri) and Linkage with Protection, Schemes, and Centers (Helpline, Counseling Centre, Legal Advice, Shelter Homes, etc.) in Mangalore

5.3.1 Establishment of a Resource Center

(a) Developing the policies, systems, and procedures which include target groups from the target areas for the sustainability of the resource center

5.3.2 Organizing Refresher Training on Receiving Complaints and Processing the Grievance Redressal

(a) Coordination and convergence meetings with responsible institutions and state programs
(b) Coordination and convergence meetings between panchayat-level vigilance committee, district-level vigilance committee, and different government departments

6 Post-implementation of Program

6.1 No Incidence of Early Pregnancy (Current Status Is Approximately 8–10%)

There are more teenage girls who conceive and give birth to babies. Hence, the project intervention will focus on bringing it to zero. The teenage girls will be informed through health education sessions on reproductive health. Their families too will receive information through SHG initiatives. Support and guidance to submit the applications for girls' marriage benefits from government will be provided only if the girl is above 18 years and by motivating them to plan childbirth only after completing 21 years of age. Thus, no pregnancy before the age of 21 will be there in the target panchayats among the target families.

6.2 Reduction of Early Marriages (Before 21 Years) Among Girls by 50% (i.e., 30–15%)

The parents consider their girl child as a burden till they get married. Since culturally virginity is related only to women and girls, parents want their girl child to be protected and not to keep them for long years with them. Thus, they decide to get their daughters married as early as possible, i.e., even before they are 21 years old. Through this project, awareness will be given, and efforts will be put to break their perspective. They will be brainstormed on how men and boys are also important to maintain and protect the honor of the family:

(a) Reduction of early marriage among girls before 18 years to zero
(b) Reduction of early marriage before 21 years to 50%

6.3 Increase in All Target Women's Ownership of Assets from 20 to 30%

Now almost all the movable and immovable assets are in the name of the men leader of the family. Especially almost all family ration cards are in the name of men. All vehicles are registered in the name of the man leader of the family. All cooking gas cylinder connections are in their name only. Nothing is in the name of the woman leader of the family. Registering a few of these in the name of women will boost their identity and self-worth feeling. Hence, though it is very hard, the project will intensively focus on encouraging the families to register their assets in the name of women, and if possible, a few movable and immovable assets too will be registered in the name of women leaders of the 30% families.

6.4 Increase All Target Women's Annual Income from Rs. 7000/- to Rs. 15,000/-

The unpaid care work performed by women is looked down upon in the target panchayats and is neither part of the family income nor personal income. But ironically, this sustains the economy of the family. Substantively, women's unpaid care job is enormous. It has been estimated that women carry out more than 75% of their family's work without pay. Women of the target families perform roughly around 15 times the unpaid caring job of a man. This situation is where women are unable to relinquish unpaid caring work that their ability to access paid employment is extremely limited, which leads to a downward spiral. Even if they get paid for work, they are paid precisely less than men for the same work. Also, it does not have to release them since often they would be now burdened with both paid and unpaid jobs, which leads to a so-called double burden. However, it is recognized that employment for women outside the home is crucial to their well-being. Thus, the project has focused on increasing women's independent and individual income by training them again on nonconventional vocations/occupations.

Nonconventional income-generating activities (IGAs) that women can opt for include driving, mechanical work, electronic work, mobile repair, climbing coconut trees, installing and selling of emergency lights, etc. These works were only done by men. After the intervention of the project, the team will motivate women to opt for such nonconventional IGAs.

The chapter is a case study of how a developing country like India is striving to attain SDG 5. Since the project is an ongoing work, the impact of the study is yet to be covered and is a part of further research work, which shall be pursued upon completion of the project.

7 Conclusion

The Global Gender Gap Index has been an eye-opener for the entire world. It has led to the analysis of the gap between the benchmarked difference between the current state and desired state of the parameter, namely health and safety, education, attainment of political empowerment, and economic participation with gender equality. Though the whole of South Asia ranks very poorly, the silver lining is that there has been a slow yet steady increase in India's ranking from 140 to 135 among 146 countries. It has been quoted on numerous websites that it will take 130 odd years for the achievement of gender equality goals in the Asian country. Despite this claim, we cannot ignore every crucial step that has been taken up by government agencies and NGOs in India, especially at this nascent stage towards the attainment of gender equality, which is the heart of the values established by the UN and the edifice of human rights. The COVID-19 pandemic led to the recurrence of the denial of women's rights across the globe, and there has been a sizable increase in the reported violence against women. Though there has been staggering progress made in the direction towards the attainment of equality, it has been a challenge to alter the behavior and social discriminations owing to the deep-rooted fabrics of the society regarding their perception of both women and their rights. This research is an example of how developing countries like India are inching towards the attainment of the UN objective of SDG 5, at the grassroots level itself. Hopefully, in the coming years, the entire country will soon be a role model to the world in the way they have combated these discrimination issues and have given a substantial contribution towards the attainment by the year 2030.

8 Practical Implication

The study suggests establishing effective pathways for policymakers by readdressing gender discrimination at all levels of society. Interconnecting the environment, political, economic, and social process with required action and accountability by the government functionaries, communities, society, and individuals is highly essential. The interaction of institution, power, and knowledge can create sustainable pathways to close the gender gap and achieve greater gender equality.

Annexure 1 Professional qualification of the staff team

Professional qualification	Number of staff
Medical professional—MBBS	1
Psychiatrist—MD	1
Project coordinators/managers/superintendent	10
Counsellors—MSW/BSW	10
Cluster coordinators/social workers/animators—graduates	25

(continued)

Professional qualification	Number of staff
Nurse—general and nursing aid	3
Paraprofessionals—SSLC/PUC	5
Teachers (part time)—D.Ed.	8
Technical staff—7th–10th std	3
Administrative staff—M.com/B.com/BA/PUC	16
Total	82

Source: Prajna Counselling Centre

References

Albors-Garrigos, J., Haddaji, M., & Garcia-Segovia, P. (2020). Gender discrimination in haute cuisine: A systematic literature and media analysis. *International Journal of Hospitality Management, 89*, 102569. https://doi.org/10.1016/j.ijhm.2020.102569

Anderson, C. C., Denich, M., Warchold, A., Kropp, J. P., & Pradhan, P. (2022). A systems model of SDG target influence on the 2030 agenda for sustainable development. *Sustainability Science, 17*(4), 1459–1472. https://doi.org/10.1007/s11625-021-01040-8

Chaiyanukij, C. (2004). Violence against women migrant workers in Thailand. *Journal of the Medical Association of Thailand, 87*(Suppl 3), S223–S226. [Online]. Retrieved from https://www.scopus.com/inward/record.uri?eid=2-s2.0-79952662623&partnerID=40&md5=c58e02ac16ced75691a6e30f1ac4243f.

Derbyshire, H. (2012). Gender mainstreaming: Recognising and building on progress. Views from the UK gender and development network. *Gender and Development, 20*(3), 405–422. https://doi.org/10.1080/13552074.2012.731750

Eden, L., & Wagstaff, M. F. (2021). Evidence-based policymaking and the wicked problem of SDG 5 gender equality. *Journal of International Business Policy, 4*(1), 28–57. https://doi.org/10.1057/s42214-020-00054-w

Lippens, L., Baert, S., & Derous, E. (2021). Loss aversion in taste-based employee discrimination: Evidence from a choice experiment. *Economics Letters, 208*, 110081. https://doi.org/10.1016/j.econlet.2021.110081

Magar, V., & Storer, G. (2009). Sexing development and relocating gender: An organisational case study. *Global Public Health, 4*(5), 433–447. https://doi.org/10.1080/17441690903031374

Milan, R., Hasan, N., & Nisa, Z. (2020). Analysis of profile of non-government microfinance organisations: Study at Uttar Pradesh. *International Journal of Scientific and Technology Research, 9*(3), 3918–3924. [Online]. Retrieved from https://www.scopus.com/inward/record.uri?eid=2-s2.0-85082589215&partnerID=40&md5=a94d378db1423ae34b23bc92fa656425

National Crime Record Bureau. (2021). *Cases reported & rate of crime committed against women during 2021 (state/UT-wise)*.

National Crime Records Bureau. (2022). *Crime in India 2021 statistics*, vol I. National Crime Records Bureau.

Pande, R. (2018). The history of feminism and doing gender in India. *Revista Estudos Feministas, 26*(3). https://doi.org/10.1590/1806-9584-2018v26n358567.

Rosche, D. (2016). Agenda 2030 and the sustainable development goals: Gender equality at last? An Oxfam perspective. *Gender and Development, 24*(1), 111–126. https://doi.org/10.1080/13552074.2016.1142196

Ruxton, S., & van der Gaag, N. (2013). Men's involvement in gender equality—European perspectives. *Gender and Development, 21*(1), 161–175. https://doi.org/10.1080/13552074.2013.767522

Distributive Leadership as a Sustainable Leadership Approach: The Role of TVET Institution Leaders

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1 Introduction

There are numerous meanings for leadership, giving it a very subjective and wide-ranging meaning. The initial phase of the study on leadership topics by Nordin and Ghani (2022) indicates that the majority of researchers had a stronger association between leadership and official positions in a more "hierarchical" structure, where the more authority a leader has, the higher their position. However, as time has passed, leadership researchers from a variety of fields have developed a deeper grasp of the concept of leadership. According to the Yukl research from 2008, leadership is a process through which a person persuades other group members to work toward a common objective both within the group and across the company. This view is supported by Northouse (2016), who defines leadership as a process through which an individual inspires a group of people to attain the same goal.

Leaders are responsible for leading the organization toward achieving its goals. It is the duty of leaders to guide their organizations toward accomplishing their objectives. This example demonstrates how leaders serve as a foundation and a catalyst for putting efforts into action inside the business. In this sense, leadership is crucial in deciding how well an organization performs (Bolden, 2014). The leadership landscape has changed and is now exceedingly difficult. Given its significance,

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leadership is a field that is continually evolving and requires maintenance to remain relevant (Kadir et al., 2018). According to the study from Klink (2019), overall findings discovered that relationships of trust between teachers and principals and a highly effective leadership team where members felt free to express their ideas were the root causes of sustainability. As a result of learning how to use distributed leadership to promote buy-in, boost output, and retain teachers, respondents reported that taking part in the Annenberg Distributed Leadership Project had a long-lasting effect on their leadership.

Malaysian Education Development Plan (MEDP) (2013–2025) aims to improve the quality of leadership in educational institutions (Kuppan & Razak, 2021), and one of the main focuses of MEDP is to produce skilled and competent leaders in the field of leadership in educational institutions (Abdullah, 2020). The world of education is constantly changing in terms of policy; new knowledge; social, political, economic, and technological trends; and especially organizational leadership (Abdullah et al., 2021). Therefore, TVET institutions need a productive, professional, and capable leader to produce high-skilled and skilled students to compete globally (Nashir et al., 2015). In Education 2030 Launch and Symposium: Connecting the Dots Between National Priorities and Global Targets (2016), the Chief of EISD, UNESCO Bangkok, has presented Aligning National Education Planning with Education 2030: Perspectives from UNESCO Bangkok. He emphasized that the SDG 4: Target 3, by 2030, will substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, with one of the key elements being TVET quality assurance. To improve quality assurance in organizations, leaders play the main role in creating positive organizational culture. Establishing a positive quality culture and replacing opposition with a spirit of cooperation and trust are the duties of the leader. This requires an ongoing commitment at all learning levels. Findings from Ahmad and Ahmed (2022) revealed that quality assurance and training mindsets influence a compliance leader. The goal of the leaders' implementation of quality assurance procedures is to raise the caliber of teaching, learning, and research.

Leaders must change their perspective on the nature of leadership practice in order to engage in significant and long-lasting school improvement, which can also cut down on time spent putting out fires and refocusing administrative tasks. The distributed leadership concept can be especially helpful in this situation (Suporvits et al., 2019). The dispersed view broadens our understanding of leadership to include the multiple roles that people play in the variety of social contexts that make up the community rather than just those who are formally designated. All Malaysian educational institutions are urged to change their organization's leadership in order to shift away from traditional leadership and toward distributive leadership (Asi & Yusoff, 2018). This is due to the fact that distributive leaders can create an ordered and systematic educational system at the level of educational institutions (Cansoy, 2019). According to Rabindarang et al. (2014) definition, leaders are powerful people who can guide their organization toward accomplishing specific objectives. Leaders like institutional directors, department heads, and unit heads are the

fundamental people in planning and managing all responsibilities linked to the institution in the context of TVET institutions.

1.1 Problem Statement

In leading the educational challenges of the twenty-first century, the TVET sector has always faced a variety of transformations. TVET's system and education policy changes in Malaysia have indirectly changed the approach needed in leadership at TVET institutions. According to Mayan and Mansor (2021), leaders and all citizens of TVET institutions need to be prepared for the challenge of VUCA, volatility (stability), uncertainty (uncertainty), complexity (criticism), and ambiguity. Therefore, today's leadership requires the synergy of cooperation from all parties in an organization (Jamail et al., 2019) because leaders are unable to move alone in the face of challenges to meet current demands (Abdullah, 2020).

According to Tian et al. (2016), the lack of empirical evidence on the practice and impact of distributive leadership is a research gap in the education system. Jamalulail et al. (2013) conclude that the concept of distributive leadership in Malaysia is still in its infancy as school administrators still consider this leadership to be new and foreign to them. They have suggested that a study should be conducted to know the extent to which distributive leadership approaches can be optimally developed in educational institutions. This is supported by Bush and Ng (2019) who say that the practice of distributive leadership in educational institutions in Malaysia is only modest. Therefore, further studies need to be conducted so that TVET educational institutions in Malaysia may transition from traditional leadership to distributive leadership.

2 Research Methodology

A survey study was conducted using an online questionnaire, since it is more flexible and can be conducted quickly, reducing the amount of time needed to bring a survey into the field and gather data. According to Wright (2005), an online survey is very fast and efficient, saves cost, and is convenient for responders to respond to the questions whenever, wherever, and at their own pace.

2.1 Population and Sampling

The population of this study involve the lecturers for the whole of Malaysia from public TVET institutions such as vocational and polytechnic colleges and also centers of technical and vocational training. Simple random sampling was used

because every individual in the population has the same probability of being selected as a respondent. The online survey was disseminated via several social media channels, including the WhatsApp group for the staff and the researchers' personal contacts. As a result, 531 respondents from the targeted population give a feedback voluntary for this study.

2.2 Instrument

In this study, online questionnaire was used to gather the required data. The questionnaire can provide a broad picture and make comparison easier. In this research, the questionnaire was adapted from Abdullah (2020); the items were modified based on the respondents' background. The two sections of the online survey were constructed as follows: Part A contains a total of four types of demographic information, including gender, age, level of education, and working experiences. Part B lists out four main construct items, including bounded empowerment, developing leadership, shared decision, and collective engagement. The reliability index of the items was calculated using the Cronbach alpha (α) test among 30 respondents in the pilot study. The acceptable value for research purposes is 0.60 and above. According to Table 1, the dependability coefficient results for each construct are above the acceptable level.

2.3 Data Analysis

In order to analyze the data for this study, descriptive statistics were used, including the mode, frequencies, percentage, and mean of each variable score. Meanwhile, the relationships between the variables were examined using inferential statistics. The correlation between the variables was examined using Pearson correlation.

Table 1 Reliability of items

No.	Construct	Number of items	Alpha value
1	Bounded empowerment	5	0.824
2	Developing leadership	5	0.902
3	Shared decision	6	0.820
4	Collective engagement	5	0.800
	All	21	0.781

3 Findings and Discussion

The results of this study revealed that there is an uneven distribution of participants by gender (Fig. 1); there are 26.2% more female participants than male participants.

From Fig. 1, there are 335 female respondents (63.1%) and the rest (196 = 36.9%) are male. The gender distribution accurately reflects the preference of Malaysian academic staff in TVET institutions to give their time to respond to research surveys.

Table 2 shows the age, level of education, and working experiences among respondents. Respondents with the age of 21–30 years were 13.8%, 31–40 years were 43.9%, 41–50 years were 36.3%, and 51–60 years were 6.0%. The academic qualifications of respondents were diploma (18.5%), degree (51.4%), master (27.9%), and PhD (2.2%). This table also illustrates the respondents' distribution and percentage according to the working experiences. A majority (45.4%) have 11–20 years' experiences in teaching, while there were only 1.3% of respondents with more than 30 years of working experiences.

Table 3 highlights the mean value and interpretation of the findings. Results indicate that the leaders in TVET institutions have a high level of intention to practice distributive leadership to subordinates, as evidenced by a mean score of 3.89 (standard deviation (SD) = 0.781). Leaders' decision based on the construct was rated with the highest mean score of 4.12 (SD = 0.850), and bounded empowerment from leaders was rated with the lowest mean score of 3.68 (SD = 0.824).

Table 4 demonstrates the results of test of relationship between four constructs in distributive leadership. All of the constructs related to each other, where the strongest correlation was between bounded empowerment and developing leadership with $r = 0.51$ ($p < 0.05$), which is equal to 51% connection. Meanwhile, the weak positive relationship was between bounded empowerment and collective engagement with $r = 0.23$ ($p < 0.05$). These results indicate that the construct of distributive leadership influences each other.

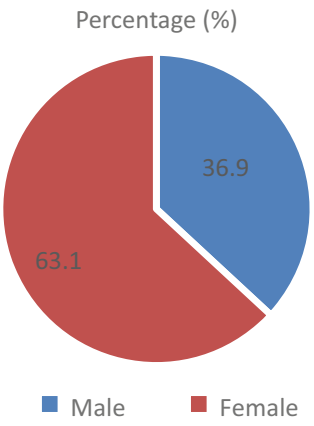

Fig. 1 Gender of respondents

Table 2 Age, academic qualifications, and working experiences ($N = 531$)

Item	*N*	%
Age		
21–30	73	13.8
31–40	233	43.9
41–50	193	36.3
51–60	32	6
Academic qualification		
Diploma	98	18.5
Degree	273	51.4
Master	148	27.9
PhD	12	2.2
Working experiences		
<10 years	204	38.5
11–20 years	240	45.2
21–30 years	80	15
>30 years	7	1.3
	531	100

Table 3 Mean value and interpretation

No.	Construct	Mean score	SD	Interpretation
1	Bounded empowerment	3.68	0.824	Medium-high
2	Developing leadership	4.04	0.902	High
3	Shared decision	4.12	0.850	High
4	Collective engagement	3.73	0.800	Medium-high
	All	3.89	0.781	High

Table 4 Correlation between constructs

Constructs	M	1	2	3	4
1. Bounded empowerment	3.68	–	0.51[a]	0.34[a]	0.23[a]
2. Developing leadership	4.04	0.51[a]	–	0.48[a]	0.27[a]
3. Shared decision	4.12	0.34[a]	0.48[a]	–	0.32[a]
4. Collective engagement	3.73	0.23[a]	0.27[a]	0.32[a]	–

[a] Significant at $p < 0.05$

Studies from Siva and Rabindarang (2014) also agree that a limited power decline has only one major negative effect to the professional learning community, namely learning and applications. Findings from Mokhlis study (2019) look at decision-making from the perspective of planning a decision. This study found that head teachers in both schools gave full trust in teachers to make decisions. Teacher commitment to perform their tasks can be further enhanced through decision-making collaborative.

Due to the chance it provides for team members to contribute their ideas and opinions, broaden perspectives, and facilitate better judgements, shared decision-

making can aid in enhancing leadership effectiveness. Additionally, it can boost team members' commitment and participation, as well as their sense of accountability for the choices they make. Ancona and Backman (2017) support this view that the application of distributive leadership can address a variety of issues. Distributive leadership is a leadership in the sharing of power, responsibility, trust, and opportunity for all to be together in the leadership team. It aims to enhance excellence, performance, and quality in education management. Therefore, the implementation of distributive leadership should consider all aspects of the organization in order to fit and achieve its targeted goals.

Good leaders are leaders who often share ideas with employees to adapt to their work environment by improving their communication, critical thinking skills, decision-making, and problem-solving (El Mansour & Dean, 2016). Education management focuses on partnership-based leadership conceptualized as distributive leadership (Hulpia et al., 2012). Perceptions of leadership practice through collective engagement are evaluated in several aspects; for example, firstly, institutional leaders use their staffing talent by engaging them in joint institutional decision-making. Secondly, institution leader provides a platform for teachers to work in groups to improve institutional operations. Thirdly, institution leader promotes staff involvement in all important decisions at the institution. Fourthly, institution leader always gives staff the opportunity to complete the task at their convenience. And fifthly, institutional leader tends to form a committee for an institution-based program.

4 Conclusion

This study's crucial finding was that among the four elements in distributive leadership, two of them are in high-moderate level of interpretation, which implies that our TVET institution leaders need to improve more in both aspects: bounded empowerment and collective engagement. Institutions that express the aim to distribute leadership, like lecturer-powered schools, may be the best places to see this process in action. All institutions need strong leadership and management to make sure that resources are used effectively and efficiently to accomplish certain objectives. The leadership acquired by the TVET institutions as a whole includes competency development for all staff members, sharing of experiences, opportunities for members who have the potential to become leaders in the future, and leadership development for its members. When it comes to decision-making in organizations, it has the quality that the choices made are ones that safeguard all members without lessening their accountability for the institution's objectives. The judgements made also involve parties who are not affiliated with the institution, which may benefit both parties. Recommendation from this study for the TVET institutions is that the content of a leadership course needs to focus on their job area, which makes it easy for them to apply what they have learnt after they come back from the course.

Besides, to encourage distributed leadership among aspiring leaders, the organization should offer all the training and development programs for the leaders.

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References

Abdullah, S. S. Z. S. (2020). The influence of distributed leadership on professional learning community among secondary school leaders in the state of Johore/ influence of distributive leadership on professional learning communities in Johor secondary school leaders. *Sains Humanika*, *12*(2–2).

Abdullah, J. B., Nor, Z. H. M., Abd Hamid, A. H., Harun, N. H., Koswara, E. M. D., Stapa, M. A., et al. (2021). Development of TVET leadership model among leaders in TVET institutions. *Leadership, 3*(11), 77–92.

Ahmad, S., & Ahmed, A. (2022). The role of leadership in effective implementation of quality assurance mechanisms in higher education: An exploratory case study from Pakistan. *Quality Assurance in Education*. Epub ahead-of-print. https://doi.org/10.1108/QAE-02-2022-0037.

Ancona, D., & Backman, E. (2017). *Distributed leadership from pyramids to networks: The changing leadership landscape*. MIT Leadership Center.

Asi, A., & Yusoff, M. N. M. (2018). The practice of distributive leadership of the headmaster and its relationship to the commitment of the teacher organization. In *Seminar Pendidikan Transdisiplin* (pp. 247–56).

Bolden, R. (2014). Distributed leadership in organizations: A review of theory and research international. *Journal of Management Reviews, 13*(3), 251–269.

Bush, T., & Ng, A. Y. M. (2019). Distributed leadership and the Malaysia education blueprint: From prescription to partial school-based enactment in a highly centralised context. *Journal of Educational Administration, 57*(3), 279–295.

Cansoy, R. (2019). The relationship between school principals' leadership behaviours and teachers' job satisfaction: A systematic review. *International Education Studies, 12*(1), 37–52.

El Mansour, B., & Dean, J. C. (2016). Employability skills as perceived by employers and university faculty in the fields of human resource development (HRD) for entry level graduate jobs. *Journal of Human Resource and Sustainability Studies, 4*(1), 39.

Hulpia, H., Devos, G., Rosseel, Y., & Vlerick, P. (2012). Dimensions of distributed leadership and the impact on teachers' organizational commitment: A study in secondary education. *Journal of Applied Social Psychology, 42*(7), 1745–1784.

Jamail, M., Don, Y., & Zain, F. M. (2019). Distributed leadership and conflict management style of generation Y teachers: Malaysian context. *International Journal of Academic Research in Business and Social Sciences, 9*(7), 1298–1320.

Jamalulail, A. W., Aida Hanim, A. H., Suriati, Z., & Md Fuad, M. R. (2013). The relationship between headteacher's distributed leadership practices and teachers' motivation in national primary schools. *Asian Social Science Journal, 9*, 16.

Kadir, M. B. A., Azman, N., & Ibrahim, M. S. (2018). Influence of leadership integrity on the implementation of comprehensive quality management at the Mara higher education institution. *Akademika, 78*, 67–75.

Klink, M. (2019). *The sustainability of distributed leadership*. University of Pittsburgh. EdD Dissertation.

Kuppan, R., & Razak, A. Z. A. (2021). Distributive leadership of head teachers and teacher commitment at national schools in Gombak district. *Jurnal Kepimpinan Pendidikan, 8*(4), 20–35.

Mayan, M. P., & Mansor, M. (2021). Distributive leadership practices and teachers' self-efficacy in National School, Selangor. *Management Research Journal, 10*, 12–23.

Mokhlis, S. (2019). Kepimpinan Guru Besar dalam Pelaksanaan Pendidikan Abad Ke-21: Satu Kajian Preliminari: Headmasters' leadership in the implementation of 21st century education: A preliminary study. *Attarbawiy: Malaysian Online Journal of Education*, *3*(2), 11–21.

Nashir, I. M., Mustapha, R., & Yusoff, A. (2015). Developing leadership instruments in the technical and vocational education system: The use of customized Delphi techniques. *Journal of Quality Measurement and Analysis, 11*(1), 41–47.

Nordin, N., & Ghani, M. F. A. (2022). Vocational college leadership issues strategy in Malaysia: Perceptions of leaders. *JuPiDi: Jurnal Kepimpinan Pendidikan, 9*(4), 1–18.

Northouse, P. G. (2016). *Leadership: Theory and practice* (7th ed.). Sage.

Rabindarang, S., Khuan, W. B., & Khoo, Y. Y. (2014). Reflections of faculty on distributive leadership and work pressure in technical and vocational education. *Akademika, 84*, 17–27.

Siva, A., & Rabindarang, L. (2014). Kepimpinan distributif, komitmen organisasi dan tekanan kerja di kolej vokasional Malaysia. (Doctoral dissertation, Tesis Doktor Falsafah: Universiti Pendidikan Sultan Idris).

Suporvits, J. A., D'Auria, J., & Spillane, J. P. (2019). Meaningful & sustainable school improvement with distributed leadership. CPRE Research Report.

Tian, M., Risku, M., & Collin, K. (2016). A meta-analysis of distributed leadership from 2002 to 2013: Theory development, empirical evidence and future research focus. *Educational Management Administration & Leadership, 44*(1), 146–164.

Yulk, G. (2008). How leaders influence organizational effectiveness. *The Leadership Quarterly, 19*(6), 708–722.

A Bibliometric Analysis of Sustainable Leadership as a Partnership to Achieve the Goal (SDG17)

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1 Introduction

Sustainability is a real challenge for both the society and businesses under intense climate change (Amui et al., 2017; Iqbal et al., 2018; Roscoe et al., 2019). Different problems that have introduced the need of sustainability such as violence, cultural differences, lack of resources, inefficient workforce, technological loopholes, and unstable political policies are the major causes that have paved for the growing organizations to heed the need of their surroundings and environments, taking care of their near and far requirements of the globe (Boiral et al., 2014; Mebratu, 1998). The United Nations has introduced "Sustainable Development Goals" (SDGs) taking into account of the diversity of every organization requiring adoption of these policies to be sustainable in nature (Sachs, 2012). These are goals that drive society and organizations towards a common end that rejuvenates the surrounding into a new place through "SDGs," which accumulate the long-term mind-set of powerful authorities who are capable of taking actions to drive positive change in the society they dwell in (Paraschiv et al., 2012; Sotarauta et al., 2012; Visser & Courtice, 2011). Implementation of these goals has transformed the short-term goals into long-term sustainable approach and brought in leadership goals among leaders (Avery & Bergsteiner, 2011a, 2011b; Day & Schmidt, 2007; Morsing & Oswald, 2009), also referred to as "sustainability leadership" (Ferdig, 2007;

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Galpin & Whittington, 2012; Lourenço et al., 2014; Robinson et al., 2011; Shriberg & MacDonald, 2013). Qualities such as developing the foundational level basics into strong capable resources, gradual and sustainable developments, and transforming short-term vision into long-term goals by striving to reach a certain parameter step-by-step are the main approaches that "Sustainable Development Goals" focus mainly upon (Hallinger & Suriyankietkaew, 2018). Organization must take care of the needs of employees by treating them in a respectable manner, heeding to their requests and paying attention to their expectations from organizations; this helps organizations build sustainable bond with employees and society. Society provides different raw materials and resources to the organization; in reverse, it is the grave responsibility of the organization to give back to the society in the form of "corporate social responsibility" (Suriyankietkaew & Avery, 2016). This is the reason literature has pulled the topic of responsibility, societal upbringing and sustainability in leadership, to explore more about the potential goals and focus that sustainability would drive in future for the society (Burawat, 2019). It is brought into light that in spite of gradual attempts by various research scholars, writers, and authors, efforts are needed to dive in depth of already existing research practices and theoretical approaches in the field of sustainable leadership in driving an organization into potential long-term sustainable future (Visser & Courtice, 2011). Those other researchers have been very keen in studying the pattern, scope, and behavior of sustainability in the leadership domain that affects every firm, organization, and unit, but only few studies have pondered on analyzing the publication trends of sustainable leadership. Hence, this study attempts to assess the publication trend, leading countries, journals, authors, and keywords with respect to sustainable leadership in order to measure the depth of knowledge in this domain.

2 Related Contexts of the Study

The first and foremost conceptual definition of "sustainable leadership" has been offered by Hargreaves and Fink in 2004. They have proposed the definition that sustainable leadership aims to meet the needs of present-day society, without compromising the ability to meet the needs of future generation. In addition to that, Avery and Bergsteiner (2011b) asserted, "sustainable leadership requires taking a long -term perspective in making decisions; fostering systemic innovation aimed at increasing customer value; developing a skilled, loyal, and highly engaged workforce; and offering quality products, services, and solutions" (p. 5).

As per the NRBV theory, the prime sources of competitive economic activity are the resources and capabilities that are responsible in fostering environmentally sustainable economic activities (Hart, 1995). Since the past two decades, deep interest in the academia of different skills among competencies and values that binds leaders into effective leadership has been focused largely upon, with regard to preserving the planet and natural resources (Ploum et al., 2018; Wesselink & Wals, 2011). In fact, Visser and Courtice (2011) have studied SL at the individual level through situational leadership that is based on model (Lynch et al., 2011;

Papworth et al., 2009). In regard to their model, sustainable leaders possess basic knowledgeable skills that are bound with emotional intelligence and consider each and every subordinate irrespective of any differences; these indirectly contribute largely to sustainable practices (Visser & Courtice, 2011), understanding in a systematic approach and interdisciplinary understanding, promptness to work and innovation by itself for a long-term vision imbibing ethics and morality (Besieux et al., 2018), willingness to pursue goal, thinking systematically (Ploum et al., 2018), thinking innovatively (Benton-Short & Merrigan, 2016), focusing on the vision (Westley & Mintzberg, 1989), creativity (Basadur, 2004), and altruism (Sosik et al., 2009). Skills such as these act as the base for the leaders to guide the team, and the entire organization's upbringing lies in the hands of all the leaders striving towards more sustainable development by defeating complexities and conflicts in social, economic, and environmental domains (Gill & Singh, 2020).

Shortly, these six competencies act as a base for every sustainable leader to upbring the organization: collaboration, influence, delivering of results, commercial awareness, anticipation of long-term trends, and evaluation of long-term trends (Tideman et al., 2013).

Thus, the study is focused on bibliometric approach, inclusive of citation, co-occurrence, collaboration, structure, and thematic clustering, in order to depict the progress and current structure of sustainable leadership.

3 Methodology

As bibliometric data utilizes quantitative tools, it has helped in spreading the focus throughout the field of research to extract and analyze the data. This is the upper hand of bibliometric data, where it focuses on larger side of the topic rather than providing just a micro-view of the context. The growth structure of any particular field can be analyzed in detail through adoption of bibliometric technique such as analysis of performances and mapping of networks (Jain et al., 2022) (Table 1).

Table 1 Methodology of the study

Research question	Research objective	Research methodology	Analysis
What is the volume and document citation with respect to sustainable leadership?	To understand the evolution and trend in the publications of sustainable leadership	Publication trend—performance analysis considering total publications and total citations with bar diagram	Bibliometric analysis
Which are the top countries, journals, authors, and titles with respect to sustainable leadership?	To figure out the top countries, leading journals, and influential authors and titles with respect to sustainable leadership	Performance analysis and science mapping	

In order to locate the study, there is a requirement for trustworthy and relevant database for the main purpose of validation and reliability of collected data to be ensured and analyzed. For the purpose of addressing research objectives, Scopus database has been made use of for data collection. Data has been acquired from Scopus as it offers a wide coverage of peer-reviewed research in particular domain (Donthu et al., 2021), for the rapid update in the frequency and flexibility to debug and process data (Donthu et al., 2021).

3.1 Extraction of Relevant Literatures

Application of Scopus database has been in relevance for initiation of selection process. The time period from 1981 to 2023 has been chosen to test the trend in the movement of sustainable leadership concept. The keywords to track and retrieve relevant articles by examining the literature have been based upon sustainable leadership. The actual main process to extract literature on sustainable leadership for bibliometric analysis is depicted in Fig. 1.

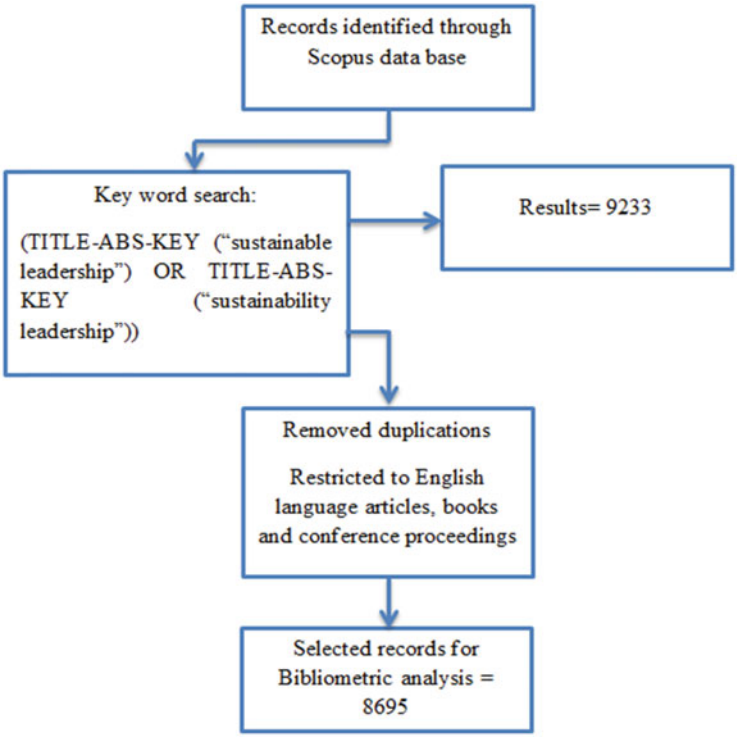

Fig. 1 Data extraction methodology for bibliometric analysis (*Source: Compiled by the researcher*)

The dataset of the study on sustainable leadership has been extracted from Scopus database on January 18, 2023, that consisted of 9233 documents. Exclusion criteria have been applied, out of which 538 were eliminated. Thus, this has been resulted into the final dataset of 8695 documents for the bibliometric analysis. VOSviewer (Visualization of Similarities) and Excel software have been used to apply bibliometric methods. VOSviewer software has been used in the construction of network mapping, and Excel has been used as a tool for filtering the data and tabulation.

4 Bibliometric Analysis

Large set of bibliometric data have been summarized through bibliometric analysis in order to showcase and draw the conclusion of the intellectual structure and emergence of sustainable leadership. Two prominent categories have been followed for bibliometric analysis; they are (1) performance analysis, and (2) science mapping. With a motto to satisfy the research questions and study objectives, the bibliometric analysis has been conducted which is divided under various heads such as annual publication and citation trends, top countries, top journals/sources, co-occurrence of author keywords, and top authors with high citations and documents with respect to sustainable leadership.

4.1 Annual Publication and Citation Trend of Sustainable Leadership

Annual scientific production of various research articles focusing on the sustainable leadership, provides a dynamic analysis based on the growth, evolution, and present trend. From the year 1981 till 2023, the trend is shown in Fig. 2.

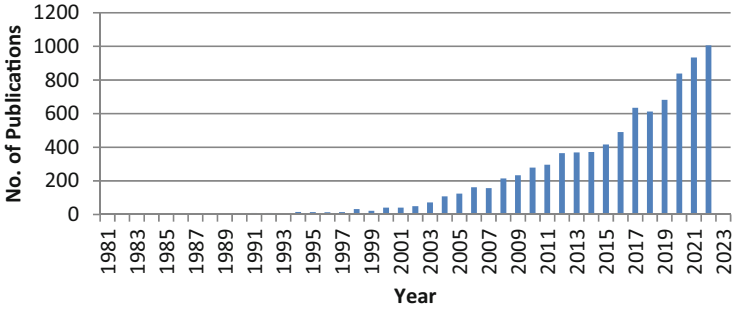

Fig. 2 Annual publications (1981–2023). (*Source: Compiled by the researcher through data extracted from* ***Scopus***)

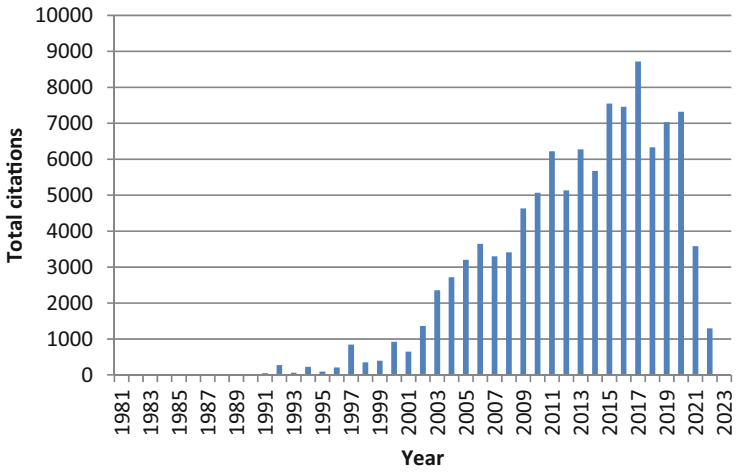

Fig. 3 Annual citations (1981–2023). (*Source: Compiled by the researcher through data extracted from* ***Scopus***)

Most commonly, sustainable leadership has been a trending topic that has been talked about by researchers since long ago. Papers on sustainable leadership appeared in 1981–2000, and the trend for publication on the same has not been extraordinary. Sustainable leadership-based publications have been moving up in numbers after 2004, where high demand for this topic was witnessed in recent years after 2017. In the wake of COVID-19 (i.e., 2021), the term sustainable leadership has been focused highly upon by every organization, to reduce the employees leaving organizations due to inadequate policies. Exceptionally, in 2022, 1006 publications were witnessed, and the year 2023 has more scope of witnessing furthermore publications in the sustainable leadership context. Over the years, the focus has been driven upon the term sustainable leadership due to the environmental changes that have been observed (Fig. 3).

Based on the data extracted, articles lacking high citations have been published since 1981–2000, due to the reason that it is related to a historical time frame that has been outdated in the current context. Thereafter, there has been a slow-paced surge since the year 2000 with 922 citations that have been gradually hiked in the year 2011 with total number of citations of 6222. Moreover, sustainable leadership has been the center of attraction from the viewpoint of researchers in the year 2017, as 8718 citations were derived in that particular year. Thereafter, a slow fall in the citations since 2018–2022 has been observed. Altogether, the articles on the subject sustainable leadership have been booming, among which the year 2017 has been marked as the most remarkable year that witnessed high prominence in the field of sustainable leadership.

4.2 Top Countries in Sustainable Leadership Research

Understanding the research conducted on sustainable leadership across the globe defines the geographical coverage of the topic. This as well pinpoints the list of countries that emphasize on the sustainable leadership and are keen to learn more about it. Figure 4 emphasizes the list of top 15 countries that have the highest number of publications in the field of sustainable leadership.

The uprooted database clarifies that the United States is the most leading nation in regard to the research in the domain of sustainable leadership with 2762 publications, and the United Kingdom stands as the second most leading country with 1090 publications. The United States and the United Kingdom have contributed majorly to the sector of sustainable leadership with an aim of being a cut above other countries in respect to performances, modernization, and technological advancements. Furthermore, countries such as Australia (808), Canada (564), and China (460) have as well shown consequential curiosity in publishing researches with respect to the subject of sustainable leadership.

4.3 Top Journals/Sources in the Domain of Sustainable Leadership

Peer-reviewed journal papers act as a base or guide for future researches and to assess the comparative study in past and present and the scope of knowledge in the

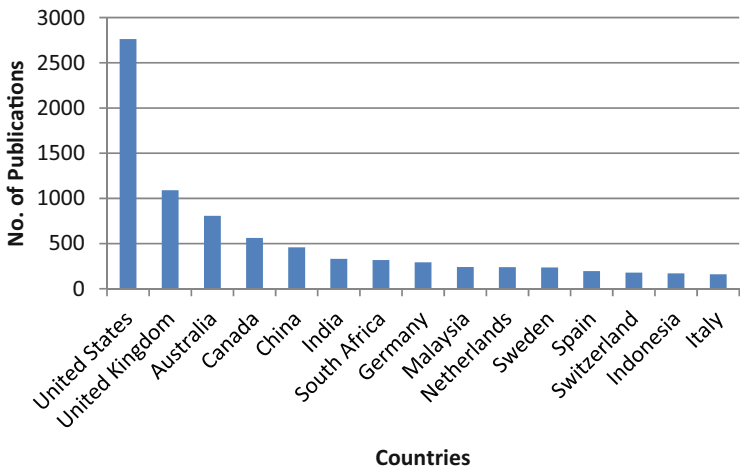

Fig. 4 Top countries (*Source: Compiled by the researcher through data extracted from* ***Scopus***)

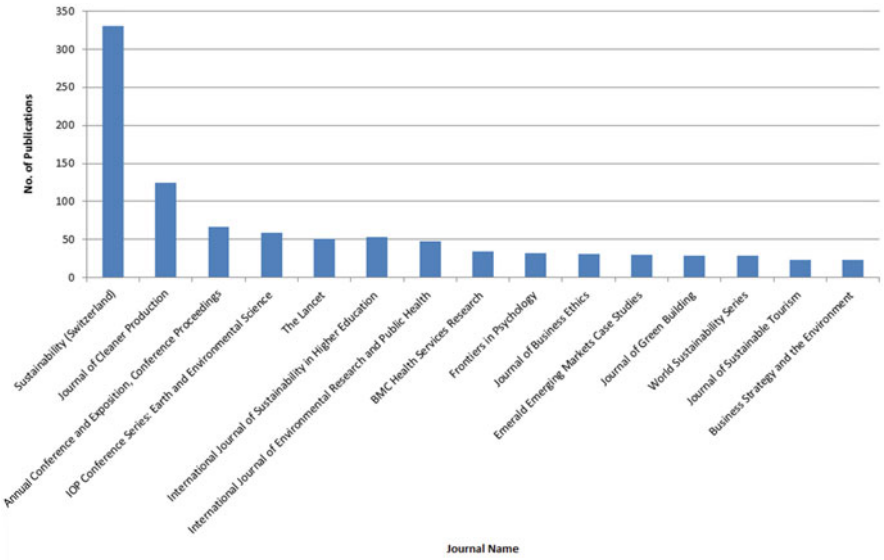

Fig. 5 Leading journals/sources. (*Source: Compiled by the researcher through data extracted from* ***Scopus***)

upcoming days as it has progressed in a certain field of study (Chalissery et al., 2023). With regard to the data driven out of most of the famous journals and sources which have researched on sustainable leadership, it has been showcased that Sustainability (Switzerland) has the upper hand with 330 publications followed by the Journal of Cleaner Production with 124 publications. Furthermore, some of the conference proceedings such as ASEE Annual Conference and Exposition, Conference Proceedings (66), and IOP Conference Series: Earth and Environmental Science (60) have also highly contributed to the field of sustainable leadership. The graphical representation as per leading journals and sources in the domain of sustainable leadership is presented in Fig. 5 and Table 2.

In respect of citations, Journal of Cleaner Production (6873) has the highest number of citations, followed by Sustainability (Switzerland) (3420) and The Lancet (3188). Despite the journal Sustainability (Switzerland) (330) being the most productive one, the Journal of Cleaner Production has been highly cited and recognized by researchers in the domain of sustainable leadership. The Lancet possesses the highest citation score (115.3), SNIP (33.801), and SJR (15.652) followed by the Journal of Sustainable Tourism indicating the highest quality of journal in producing the articles on "sustainable leadership." With respect to citation per publication, The Lancet is ranked as the first (62.5098), after which the Journal of Business Ethics (51.67742) and the Journal of Cleaner Production (55.42742). As a whole, it indicates that Sustainability (Switzerland), the Journal of Cleaner Production, the International Journal of Sustainability in Higher Education, The Lancet, and the

Table 2 Top journals/sources in the domain of sustainable leadership

Sl. no.	Source	TPN	TCN	C/P	Cite score	SNIP	SJR
1	Sustainability (Switzerland)	330	3420	10.36364	5.0	1.31	0.664
2	Journal of Cleaner Production	124	6873	55.42742	15.8	2.444	1.921
3	ASEE Annual Conference and Exposition, Conference Proceedings	66	123	1.863636	N/A	N/A	N/A
4	IOP Conference Series: Earth and Environmental Science	59	56	0.949153	0.6	0.409	0.202
5	International Journal of Sustainability in Higher Education	53	1470	27.73585	5.6	1.496	0.857
6	The Lancet	51	3188	62.5098	115.3	33.801	15.652
7	International Journal of Environmental Research and Public Health	48	573	11.9375	4.5	1.44	0.814
8	BMC Health Services Research	34	317	9.323529	3.9	1.516	0.997
9	Frontiers in Psychology	32	170	5.3125	4.0	1.605	0.873
10	Journal of Business Ethics	31	1602	51.67742	10.8	2.863	2.438
11	Emerald Emerging Markets Case Studies	30	23	0.766667	0.2	0.203	0.225
12	Journal of Green Building	29	214	7.37931	1.9	0.407	0.27
13	World Sustainability Series	29	72	2.482759	1.2	N/A	N/A
14	Business Strategy and the Environment	23	1288	56	11.9	2.289	2.241
15	Journal of Sustainable Tourism	23	1070	46.52174	13.8	2.801	2.476

TPN Total publications, *TCN* Total citation, *C/P* Citation per publication, *SJR* Scimago Journal Ranking, *SNIP* Source normalized impact per paper, *N/A* Not applicable
Source: Compiled by the researcher through data extracted from ***Scopus***

Journal of Business Ethics were among the top journals in the domain of sustainable leadership.

4.4 Co-occurrence of Author Keywords

The researcher has studied the keywords used by authors through co-occurrence analysis to get in depth of predominant research topics in the field of "sustainability leadership" and its relevance. This is shown in the network visualization using VOSviewer in Fig. 6, where each node represents the title of the study. The analysis throws light on the nine authors who have analyzed the keyword "performance" based on their occurrences, with a frequency of repetition of 212 times with the total 223 link strength. The keyword "building" that has the second highest link strength of 83 has occurred 135 times and the link strength of 65 followed by the terms effect, behavior, action, future, COVID, relations, and SDGs.

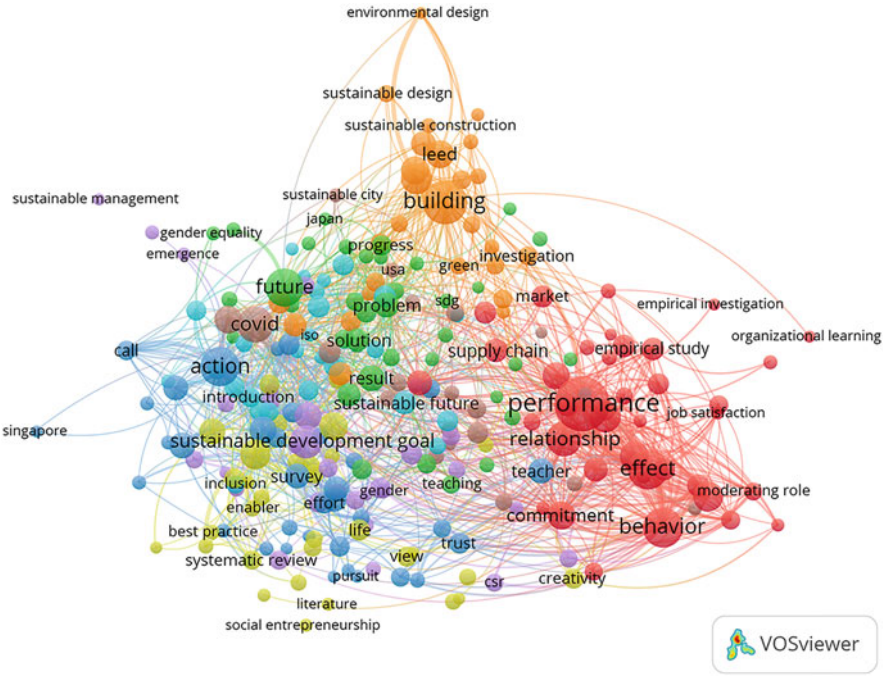

Fig. 6 Occurrence of author keywords (*Source: Compiled by the researchers through the extraction of data from* ***Scopus*** *database and visualized using* ***VOSviewer***)

Table 3 Top authors with high citations and documents

Authors	Total publications	Authors	Total citations
Wang, Y.	20	Huisingh, D.	690
Liu, Y.	18	Wang, Y.	369
Zhang, Y.	16	Wang, J.	283
Li, Y.	13	Zhang, Y.	280
Iqbal, Q.	12	Song, Y.	266
Wang, X.	12	Singh, S.	264
Chen, Y.	11	Tseng, M.L.	252
Wang, J.	10	Ahmad, N.H.	228
Song, Y.	10	Iqbal, Q.	206
Li, Z.	10	Avery, G.C.	202
Li, X.	10	Xu, Y.	200
Kantabutra, S.	10	Suriyankietkaew, S.	176

Source: Compiled by the researcher through data extracted from ***Scopus***

4.5 Top Authors with High Citations and Documents

The current domain has been studied by various authors, where Table 3 provides a conventional insight regarding the list of authors who contributed to sustainable leadership. Wang, Y. has contributed the top-most spellbinding publications that are highest of 20 publications in number in the field of sustainable leadership, succeeded by Liu, Y. who has come up with 18 write-ups with the second most published articles, followed by Zhang, Y. with 16 articles and the third highest number of publications in the field of sustainable leadership. Apart from the listed authors, few among the top authors with the highest citations are Huisingh, D. who stands first with 690 citations, followed by Wang, Y. with 369 citations, succeeded by Wang, J. with 283 citations in the same filed of sustainability leadership. Additionally, in Figs. 7 and 8, authors possessing higher citations and documents through VOSviewer are shown.

5 Conclusion

Given the significance of sustainable leadership, the researchers aimed to investigate the body of knowledge in this subject of literature, where the researchers aimed to identify the publication trends, top countries, leading journals, and influential authors and titles with respect to sustainable leadership through bibliometric analysis. The findings highlighted the maximum number of publications of papers on

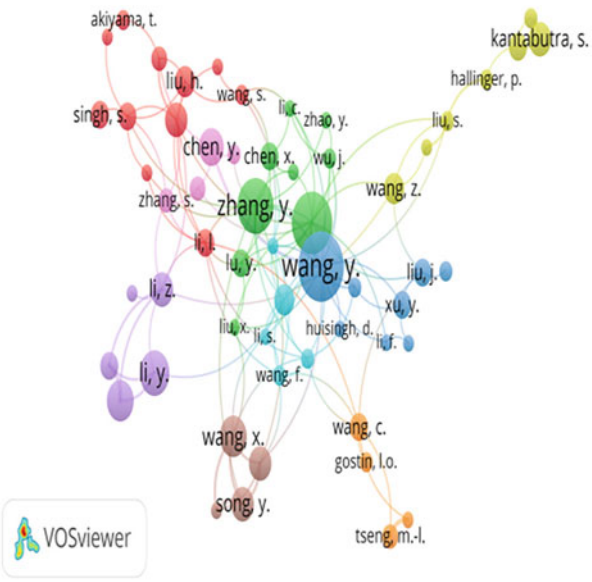

Fig. 7 Topmost authors with high publications (*Source: Compiled by the researcher through the extraction of data from Scopus database and visualized using VOSviewer*)

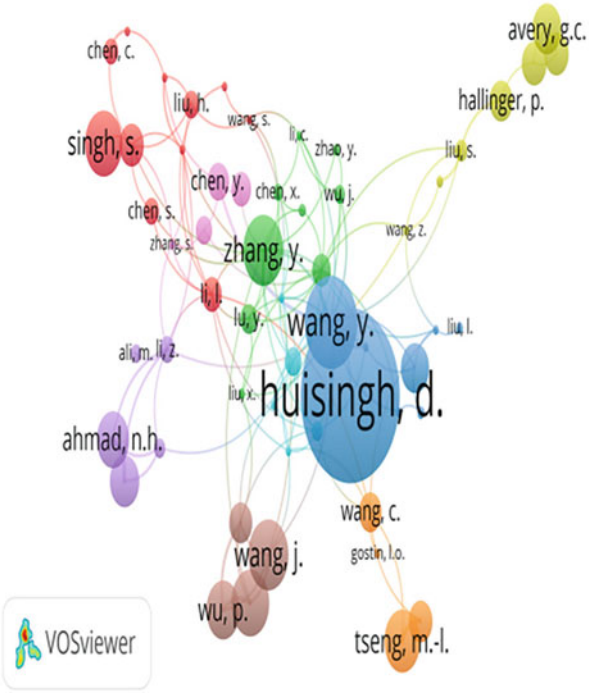

Fig. 8 Topmost authors with high citations (*Source: Compiled by the researcher through the extraction of data from Scopus database and visualized using VOSviewer*)

sustainable leadership in the years 2020–2021, with the United States as the top country. Despite the trend of publishing in this field of study extending throughout time, the majority of research on the issue was undertaken in developed countries such as the United States and the United Kingdom. There has not been much study on emerging and developing countries, notably India. Moreover, as far as citations are concerned, the amount of citations for papers on sustainable leadership has been increasing, but 2017 seems to be the year of high prominence for sustainable leadership. According to leading journals or sources of research on sustainable leadership, Sustainability (Switzerland) has the upper hand. In terms of citations, the Journal of Cleaner Production had the most, and in terms of author publications, Wang, Y. has the most articles published in the field of sustainable leadership. However, Huisingh, D. is ranked first among top authors with many citations. It was fascinating to find that the key term "performance" is strongly related to sustainable leadership, which confirms many studies that measure performance as a result of implementing sustainable leadership.

Emerging and developing countries will need to pay greater attention in the future to achieve sustainable growth in the organization through sustainable leadership. Regulatory organizations should emphasize the need of encouraging the sustainable leadership among organizations in order for economies to achieve sustainable growth through better utilization of human resource and cutting the costs. Furthermore, this study broadens the future possibilities for improving sustainable

leadership literatures in order to close the knowledge gap. Overall, it is very essential to highlight the criticism of the study in order to provide further research agenda for the future authors studying in the same domain. This study was strictly restricted to sustainable leadership with only data extracted from Scopus, where other databases have been completely omitted, as there is no scope of combining the data from various sources in a single file. Further, researchers recommend collaboration between these sources such as Scopus, Web of Science, and PubMed to provide data in a same format to combine the databases and provide more extensive bibliometric analysis on a particular topic.

References

Amui, L. B. L., Jabbour, C. J. C., de Sousa Jabbour, A. B. L., & Kannan, D. (2017). Sustainability as a dynamic organizational capability: A systematic review and a future agenda toward a sustainable transition. *Journal of Cleaner Production, 142*, 308–322.

Avery, G. C., & Bergsteiner, H. (2011a). How BMW successfully practices sustainable leadership principles. *Strategy and Leadership., 39*, 11.

Avery, G. C., & Bergsteiner, H. (2011b). Sustainable leadership practices for enhancing business resilience and performance. *Strategy and Leadership., 39*, 5.

Basadur, M. (2004). Leading others to think innovatively together: Creative leadership. *The Leadership Quarterly, 15*(1), 103–121.

Benton-Short, L., & Merrigan, K. A. (2016). Beyond interdisciplinary: How sustainability creates opportunities for pan-university efforts. *Journal of Environmental Studies and Sciences, 6*(2), 387–398.

Besieux, T., Baillien, E., Verbeke, A. L., & Euwema, M. C. (2018). What goes around comes around: The mediation of corporate social responsibility in the relationship between transformational leadership and employee engagement. *Economic and Industrial Democracy, 39*(2), 249–271.

Boiral, O., Baron, C., & Gunnlaugson, O. (2014). Environmental leadership and consciousness development: A case study among Canadian SMEs. *Journal of Business Ethics, 123*(3), 363–383.

Burawat, P. (2019). The relationships among transformational leadership, sustainable leadership, lean manufacturing and sustainability performance in Thai SMEs manufacturing industry. *International Journal of Quality and Reliability Management, 36*, 1014.

Chalissery, N., Tabash, M. I., Nishad, T. M., & Saleh Al-Faryan, M. A. (2023). A bibliometric analysis of socially responsible investment based on thematic clustering. *Cogent Business & Management, 10*(1), 2154057.

Day, C., & Schmidt, M. (2007). Sustaining resilience. In *Developing sustainable leadership* (pp. 65–86).

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research, 133*, 285–296.

Donthu, N., Kumar, S., Pattnaik, D., & Lim, W. M. (2021). A bibliometric retrospection of marketing from the lens of psychology: Insights from Psychology and Marketing. *Psychology and Marketing, 38*(5), 834–865.

Ferdig, M. A. (2007). Sustainability leadership: Co-creating a sustainable future. *Journal of Change Management, 7*(1), 25–35.

Galpin, T., & Whittington, J. L. (2012). Sustainability leadership: From strategy to results. *Journal of Business Strategy, 33*(4), 40–48.

Gill, S., & Singh, G. (2020). Developing inclusive and quality learning environments in HEIs. *International Journal of Educational Management, 34*, 823.

Hallinger, P., & Suriyankietkaew, S. (2018). Science mapping of the knowledge base on sustainable leadership, 1990–2018. *Sustainability, 10*(12), 4846.

Hargreaves, A., & Fink, D. (2004). The seven principles of sustainable leadership. *Educational Leadership, 61*(7), 8–13.

Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review, 20*(4), 986–1014.

Iqbal, Q., Ahmad, N. H., & Ahmad, B. (2018). Enhancing sustainable performance through job characteristics via workplace spirituality: A study on SMEs. *Journal of Science and Technology Policy Management*.

Jain, J., Walia, N., Singh, S., & Jain, E. (2022). Mapping the field of behavioural biases: A literature review using bibliometric analysis. *Management Review Quarterly, 72*(3), 823–855.

Lourenço, I. C., Callen, J. L., Branco, M. C., & Curto, J. D. (2014). The value relevance of reputation for sustainability leadership. *Journal of Business Ethics, 119*(1), 17–28.

Lynch, B. M., McCormack, B., & McCance, T. (2011). Development of a model of situational leadership in residential care for older people. *Journal of Nursing Management, 19*(8), 1058–1069.

Mebratu, D. (1998). Sustainability and sustainable development: Historical and conceptual review. *Environmental Impact Assessment Review, 18*(6), 493–520.

Morsing, M., & Oswald, D. (2009). Sustainable leadership: Management control systems and organizational culture in Novo Nordisk A/S. *Corporate Governance, 9*(1), 83–99.

Papworth, M. A., Milne, D., & Boak, G. (2009). An exploratory content analysis of situational leadership. *Journal of Management Development, 28*, 593.

Paraschiv, D. M., Nemoianu, E. L., Langă, C. A., & Szabó, T. (2012). Eco-innovation, responsible leadership and organizational change for corporate sustainability. *Amfiteatru Economic Journal, 14*(32), 404–419.

Ploum, L., Blok, V., Lans, T., & Omta, O. (2018). Toward a validated competence framework for sustainable entrepreneurship. *Organization & Environment, 31*(2), 113–132.

Robinson, M., Kleffner, A., & Bertels, S. (2011). Signaling sustainability leadership: Empirical evidence of the value of DJSI membership. *Journal of Business Ethics, 101*(3), 493–505.

Roscoe, S., Subramanian, N., Jabbour, C. J., & Chong, T. (2019). Green human resource management and the enablers of green organisational culture: Enhancing a firm's environmental performance for sustainable development. *Business Strategy and the Environment, 28*(5), 737–749.

Sachs, J. D. (2012). From millennium development goals to sustainable development goals. *The Lancet, 379*(9832), 2206–2211.

Shriberg, M., & MacDonald, L. (2013). Sustainability leadership programs: Emerging goals, methods & best practices. *Journal of Sustainability Education*, *5*.

Sosik, J. J., Jung, D., & Dinger, S. L. (2009). Values in authentic action: Examining the roots and rewards of altruistic leadership. *Group & Organization Management, 34*(4), 395–431.

Sotarauta, M., Horlings, I., & Liddle, J. (Eds.). (2012). *Leadership and change in sustainable regional development* (Vol. 60). Routledge.

Suriyankietkaew, S., & Avery, G. (2016). Sustainable leadership practices driving financial performance: Empirical evidence from Thai SMEs. *Sustainability, 8*(4), 327.

Tideman, S. G., Arts, M. C., & Zandee, D. P. (2013). Sustainable leadership: Towards a workable definition. *Journal of Corporate Citizenship, 2013*(49), 17–33.

Visser, W., & Courtice, P. (2011). *Sustainability leadership: Linking theory and practice*. Retrieved from SSRN 1947221.

Wesselink, R., & Wals, A. E. (2011). Developing competence profiles for educators in environmental education organisations in the Netherlands. *Environmental Education Research, 17*(1), 69–90.

Westley, F., & Mintzberg, H. (1989). Visionary leadership and strategic management. *Strategic Management Journal, 10*(S1), 17–32.

PR Leadership and Immersive Environment in Metaverse Technology Adoption: The Mediation of Horizon Workrooms and Embodied Social Presence

Riadh Jeljeli and Faycal Farhi

1 Introduction

Leadership plays an important role in determining the success and performance of an organization. Leaders are important as they adopt certain policies and approaches that may help to avail the organizational goals and objectives (Reynolds et al., 2020). Talking specifically about the current era of technology and leadership, Kyoung (2021) highlighted the adoption of metaverse technology, providing immersive environments further empowered by horizon workrooms and embodied social presence. In other words, metaverse technology for organizational purposes facilitates the communication and interaction between employees and leaders through virtual workrooms, supported by equipment like virtual reality and augmented reality (Lee et al., 2021). These virtual workrooms provide the users with a 3D view and immersive simulations where both touching and visual senses feel like a physical environment. Consequently, working experiences are even developed and improved, gaining much attention from organizational stakeholders across the globe (Mystakidis, 2022). Besides interaction and communication, Cheng and their colleagues (2022a) also consider metaverse in teamwork and office presentations, providing opportunities to directly communicate with the group leaders and in formal meetings among the organizational members. For Allam et al. (2022), the embodied social presence and horizon workrooms are important factors that may strengthen the metaverse technology adoption by organizational leaders. As a result, today, companies from small to medium and larger level prefer remote working

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through metaverse technology as a part of their professional, day-to-day task management and performance operations (Ning et al., 2021).

Thus, this research also analyzed the role of both factors in motivating the employees of public relations departments in different automotive organizations in the United Arab Emirates. This chapter is structured according to the formal research requirements, as the aim is to provide empirical and systematic evidence about the selected phenomenon.

2 Review of Literature

2.1 PR Leadership in Metaverse Technology Adoption

According to Ugochukwu and Phillips (2018), the role of leadership in an organization bears many responsibilities and has a greater significance. Especially today, when communication and interaction are considered key to success and improvements, organizational departments such as public relations focus on training the employees and equipping them with modern technology to increase their compatibility and performance (Cheng et al., 2022a). As a result, Cheng and their colleagues (2022b) indicate the strategy of public relations practitioners in different organizations to foster innovation and enhance economic contributions by using metaverse technology through R&D collaborations.

H1. PR leadership has a significant effect on metaverse technology.

2.2 Immersive Simulation in Metaverse Technology

Immersive simulation is an important aspect of metaverse technology. Talking specifically about its use in reote working, immersive simulations enable the employees to avail of the virtual session, including meetings, conferences, training, and development (Lee, 2021). More specifically, Wang and Su (2022) explain immersive simulation in metaverse technology as enabling the users to experience the effects of their performance. These users perform their tasks in more personalized and safer virtual environments. For example, people who prefer remote working might perform poorly initially, yet their skills improve when they get used to the immersive simulation and virtual work environment.

H2. Immersive simulation has a significant effect on metaverse technology.

2.3 *Leadership and Immersive Simulation in Virtual Working Environment*

Leaders are central to ensuring organizational performance and stability by motivating and considering the employees' skills as an important pathway to achieving the designated goals (Reynolds et al., 2020). However, if the leaders are weak or have less interest in innovation technology, they can adversely affect innovation technology adoption among the employees (Kyoung, 2021). A similar case is with the adoption of metaverse technology and immersive simulation among the elders that may directly or indirectly affect the employees' decision to work in a virtual environment (Ning et al., 2021). For example, organizations in the United Arab Emirates adopted a strategy to introduce and invest in buying equipment regarding metaverse technology, including VR headsets, AR gear, smartphones, and computer systems, for their workforce (Lalani & Crawford, 2021).

H3. PR leadership has a significant effect on the immersive environment.

2.4 *Horizon Workrooms, Leadership, and Technology Adoption*

According to Pamucar and their colleagues (2022), the Facebook corporation introduced the horizon workroom. The concept of horizon workrooms is a phenomenon that has been around for a while. Still, it has gained much popularity during the past few years due to its innovativeness and virtual concepts and services. Notably, these horizon workrooms can be accessed using the specific headsets that the users wear when doing collaborative work, meetings, and conferences (Lee et al., 2021). These horizon workrooms are mainly controlled by the group or organizational leaders that allow the employees to enter and join the collaborations.

H4. Horizon workrooms mediate the effect of PR leadership on metaverse technology adoption.

2.5 *Horizon Workrooms and Embodied Social Presence in Metaverse Technology Adoption*

Social presence is a crucial and integral component of metaverse technology that accelerates user adoption (Voinea et al., 2022). As a result, the users coexist and interact with each other. Embodied social presence is also explained by the concept of embodied social presence to indicate its importance and role in the

metaverse-based virtual world (Evans et al., 2022). Metaverse technology is based on virtual presence, interactivity, communication, and contact; horizon workrooms offer these. The users necessarily have all the required equipment that enables them to enter the rooms and join the virtual world (Oh et al., 2018). This virtual presence is an embodied social presence, nearly a substitute for the physical world (Khader, 2022).

H5. Embodied social presence mediates the effect of immersive environment on metaverse technology adoption.

3 Theoretical Framework

Embodied social presence theory provides theoretical support to the conceptual framework of this study (refer to Fig. 1). The primary notion of the relevant theory is about the avatars adopted by the users that enable them to feel that their virtual presence is a substitute for their physical presence in a social environment (Wen-xi et al., 2022). As noted by Amirulloh and Multi (2022), the notion of metaverse is effective when the interaction between the users is task based, yet the sense of community being in place is absent. According to Mennecke et al. (2010), embodied social presence regarding the metaverse increasingly has affective filtering with a low social presence. Especially when metaverse is used for remote working purposes, the embodied social presence is of greater significance providing the individuals with a feeling of a virtual, yet face-to-face, interactive environment with immersive simulation and a feeling of physical presence in a virtual environment. Zaman et al. (2022) cited an example of horizon workrooms in metaverse technology that provides virtual, collaborative environments for professional purposes.

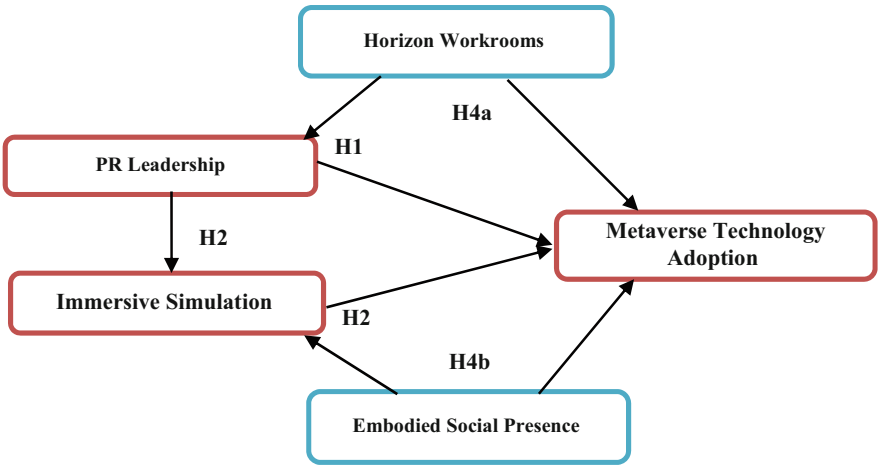

Fig. 1 Conceptual model of current research

4 Research Methods

4.1 Design and Data Gathering

This study involved experimental design focused on the hypotheses proposing the relationship between exogenous and endogenous variables. To keep consistent with the study objectives and problems, the researchers used closed-ended questionnaires designed on -a point Likert scale for data collection purposes. The researchers gathered data by using online resources such as respondents' emails and the URL of the Google form. The data gathering was done from May 2022 to October 2022. Further, the data was manipulated, coded, and saved for analysis in the Statistical Package for Social Sciences (SPSS) (Jeljeli et al., 2022a).

4.2 Study Sample

The population of this research involves public relations employees currently working in both public and private sector organizations across the United Arab Emirates. However, the researchers selected six private sector organizations, specifically automobile companies currently working in the three cities, including Sharjah, Dubai, and Al Ain. The sample size is based on the G* power sample size determination criteria (refer to Fig. 2) (Jeljeli et al., 2022b). As per the number of the predictor variable, the relevant criteria indicated an ideal sample size of minimum $n = 74$ individuals. As a result, the researchers further selected a sample size of $n = 250$ to ensure the research tool's reliability and validity, as the study involves structural equation modeling (Ali & Bhaskar, 2016). Finally, the researchers used the convenience sampling technique as the data was required only from the PR employees (Etikan, 2017). The aim was to gather data from the most suitable individuals for this study. Thus, after the data collection, the researcher carefully

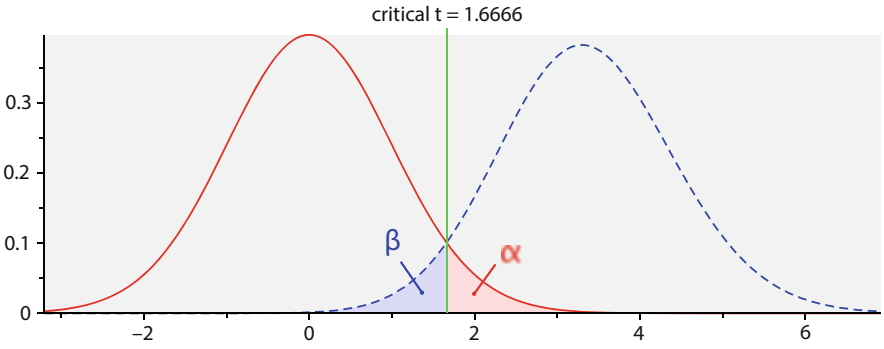

Fig. 2 Sample size distribution according to G* analysis

evaluated the responses from each individual and shortlisted $n = 240$ questionnaires as $n = 10$ were missing or wrongly filled. Overall, the response rate was 96.0%, which was further used for statistical analysis purposes.

5 Study Analysis

The researchers examined the model by testing the measurement model and structural model. Testing the measurement model involved convergent validity and construct reliability assessment (refer to Table 1). For the convergent validity, the researchers calculated factor loading and averages of the items under consideration (Jeljeli et al., 2022a). Results revealed that most loadings are greater than the alpha value of 0.5. Besides, the average values are also exceeding the alpha value of 0.5. Regarding the construct reliability, the value from both composite reliability and Cronbach alpha is also found to exceed the alpha value of 0.7. Overall, the measurement model's convergent validity and composite reliability are validated.

The measurement model's divergent validity is examined using two criteria considered standard approaches in a study containing structural equation modeling (Jeljeli et al., 2022a). First, the calculation of squares of average values (refer to Table 1) indicated that they range from 0.577 to 0.732, which are not only greater

Table 1 Summary of the correlation between survey items

Constructs	Items	Loads	VAR	CR	CA
PR leadership	PRL1	0.789	0.763	0.801	0.793
	PRL2	0.715			
	PRL3	0.863			
	PRL4	0.811			
Immersive simulation	IMS1	−0.136	0.856	0.815	0.782
	IMS2	0.891			
	IMS3	0.822			
	IMS4	0.314			
Horizon workrooms	HWR1	0.839	0.787	0.799	0.882
	HWR2	0.126			
	HWR3	0.436			
	HWR4	0.678			
Embodied social presence	ESP1	0.829	0.790	0.821	0.852
	ESP2	0.897			
	ESP3	0.991			
	ESP4	0.752			
Metaverse technology adoption	MTA1	0.769	0.760	0.764	0.746
	MTA2	0.735			
	MTA3	0.613			
	MTA4	0.737			

Table 2 Summary of divergent validity (Fornell-Larcker criterion)

	PRL	IMS	HWR	ESP	MTA
PRL	**0.582**				
IMS	0.030	**0.732**			
HWR	0.487	0.094	**0.619**		
ESP	0.483	0.300	0.383	**0.624**	
MTA	0.036	−0.005	−0.032	0.092	**0.577**

PRL PR leadership, *IMS* immersive simulations, *HWR* horizon workrooms, *ESP* embodied social presence, *MTA* metaverse technology adoption

Table 3 Summary of divergent validity (heterotrait-monotrait ratio)

	PRL	IMS	HWR	ESP	MTA
PRL					
IMS	0.027				
HWR	0.481	0.128			
ESP	0.548	0.325	0.471		
MTA	0.036	0.005	−0.032	0.092	

PRL PR leadership, *IMS* immersive simulations, *HWR* horizon workrooms, *ESP* embodied social presence, *MTA* metaverse technology adoption

Table 4 Summary of multicollinearity between exogenous variables (VIF)

Model	Tolerance	VIF
PR leadership	0.460	1.080
Immersive simulation	0.460	1.080

than the rest of the correlated values in Table 2 but are unrelated to them as well. Besides, calculating the heterotrait-monotrait ratio values indicated the HTMT value of 0.182 (refer to Table 3), which is smaller than the alpha value of 0.8. Overall, both criteria indicated that the divergent validity is also validated in the current research.

Further, the aim was to examine any potential correlation between the two predictor variables, including PR leadership and immersive simulation, in this research. The results indicated that, with the tolerance value at 0.460 and variance inflation factor (VIF) value at 1.080, both exogenous factors have a cutoff value at 1.080, which is smaller than the alpha value of 0.5, indicating that both variables are not correlated (refer to Table 4).

The goodness of fit, also known as model fit, helps to determine the extent to which the observed data fits well with the expected data (Sun, 2005). In other words, the goodness of fit examines the divergence between the model-predicted data and observed data as the model predicted based on poor fits causes serious concerns to the research process and results. Thus, the goodness of fit in this research revealed the chi-square value of 3.018, which is between the normal range of 3 and 5. Besides, the Tucker-Lewis index value is 1.920, and incremental fit index (IFI) is at 1.63. Finally, the standardized root mean square value remained at 0.036, lower than the alpha value of 0.9 (Tenenhaus et al., 2009). Overall, the results revealed affirmed the acceptable values for model fit.

Table 5 Summary of path analysis

Hypotheses	***B***	***t***	***Sign***
PR leadership → Metaverse technology adoption	0.292	6.480	***
Immersive simulation → Metaverse technology adoption	0.211	3.735	0.063
PR leadership → Immersive simulation	0.258	5.225	***
Hypotheses	***B***	***Ind. effects***	***Sign***
PR leadership → Horizon workrooms → Metaverse technology adoption	0.186	2.868	0.004
Immersive simulation → Embodied social presence → Metaverse technology adoption	0.492	1.870	0.061

Finally, the researchers examined the study hypotheses using the Amos Ver 26 (refer to Table 5). First, the effect of PR leadership on metaverse technology adoption was examined. The relevant proposition was consistent with the argumentation indicating the role of leadership in general and PR leadership, in particular, to encourage employees to adopt metaverse technology for better work experience (Aloqaily et al., 2022). The results were consistent with the relevant argumentation as the p-value at $p > 0.000$ indicated a strong effect of PR leadership in the metaverse technology adoption. The second hypothesis proposed a significant effect of immersive simulation on metaverse technology adoption. As noted by Kyoung (2021), immersive simulation is an important feature of metaverse technology. From avatar selection to physical movements, metaverse technology offers different types of immersive simulations that further enhances its adoption among users. Thus, the H2 of this research was also significant at $p > 0.063$ and consistent with the argumentations by Kyoung. Concerning the third hypothesis, the effect of PR leadership on the immersive simulation was significant, where the role of leadership in adopting, affecting, and acknowledging the immersive simulation remained prominent (Roberts, 2019). The mediation of horizon workrooms (H4) on the effect of PR leadership on metaverse technology adoption was tested and found as significant ($p > 0.004$ and indirect effect value of 0.868). As noted by (Allam et al., 2022), horizon workrooms are important for people preferring remote working. These individuals consider horizon workrooms as facilitating their professional responsibilities, especially when collaborative efforts are required from the employees. Finally, the mediation of embodied social presence on the effect of immersive simulation towards metaverse technology was also found as significant ($p > 0.061$ and indirect effect value of 0.870), thus indicating embodied social presence as an important phenomenon further affecting and accelerating the metaverse technology adoption (Ugochukwu & Phillips, 2018), especially for the remote working purposes (Roberts, 2019).

Focusing on the current findings, the overall results supported the propositions. The respondents widely agreed with the role of PR leadership and immersive simulation in accelerating metaverse technology adoption (Ugochukwu & Phillips, 2018). Primarily, the research model was based on the five theme questions,

followed by four root questions for each variable. Most of the respondents not only agreed with the role of PR leadership but also indicated immersive simulation as a significant factor in metaverse technology adoption. Besides, the respondents also agreed with the effect of PR leadership on immersive simulation, indicating that PR leadership considers the relevant phenomenon as an important factor regarding remote working (Roberts, 2019). Finally, the mediation of horizon workrooms on metaverse technology adoption further magnified the importance of PR leadership in enhancing metaverse technology adoption in the selected organization. Besides, the role of embodied social presence regarding the effect of immersive simulation on metaverse technology adoption also indicated the extent to which virtual social presence contributed to accepting and adapting the levant technology for professional purposes (Amirulloh & Mulqi, 2022). Thus, current research results indicated consistency with the existing literature considering leadership and immersive simulations as important factors, mediated by horizon workrooms and embodied social presence, in metaverse technology adoption. It is conducted that technology is evolving today, and virtual social presence for remote working is trending. Leadership in automobile companies in the United Arab Emirates also acknowledges and contributes to increasing metaverse technology adoption for better work experiences.

5.1 Limitations

This research has some primary limitations that further narrow down its scope. First, it involves several factors that accelerate metaverse technology adoption. The existing literature further highlights other factors that can produce in-depth results. Second, it is focused on PR leadership, yet the researchers have not highlighted any leadership styles in the relevant organizations and departments, which also limits its scope. Finally, the third limitation involves the geographical generalizability of the result. As the study is conducted in some three cities, the findings can be different when conducted in other cities or regions.

References

Ali, Z., & Bhaskar, S. B. (2016). Basic statistical tools in research and data analysis. *Indian Journal of Anaesthesia, 60*(9), 662–669. https://doi.org/10.4103/0019-5049.190623

Z. Allam, A. Sharifi, S. E. Bibri, D. S. Jones, and J. Krogstie, The metaverse as a virtual form of smart cities: Opportunities and challenges for environmental, economic, and social sustainability in urban futures. Smart Cities, 5(3): 771-801, 2022. https://doi.org/10.3390/smartcities5030040.

Aloqaily, M., Bouachir, O., Karray, F., Ridhawi, I. A., & Saddik, A. E. (2022). Integrating digital twin and advanced intelligent technologies to realize the Metaverse. *IEEE Consumer Electronics Magazine, 12*, 1–8. https://doi.org/10.1109/MCE.2022.3212570

Amirulloh, M. F. N., & Mulqi, M. (2022). Know more metaverse as the technology of the future. *International Journal of Research and Applied Technology, 2*(1), 174–177. https://doi.org/10.34010/injuratech.v2i1.6915

Cheng, R., Wu, N., Chen, S., & Han, B. (2022a). Reality check of metaverse: A first look at commercial social virtual reality platforms. In 2022 IEEE conference on virtual reality and 3D user interfaces abstracts and workshops (VRW) (pp. 141–148). https://doi.org/10.1109/VRW55335.2022.00040.

Cheng, R., Wu, N., Chen, S., & Han, B. (2022b). Will metaverse be NextG internet? Vision, hype, and reality. *arXiv*. https://doi.org/10.48550/arXiv.2201.12894.

Etikan, I. (2017). Sampling and sampling methods. *Biometrics and Biostatistics International Journal, 5*(6), 215–217. https://doi.org/10.15406/bbij.2017.05.00149

Evans, L., Frith, J., Saker, M., Evans, L., Frith, J., & Saker, M. (2022). Social worlds. In *From microverse to metaverse* (pp. 25–32). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80455-021-220221003

Jeljeli, R., Farhi, F., & Hamdi, M. E. (2022a). The effect of consumer review on the perceived trustworthiness of online retailers: Item response theory perspective. *International Journal of Data and Network Science, 6*(4), 1341–1350. https://doi.org/10.5267/j.ijdns.2022.6.001

Jeljeli, R., Farhi, F., Setoutah, S., & Laghouag, A. A. (2022b). Microsoft teams' acceptance for the e-learning purposes during Covid-19 outbreak: A case study of UAE. *International Journal of Data and Network Science, 6*(3), 629–640. https://doi.org/10.5267/j.ijdns.2022.4.010

Khader, J. (2022). Welcome to the metaverse: Social media, the phantasmatic big other, and the anxiety of the prosthetic gods. *Rethinking Marxism, 34*(3), 397–405. https://doi.org/10.1080/08935696.2022.2111957

Kyoung, L.. (2021). A study on immersive media technology in the metaverse world. *Journal of the Korea Society of Computer and Information*, *26*(9). [Online]. Retrieved November 27, 2022, from https://koreascience.kr/article/JAKO202128054574787.page

Lalani, K., & Crawford, J.. (2021). Academic leadership during COVID-19 in higher education: Technology adoption and adaptation for online learning during a pandemic. *International Journal of Leadership in Education*. [Online]. Retrieved November 27, 2022, from https://www.tandfonline.com/doi/abs/10.1080/13603124.2021.1988716

Lee, J. Y. (2021). A study on metaverse hype for sustainable growth. *International Journal of Advanced Smart Convergence, 10*(3), 72–80. https://doi.org/10.7236/IJASC.2021.10.3.72

Lee, L.-H., et al. (2021). All one needs to know about metaverse: A complete survey on technological singularity, virtual ecosystem, and research agenda. *arXiv*. https://doi.org/10.48550/arXiv.2110.05352.

Mennecke, B. E., Triplett, J. L., Hassall, L. M., & Conde, Z. J. (2010). Embodied social presence theory. In *2010 43rd Hawaii international conference on system sciences* (pp. 1–10). https://doi.org/10.1109/HICSS.2010.179.

Mystakidis, S. (2022). Metaverse. *Encyclopedia, 2*(1), 486–497. https://doi.org/10.3390/encyclopedia2010031

Ning, H., et al. (2021). A survey on metaverse: The state-of-the-art, technologies, applications, and challenges. arXiv. https://doi.org/10.48550/arXiv.2111.09673.

Oh, C. S., Bailenson, J. N., & Welch, G. F.. (2018). A systematic review of social presence: Definition, antecedents, and implications. *Front Robot AI*, *5*. [Online]. Retrieved December 1, 2022, from https://www.frontiersin.org/articles/10.3389/frobt.2018.00114

Pamucar, D., Deveci, M., Gokasar, I., Tavana, M., & Köppen, M. (2022). A metaverse assessment model for sustainable transportation using ordinal priority approach and Aczel-Alsina norms. *Technological Forecasting and Social Change, 182*, 121778. https://doi.org/10.1016/j.techfore.2022.121778

Reynolds, S., Cotrino, F., Ifedi, C., & Donthu, N. (2020). An exploratory study of executive factors that lead to technology adoption in small businesses. *International Small Business Journal Researching Entrepreneurship, 30*(4), 406–431.

Roberts, R. (2019). *The psychological factors that influence successful technology adoption in the oil and gas industry—Ruby Roberts, Rhona Flin, 2019*. In Proceedings of the human factors and ergonomics society annual meeting. https://doi.org/10.1177/1071181319631105.

Sun, J. (2005). Assessing goodness of fit in confirmatory factor analysis. *Measurement and Evaluation in Counseling and Development, 37*(4), 240–256. https://doi.org/10.1080/07481756.2005.11909764

Tenenhaus, M., Amato, S., & Vinzi, V. E. (2009). *A global goodness-of-fit index for PLS structural equation modelling* (p. 5).

Ugochukwu, A. I., & Phillips, P. W. B.. (2018). Technology adoption by agricultural producers: A review of the literature | SpringerLink. *From Agriscience to Agribusiness*. [Online]. Retrieved November 27, 2022, from https://link.springer.com/chapter/10.1007/978-3-319-67958-7_17

Voinea, G. D., et al. (2022). Study of social presence while interacting in metaverse with an augmented avatar during autonomous driving. *Applied Sciences, 12*(22), 11804. https://doi.org/10.3390/app122211804

Wang, Y., & Su, Z. (2022). A survey on metaverse: Fundamentals, security, and privacy | IEEE Journals & Magazine | IEEE Xplore. Retrieved October 22, 2022, from https://ieeexplore.ieee.org/abstract/document/9880528

Wen-xi W., Fang Z., Yue-liang W. A. N, & Huan-sheng N. (2022). A survey of metaverse technology. 工程科学学报, *44*(4), 744–756. https://doi.org/10.13374/j.issn2095-9389.2022.01.15.003.

Zaman, U., Koo, I., Abbasi, S., Raza, S. H., & Qureshi, M. G. (2022). Meet your digital twin in space? Profiling international Expat's readiness for metaverse space travel, tech-savviness, COVID-19 travel anxiety, and travel fear of missing out. *Sustainability, 14*(11), 6441. https://doi.org/10.3390/su14116441

Strategic Leadership for Organizational Sustainable Competitive Advantage: The Stimulation of Innovation and Creativity in an Organization

Bayan Yousef Farhan

1 Introduction

How should one build sustainable competitive advantage in an organization? Assume that you are asked to help in boosting your organization's competitive advantage and providing an appropriate model to support its sustainable competitiveness in the global market. Which methodologies should you use? Which theoretical approaches should you rely on? Numerous frameworks and models could be used, but accelerating competition in the global market forces organizational leaders to pay more attention to creativity and innovation as instruments to reach growth targets and survive. The key argument in this study is that sustainable competitive advantage today hinges upon organizational innovation and creative practices. The chapter aims to identify the key elements that directly stimulate innovation and creativity, which in turn indirectly build sustainable competitive advantage. Microsoft is used as a case example to examine the research argument and to investigate how design thinking methodology, leadership growth mindset, and learning culture can facilitate organizational innovation and creativity, thereby promoting competitive advantage and sustainability. Arguably, the process of design thinking can increase the number of creative ideas and solutions and foster people's innovation, which contributes to organizational innovation and sustainable competitive advantage. To encourage this foundation of creativity and innovation in an organization, three research assumptions are examined:

1. Design thinking methodology is a key strategy. Its five activities are grouped in this study around three areas: creativity, invention, and innovation.

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2. The combination of design thinking methodology, leadership growth mindset, and organizational learning culture is essential to stimulate innovation and creativity in an organization.
3. The three approaches together stimulate the innovation and creativity that determine an organization's sustainable competitive advantage.

I first review the theoretical basis of design thinking methodology, growth mindset, learning culture, and competitive advantage. This review is followed by the study methodology. To test the research assumptions, I investigate Microsoft as a case example, where the application of the three approaches can be proved and the organizational innovation and competitive practices can be illustrated. I then propose an innovation and creativity assessment matrix and a model of stimulating innovation and creativity to help organizations build competitive advantage and operate successfully in the market. Finally, I end with the conclusion and limitations.

2 Theoretical Background: Key Approaches to Innovation and Creativity

Design thinking methodology was developed by David Kelley, the founder of Stanford University's design school (d.school), and has become d.school's motivating idea. Kelley underlined that people need to act like design thinkers: "We moved from thinking of ourselves as designers to thinking of ourselves as design thinkers. We have a methodology that enables us to come up with a solution that nobody has before" (as cited in Tischler, 2020, para. 5). Design thinking is a human-centric approach and a solution-based process; it is a design that allows creative individuals to use their creativity and solve challenging problems (Jayakumar et al., 2019). Design thinking methodology is a five-step problem-solving practice that can be seen as a strategic tool for innovation. Kelley (as cited in Walters, 2013) explained that the first critical step in design thinking is to build empathy to understand the people who have a problem, acting as a design thinker to design a solution for them. Dam and Siang (2020) noted that empathy requires design thinkers to be neutral and set aside their own beliefs and assumptions to get deep understanding and insight into people's needs and problems.

The first step is explained by Jayakumar et al. (2019). They pointed out that the process of observing and asking questions to understand those who have a problem and know the factors influencing them represents the fundamental ground for customer-centric design solution. The second step, define, is the process of setting a problem statement by analyzing the design thinker's observations and insights (Dam & Siang, 2020). Ideate, the third step, involves generating ideas and possible solutions through working with others and thinking outside the box. Kelley (as cited in Camacho, 2017) explained the ideate step as a way of developing new creative ideas with respect to specific problems. Ideate, as the third step of design thinking, can help group creativity through convergent and divergent thinking (Lee et al.,

2019). The fourth step is a prototype, during which the best alternative solutions are implemented with respect to how users think and feel. The final step is test. Design thinkers at this last stage focus on testing the selected idea or solution by asking the original users to provide feedback on their experience (Dam & Siang, 2020).

People with a growth mindset observe challenges as opportunities to learn and improve their competencies, and they work hard to develop their intelligence and ability (Kouzes & Posner, 2019). Murphy and Dweck (2016) confirmed that people with a growth mindset have a strong belief in their ability to develop themselves through learning and practicing. In contrast, those with a fixed mindset, as Kouzes and Posner (2019) discussed, have experienced their life as a constant measure of their talents, intelligence, and abilities, which influences their actions and decisions. According to Lou and Noels (2016), people with a fixed mindset avoid challenges that highlight their lack of ability or that they perceive they cannot overcome. Arguably, leaders with a growth mindset can influence employees' behavior towards improvement and development, which in turn influences employees' attitudes and organizational culture. Organizational learning culture outlines the interactions among organizational subordinates and their practices of sharing knowledge and experience. A company's focus on organizational learning, for example, can be seen as a distinct, sustained competitive advantage (Curado, 2006). Further, learning culture and knowledge can enhance an organization's flexibility, allow it to react faster to overcome challenges and changes, and contribute to innovation and creativity (Curado, 2006). Other scholars (e.g., Szulanski, 2003) have observed competitive advantage at the organizational level as a function of organizational learning processes. Changing the mindset is not complex, but it requires (a) purposeful leadership; (b) modelling what one expects from others to ensure the change process; (c) involvement and engagement to move rapidly; and (d) a process for hiring, firing, promoting, and communication to ensure sustainability (Johnston, 2017). However, little attention has been given to the combination of the three approaches that contribute to sustainable competitive advantage: design thinking methodology, leadership growth mindset, and organizational learning culture. As well, there is a shortage of empirical evidence to explain the stimulation of innovation and creativity as strategies to create sustainable competitive advantage.

3 Methodology

I adopted a qualitative research method using Microsoft as a case example to examine the study assumptions and the key argument that sustainable competitive advantage is contingent upon the stimulation of organizational creativity and innovation. Qualitative data were obtained from secondary sources (e.g., published documents, the Microsoft website, and literature that included Microsoft leaders' and experts' opinions and insights) on issues such as the implementation of design thinking, growth mindset, and learning culture approaches. A purposeful sampling strategy is employed to understand the research arguments. The purpose of

examining these logically integrated approaches is to draw a strategic leadership model for organizational sustainable competitive advantage.

4 Discussion and Analysis

This section is organized, first, to investigate and provide a brief explanation of the case example of Microsoft and, second, to examine the three research assumptions. The Microsoft case analysis highlights the effectiveness of the three approaches.

4.1 First: Microsoft as a Case Example

I selected Microsoft as a case example for several reasons. First, innovation is a key part of its values; it has more than 1000 professional researchers who focus on innovation and creativity in its labs (Microsoft, n.d.-c). Second, Microsoft is a large organization with 175,508 employees worldwide who aim to serve and earn the trust of billions of customers worldwide (Microsoft, n.d.-b). Third, Microsoft works hard and smart to achieve its mission (Microsoft, n.d.-a). Last, the Microsoft team spends a large amount of money on research and development for future sustainability (Pratap, 2018). Microsoft leaders observe innovation as a core competency of differentiation and sustainable competitive advantage (Woods, 2020). As discussed by Sangya Singh, chief experience officer and director of product management, Microsoft believes that innovation is a process of having an appropriate leadership style, developing a learning organizational culture, and using the methodology of design thinking (Woods, 2020). Microsoft applies the design thinking methodology as a key instrument for innovation in its daily processes and to achieve its mission to attain more by empowering all people and organizations worldwide (Microsoft, n.d.-a). Satya Nadella, the CEO, confirmed that design thinking allows for listening beyond words and realizing customers' unspoken needs (Bridge, 2020).

Elmansy (2017) explained how design thinking helps Microsoft develop empathy and solve customer problems with a user-centric lens, which has been critical to Microsoft's success. Microsoft fuels its creativity and innovation through a human-centered approach that focuses on the process of exploring the problem, finding the best ideas and solutions, and converting those solutions into market opportunities (Woods, 2020). At Microsoft, the application of the five steps of design thinking includes three stages: explore, create, and implement. The first stage, explore, is about avoiding bias and getting an in-depth understanding of the problem before jumping to design solutions. It requires direct observation and interviews with users to get insights into their needs and identify opportunities. The second stage, create, is a key tool to generate ideas through brainstorming and build on others' ideas. Based on early testing and weekly feedback from users, Microsoft makes improvements and ends up with a usable prototype after several iterations. A design thinking

mindset is based on being empathetic, optimistic, and experimental; iterating fast; and observing things from many perspectives to envision solutions that meet users' needs. Finally, implementation is the stage of creating a product that fulfils users' needs. Satya Nadella, Microsoft's CEO, explained the importance of culture in the adoption of the design thinking methodology by saying that any company can reach the stars if it has a culture of learning, listening, and connecting people's talents to the company's mission (Chaudhary, 2021). He characterized his responsibility in creating a learning culture as focusing on improving the growth mindset, delivering a positive customer experience, and enhancing diversity and teamwork. Nadella has promoted a culture that focuses on continuous learning and improvement and has encouraged employees, when ideas have flopped, to keep learning and improving.

4.2 Second: Examining the Study's Assumptions

To gain a better understanding of the study argument, there is a need to examine the research assumptions along with the analysis of Microsoft as a case example.

Examining the First Assumption. Design thinking methodology is a key strategy. Its five activities are grouped in this study into three areas: the two areas (creativity, invention) illustrate the process of design thinking, and the third area is added (innovation) that illustrates the outcomes. The first area, empathy, as part of creativity, serves the purpose of understanding and defining users' problems and needs in order to ideate possible solutions. Defining and ideating, as part of creativity, can be done by analyzing the observed and collected information. At Microsoft, employees use empathy as a tool to understand customers' needs. Then, define and ideate focus on understanding the collected information. Microsoft uses the design thinking process to define the problem and find solutions that lead to building and designing new products (Elmansy, 2017). In the second area, invention, Microsoft uses invention, or the process of developing prototypes and checking the quality of the product before releasing it to the market, and then evaluates it as a product that solves customers' problems or meets customers' needs (Elmansy, 2017). Singh, Microsoft's chief experience officer, described the company's use of creativity and invention, saying that Microsoft follows the strategy of engaging with employees. This strategy allows the team to discover problems, create concepts and prototypes, and then narrow those down to the desired product and release it (as cited in Woods, 2020). At Microsoft, this strategy is reflected through invention that helps end users to test the desired products that solve their problems (Elmansy, 2017). The third area, innovation, includes the implementation and commercialization of the selected solution to the market. Innovation entails the process of reaching the final shape of the solution or the product so that the organization can generate income from it. Design thinking is key for innovation because it helps Microsoft to know the next products and services that customers and stakeholders need (Nadella, as cited in Redmond, 2018). Examining the first assumption shows that the adoption of design

thinking becomes a key strategy for innovation and creativity, which is essential for differentiation.

Examining the Second Assumption. The combination of the three approaches is essential to stimulate innovation and creativity in an organization. Deploying design thinking methodology is practical to cultivating a leadership growth mindset and organizational learning culture. At Microsoft, Nadella wanted culture change "centered on delivering a growth mindset, to be customer-obsessed, diverse, and inclusive, and working as One Microsoft to get us there" (as cited in Chaudhary, 2021, para. 1). Microsoft identifies a growth mindset as one that is forward-thinking, which regards mistakes as opportunities to learn and places no limitations on intelligence or ability (Microsoft 365 Team, 2020). The company's growth mindset theory is that the availability of supportive environments and encouragement can help to develop people's intelligence and skills (Microsoft 365 Team, 2020).

Microsoft's leadership growth mindset—its belief in employees' ability to reach their potential and achieve anything with an acceptable level of effort (Microsoft 365 Team, 2020)—inspires cultural change because it focuses on the process rather than ability. Having a learning culture is important for organizations that aim to keep reinventing themselves (Nadella, as cited in Tan, 2019). Microsoft spreads a culture of learning by building a team environment with shared goals, stopping the fear of failing, encouraging the team ownership, and boosting creativity and innovation by considering mistakes as opportunities to learn (Microsoft 365 Team, 2020). As a result, it has attracted people who like challenges, who lead by example, who do not punish failure, and who encourage positivity and team development (Microsoft 365 Team, 2020). Microsoft has adopted several strategies to promote the culture of learning and the mindset that people's efforts and assertiveness can help in improving their skills over time (Weller, 2019). Using Microsoft as a case to examine the second assumption shows that to stimulate the innovation that is vital to compete successfully in the market, an organization needs to apply the design thinking process, improve leadership growth mindset, and shape the culture to be a learning culture.

Examining the Third Assumption. The three approaches together stimulate the innovation and creativity that determine an organization's sustainable competitive advantage. Microsoft has implemented the first approach, design thinking, using teams that focus on collecting ideas, brainstorming, and giving feedback (Ammerlaan, 2020). The implementation of the design thinking process has become one of Microsoft's sustainable competitive advantages (Woods, 2020). The application of design thinking has allowed Microsoft to collect information and understand stakeholders' needs to outline ideas and select the best solution. The second approach, leadership growth mindset, has also become a part of Microsoft's competitive advantage. According to Nazir et al. (2022), organizations have to highlight core competencies and to show their innovation abilities to stay competitive. Downie (2019) stressed that although leadership is critical to an organization's success, Microsoft's leadership growth mindset and culture have enabled it to keep its leading position, overcome its challenges, and sustain its economic profit. The third approach, learning culture, has led to remarkable diversity at Microsoft in

communication styles such as mind maps that design networks and interconnected ideas (Ammerlaan, 2020). Under Nadella's leadership, Microsoft's learning culture, brand image, and human resource management have been improved (Pratap, 2018). These factors have all been sources of Microsoft's sustainable competitive advantage. The application of the integrated approaches has been observed in investments on research and development to foster innovation through discovering new areas of knowledge and technology. This type of investment helps Microsoft expand its range of products significantly and compete successfully in several areas. The application of the three approaches has thus become a source of Microsoft's competitive advantage, helping it to keep and/or increase its market share.

5 Results and Implications: A Proposed Model and the Matrix

5.1 The Proposed Model

The focus of this study is to develop a model that identifies the key approaches that facilitate innovation and creativity to build an organization's sustainable competitive advantage (see Fig. 1).

The proposed model highlights three significant contributions to organizational sustainable competitive advantage. First, the contribution of design thinking has been confirmed by scholars. Cousins (2018), for example, observed design thinking methodology as a management tool to create sustainable competitive advantage by collecting external knowledge to create values. Hodges and Link (2019) stated that creativity and innovation can be adopted through design thinking, which can help the organization in building its competitive advantage within an industry. Dunne and Martin (2006) underlined skills that managers should have to implement the process of design thinking successfully and capitalize on its role in building an organization's competitive advantage. Lee et al. (2019) asserted that design thinking is a creative problem-solving approach, and that collaboration and interaction not only facilitate but also develop people's creativity. The second contribution to sustainable competitive advantage shown in Fig. 1 is leadership growth mindset and culture of learning. Cousins (2018) discussed learning by doing and highlighted the practice that uses prototypes to stimulate thinking and turn ideas into tangible samples. Curado (2006) explained that organizational learning is an instrument that can be used to develop imitable valued competencies that can also contribute to the competitiveness of an organization. This study provides evidence, from Microsoft as a case example, of the role of leadership growth mindset and learning culture on encouraging employees' creativity and innovation, which in turn play a role in creating competitive advantage. The third contribution to an organization's sustainable competitive advantage is innovation and creativity. Creativity is the prerequisite for innovation in which innovation is the product of creative ideas through the design

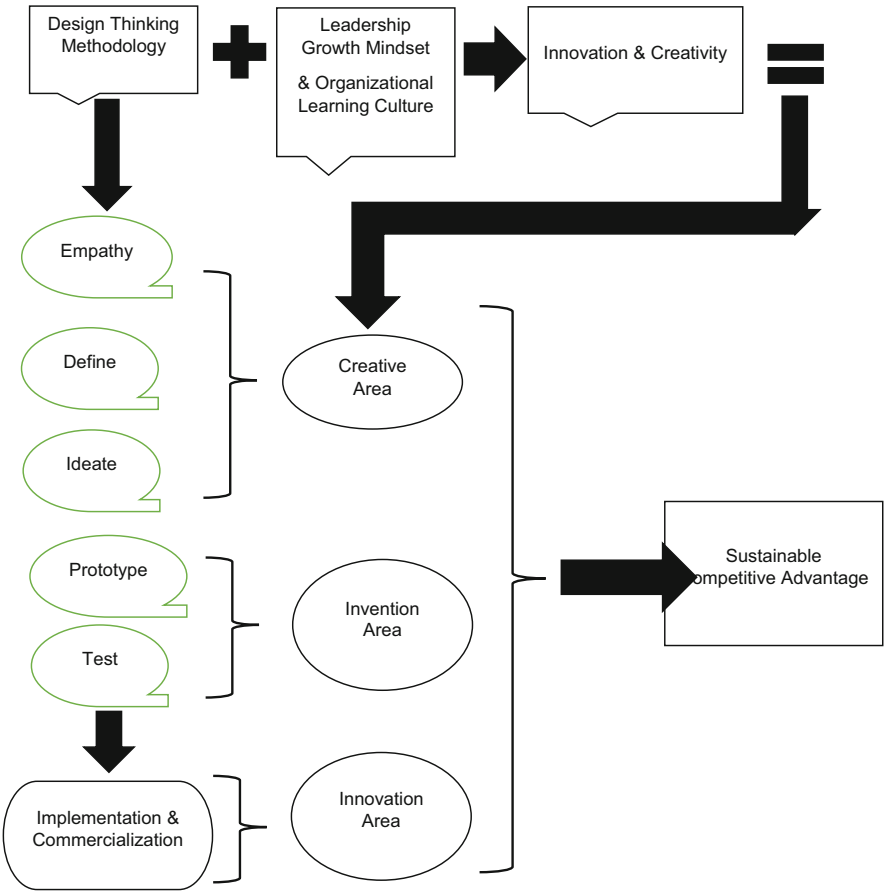

Fig. 1 A model of stimulating innovation and creativity to build sustainable competitive advantage

thinking process (Hodges & Link, 2019). According to Ballie (2019), creating a culture that supports innovation can be used to secure and grow an organization's competitive advantage. Kuppelwieser (2011) confirmed that to compete successfully in competitive markets, innovation and creativity are a must.

5.2 The Innovation and Creativity Assessment Matrix

The findings from examining the research assumptions are illustrated in an innovation and creativity assessment matrix (see Fig. 2). I developed the matrix based on the Microsoft case investigation, and it can be used as a tool to evaluate innovation and creativity at the organizational level. In other words, the matrix helps leaders to

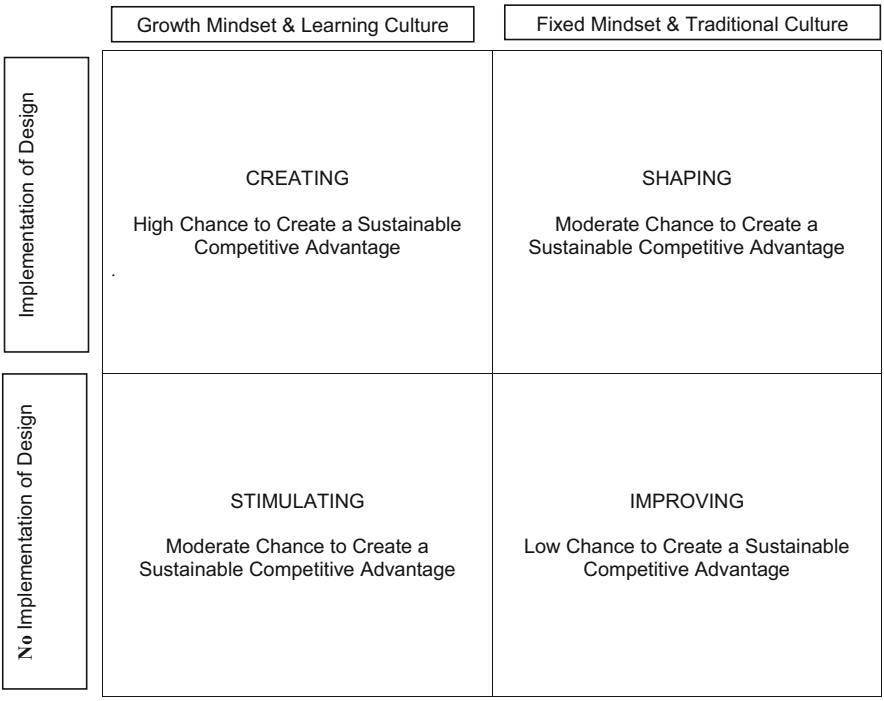

Fig. 2 Innovation and creativity assessment matrix

optimize their organization's sustainable competitive advantage by evaluating their implementation of these variables.

1. The first quadrant, creating, indicates a high chance of creating a sustainable competitive advantage. The contribution of innovation and creativity is high given the implementation of design thinking methodology and its three areas that are associated with leadership growth mindset and a learning culture. This combination gives organizations the necessary tools to sustain success in the long run.
2. The second quadrant, shaping, gives a moderate chance of creating a sustainable competitive advantage. Leadership fixed mindset and traditional culture might create barriers to innovation and creativity, hindering competitiveness. However, the existing implementation of design thinking methodology might offer an opportunity to shape the culture and the mindset in the long run, therefore enhancing competitiveness.
3. The third quadrant, stimulating, presents a moderate chance of creating a sustainable competitive advantage. The organization is not implementing design thinking methodology, but the leadership growth mindset and learning culture provide an opportunity for flexibility that can be utilized to stimulate innovation and build competitive advantage. Leadership growth mindset and learning culture can also

facilitate and support the organization's potential implementation of design thinking methodology in the long run.

4. Organizations in the fourth quadrant, improving, have a low chance of creating a sustainable competitive advantage. The presence of a fixed mindset that believes in rigid talent and intelligence, and the absence of design thinking methodology, requires improvement. A fixed mindset cannot help in stimulating the innovation that is essential for creating competitive advantage. With a fixed mindset and traditional culture, organizational leaders may compete using traditional strategies such as cost leadership, but it might not be competitive enough to sustain long-term success.

6 Conclusion

This study explains, based on a case investigation of Microsoft, how the three approaches of design thinking methodology, leadership growth mindset, and learning culture can stimulate organizational innovation and creativity, and together determine an organization's sustainable competitive advantage. Microsoft is investigated to explore the practical applications of the research assumptions. A model was developed to boost understanding of these three critical approaches, and a matrix is proposed to evaluate organizational innovation and creativity. The proposed model and matrix will help leaders develop their organization's competitive advantage and compete successfully. The proposed model and the innovation and creativity assessment matrix show the contribution of the three approaches to innovation and to the field of competitive advantage. The matrix helps leaders to optimize their organization's competitive advantage by evaluating their implementation of these variables. The proposed model helps leaders understand their current status and strengths, and how to improve what may be lacking in their organizations. The matrix helps leaders evaluate their situation and take proactive steps to move into, and stay, in the first quadrant. I recognize that this study has its limitations. First, the proposed model relies on one case example; other cases should be considered to reinforce these findings. Similarly, testing the assumptions also relied on one case from one industry, and this limitation creates the potential for method bias. Other cases should be investigated from other industries to test the assumptions of the model and the matrix. In addition, this study focused on design thinking methodology and organizational culture to stimulate creativity and build competitive advantage. Future work could explore other sources of competitive advantage such as brands, marketing, and global presence.

References

Ammerlaan, M. (2020, May 4). *Whiteboarding and brainstorming in Microsoft Teams*. Microsoft. Retrieved from https://techcommunity.microsoft.com/t5/microsoft-teams-blog/whiteboarding-and-brainstorming-in-microsoft-teams/ba-p/1353554.

Ballie, J. (2019). Design thinking for progress: Initial insights from an evolving design-led business support programme for Scotland. *The Design Journal, 22*, 981–995. https://doi.org/10.1080/14606925.2019.1595412

Bridge, D. F. S. (2020, December 7). Satya Nadella @ SFF—Purpose, culture, design thinking and cricket. Retrieved from https://bridgeto.us/2020/12/07/satya-nadella-purpose-culture-design-thinking-and-cricket/

Camacho, M. (2017, June 6). David Kelley: From design to design thinking at Stanford and IDEO. Echos School of Design Thinking. Retrieved from https://schoolofdesignthinking.echos.cc/blog/2017/06/david-kelley-from-design-to-design-thinking-at-stanford-and-ideo/

Chaudhary, R. (2021, March 5). *How Satya Nadella brought a growth mindset to Microsoft*. Mint News. Retrieved from https://www.livemint.com/news/business-of-life/how-satya-nadella-brought-a-growth-mindset-to-microsoft-11614874643362.html

Cousins, B. (2018). Validating a design thinking strategy: Merging design thinking and absorptive capacity to build a dynamic capability and competitive advantage. *Journal of Innovation Management, 6*(2), 102–120. https://doi.org/10.24840/2183-0606_006.002_0006

Curado, C. (2006). Organisational learning and organisational design. *The Learning Organization, 13*(1), 25–48. https://doi.org/10.1108/09696470610639112

Dam, R. F., & Siang, T. Y. (2020, December 30). *5 stages in the design thinking process*. Interaction Design Foundation. Retrieved from https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process

Downie, R. (2019, October 30). *Microsoft's competitive advantage: An inside look*. Investopedia. Retrieved from https://www.investopedia.com/articles/insights/072516/microsofts-competitive-advantage-inside-look.asp

Dunne, D., & Martin, R. (2006). Design thinking and how it will change management education: An interview and discussion. *Academy of Management Learning and Education, 5*(4), 512–523. https://doi.org/10.5465/AMLE.2006.23473212

Elmansy, R. (2017, January 4). *How design thinking reshaped Microsoft products*. Designorate. Retrieved from https://www.designorate.com/design-thinking-reshaped-microsoft-products/

Hodges, N. J., & Link, A. N. (2019). Innovation by design. *Small Business Economics, 52*(2), 395–403. https://doi.org/10.1007/s11187-018-0098-1

Jayakumar, T., Das, K., & Srivastava, N. (2019). Design thinking: A working strategy for the third sector. *The Journal of Business Strategy, 40*(5), 28–38. https://doi.org/10.1108/JBS-11-2018-0195

Johnston, I. (2017). Creating a growth mindset. *Strategic HR Review, 16*(4), 155–160. https://doi.org/10.1108/SHR-04-2017-0022

Kouzes, T. K., & Posner, B. Z. (2019). Influence of managers' mindset on leadership behavior. *Leadership and Organization Development Journal, 40*(8), 829–844. https://doi.org/10.1108/LODJ-03-2019-0142

Kuppelwieser, V. G. (2011). Stewardship behavior and creativity. *Management Revue, 22*(3), 274–295. https://doi.org/10.2307/41783688

Lee, J., Jung, Y., & Yoon, S. (2019). Fostering group creativity through design thinking projects. *Knowledge Management and E-Learning, 11*(3), 378–392. https://doi.org/10.34105/j.kmel.2019.11.020

Lou, N. M., & Noels, K. A. (2016). Changing language mindsets: Implications for goal orientations and responses to failure in and outside the second language classroom. *Contemporary Educational Psychology, 46*, 22–33. https://doi.org/10.1016/j.cedpsych.2016.03.004

Microsoft. (n.d.-a). *About*. Retrieved from https://www.microsoft.com/en-gulf/about

Microsoft. (n.d.-b). *Facts about Microsoft*. Retrieved from https://news.microsoft.com/facts-about-microsoft/

Microsoft. (n.d.-c). *What we value*. Retrieved from https://www.microsoft.com/en-gulf/about/values

Microsoft 365 Team. (2020, June 12). *Grow your business with a growth mindset*. Retrieved from https://www.microsoft.com/en-us/microsoft-365/business-insights-ideas/resources/grow-your-business-with-a-growth-mindset

Murphy, M. C., & Dweck, C. S. (2016). Mindsets shape consumer behavior. *Journal of Consumer Psychology, 26*(1), 127–136. https://doi.org/10.1016/j.jcps.2015.06.005

Nazir, T. N., Nawaz, N., Mahalakshmi, J., Gajenderan, V., & Hasani, I. (2022). A study on the impact of sustainable leadership and core competencies on sustainable competitive advantage in the information technology (IT) sector. *Sustainability, 14*(11), 6899. https://doi.org/10.3390/su14116899

Pratap, A. (2018, December 19). *Microsoft sources of competitive advantage: What are Microsoft's sources of competitive advantage?* Notesmatic. Retrieved from https://notesmatic.com/microsoft-sources-of-competitive-advantage/

Redmond, J. (2018, February 22). *Empathy is key to innovation, says Microsoft CEO*. SmartBrief. Retrieved from https://www.smartbrief.com/s/2018/02/empathy-key-innovation-says-microsoft-ceo

Szulanski, G. (2003). *Sticky knowledge: Barriers to knowing in the firm*. Sage Publications.

Tan, J. (2019, March 29). *Microsoft's Satya Nadella: 'Innovation comes from having a deep sense of empathy'*. Marketing Interactive. Retrieved from https://www.marketing-interactive.com/microsofts-satya-nadella-innovation-comes-from-having-a-deep-sense-of-empathy

Walters, H. (2013, October 16). *Why we need creative confidence*. TED Conferences. Retrieved from https://ideas.ted.com/david-kelley-on-the-need-for-creative-confidence/

Weller, C. (2019, November 7). *A peek inside Microsoft's growth-mindset evolution*. Neuro Leadership Institute. Retrieved from https://neuroleadership.com/your-brain-at-work/microsoft-growth-mindset-evolution-explained/

Woods, A. (2020, December 15). *Microsoft: Creative innovation through systematic design thinking to solve human problems*. B2e Media Ltd. Retrieved from https://www.b2e-media.com/executiveinsights/microsoft-creative-innovation-through-systematic-design-thinking-to-solve-human-problems

Sustainable Leadership and Sustainability: Insights from the GCC

Marwan Mohamed Abdeldayem and Saeed Hameed Aldulaimi

1 Introduction

Sustainability is more complicated than just a question of durability. It discusses how certain initiatives can be developed without compromising the growth of others in the immediate and long-term environment.

A lack of sustainability: According to Hargreaves and Fink (2006), every one of the principles of sustainable leadership and learning is violated by imposed, short-term targets (or adequate yearly progress).

Development is a civilized change that includes various material and moral aspects of life. It is a well-studied and planned civilized process that aims to create significant transformations in the economic, agricultural, political, social, and service sectors. In other words, development contributes to improving the quality of life of the citizen and improving his standard of living, providing the required social protection, and creating new and qualitative job opportunities leading to social and economic well-being, through realizing the investment of the population opportunity. Thus, the primary goal of sustainable development is to meet human needs and achieve social welfare in the long run while preserving the human and natural resource base and reducing environmental degradation. In order to accomplish this, a dynamic balance must be reached between economic and social development on the one hand and resource management and environmental protection on the other hand (Baqi et al., 2022).

Sustainable leadership has an impact, spreads, and endures. It is a shared responsibility that takes care of the local educational and community environment and

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avoids causing harm without unnecessarily depleting human or financial resources (Hargreaves).

In this study, seven sustainable leadership tenets are discussed as follows:

Depth (it matters): In relationships of care for others, it preserves, safeguard, and supports deep and broad learning for all.

Stamina (it endures): It advances and protects the most priceless facets of education and life over time, year after year, from one leader to the next.

Breadths (it spreads): It is both sustained by and dependent upon other people's leadership.

Justice (it has no adverse environmental effects): By finding ways to share knowledge and resources with nearby business organizations in the GCC and the local community, sustainable leadership actively works to improve the environment.

Diversity (diversity is encouraged): Sustainable leadership promotes peaceful diversity while avoiding aligned policy standardization, curriculum, assessment, staff development, and teaching and learning-related training. It fosters diversity, benefits from it, and forges links among its incredibly diverse components.

Resourcefulness (it reduces spending): Resource development and resource conservation are hallmarks of sustainable leadership. Sustainable leadership is a prudent and resourceful leadership that does not waste either its resources or its workforce. It revitalizes people's vigor.

Conservation (it respects the past while fostering the future): In its efforts to forge a better future, sustainable leadership honors the past and builds on it.

The remainder of the chapter is structured as follows: Section 2 reviews the literature demonstrating the link between changes in credit ratings and stock prices. Section 3 contains the research methodology, data sources, and primary variable measures. The empirical analysis of the relationship between changes in credit ratings and stock prices is presented in Sect. 4, along with the test results. Conclusions and summary are presented in Sect. 5.

2 Literature Review

Contrasting transformational leadership (TL) and sustainable leadership (SL): Numerous institutions share similarities, most notably transformational leadership, which, like SL, aims to transform systems. James Macgregor Burns created the transformational leadership (TL) theory in 1978, setting it apart from transactional leadership. In order to address unmet social needs by changing the status quo, Burns defined transformational leadership as a process in which leaders and followers work together to develop stronger intrinsic motivation. According to the first definition, leadership consists of knowledge and abilities that help others function well within the constraints of the status quo. He understood that transformational leaders offer their followers more than just the chance to work for their own gain; they also help them develop a new sense of self and a compelling mission and vision. This kind of

leader also challenges followers to develop novel, original ways to alter the present situation and the surrounding environment to assist individuals in successfully meeting their needs (Iqbal et al., 2022).

The ability of organizations to function within societies depends on leadership. To increase leaders' effectiveness, various leadership philosophies have been put forth over the years (Dubrin, 2012). Visser and Courtice (2011) define the sustainable leader as "a leader who encourages them and supports his subordinates to work to make the world better," and a study (de Haan, 2016) considers that the sustainable leader "is that leader who believes that his organization has a mere investigative role short-term temporary gain, as it develops business strategies and implements activities, and makes sure that the results are achieved business achieves and satisfies the three societal needs (economic, social and environmental) that represent the dimensions basic to sustainable development." The sustainable leadership is a self-reinforcing system of leadership that emphasizes the human management aspects of people appraisal and organization preparation as an essential partner in achieving societal well-being and sustainability of its future horizons. Gerard et al. (2017) define sustainable leadership as "leadership that seeks to promote and deepen access to knowledge of things that persist and spread without causing damage, to ensure positive effects on everything surrounding us at the present time and the continuation of these positive influences on what will surround future generations, the recipient (WBCSD, 2011; Hargreaves & Fink, 2006)".

Modern sustainable leadership models are compared to .SL. We have focused our attention in the context of this study on tactics that specifically address the problem of transformation and sustainable development. There are other approaches besides these. They were picked because they seemed to be important for sustainability and systemic change. To address the current capitalism crisis, Roberts (2012) has made a special effort to enhance transformational leadership capacities. Similar to this, Peter Senge (2008) adopted an all-encompassing leadership perspective on the need to change the larger economic system. Luenberger and Goleman examined what it takes for executives to lead sustainability initiatives in their businesses in their 2010 study. The comparison will be strengthened by the fact that these three approaches—transformational leadership, systems thinking, and emotional intelligence, respectively—represent different academic backgrounds (Abdeldayem et al. 2021; 2022).

3 Methodology

Attendance at conferences, site visits to different business organizations in the GCC, and ethnographic observations of instruction, as well as individual and focus group interviews with organizations' leaders, managers, and policymakers were the essence of data collection and analysis of this study.

The preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines are created by Moher et al. (2009) in order to conduct a

thorough review of the literature on sustainable leadership. Scopus, ScienceDirect, PubMed, JSTOR, EBSCO, Sage, Emerald ACM Digital, Taylor and Francis, Springer, and Wiley are just a few of the reputable research databases from which the literature was retrieved. "Sustainable leadership" and "leadership sustainability" are the keywords that are used as Boolean expressions.

4 Analysis and Empirical Findings

This chapter outlines several important characteristics of SL by looking at the literature on economic trends, organizational change, sustainability, and leadership as well as the findings of many interviews with prominent sustainability thinkers and practitioners. The underlying assumptions underpinning current, mainstream business leadership practices must be rethought to implement SL. First and foremost is the concept of adding value, which is not the same as merely generating income or incurring expenses. Profits result from shared value, which is created through a process of intentional cooperation and long-term interests with a common objective of stakeholders in a particular value chain. The 6C model, which can be used to classify the traits of SL, refers to the six leadership attribute categories of context, consciousness, continuity, connectedness, creativity, and collectiveness. The effectiveness of this model will be compared to a few other modern leadership frameworks developed for sustainability. In other words, "SL proposes the creation of three new C-based cognitive and technical frameworks." Under the heading "6C Sustainable Leadership model," Table 1 lists the key new leadership elements.

SDGs 5 (Gender Equality), 6 (Clean Water and Sanitation), 12 (Responsible Consumption and Production), and 13 (Climate Action) present significant challenges for the six Gulf Cooperation Council (GCC) members of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE).These challenges

Table 1 Elements of the 6C model of sustainable leadership

SL elements	Monetary and business concepts
1. Context	Acknowledging mega-trends, resource constraints, complexity, ambiguity, interconnectedness, and interdependence
2. Connectedness	Long-term horizon, courage, strength, and a shared goal are some examples of mindsets, worldviews, beliefs, mental models, and attitudes Centering; the processes of change
3. Continuity	Long-term perspective, bravery, strength, unity of purpose, centering, and change processes
4. Connectedness	Serving the interests of all parties, long- and short-term influence, cooperation, fairness, altruism, relatedness, and focusing on needs rather than wants
5. Creativity	New value measurement models, sustainable business models, innovation for sustainable shared value creation, and flow
6. Collectiveness	Increase scale for greater impact, incorporate sustainability into organizational structures, promote sustainable consumption

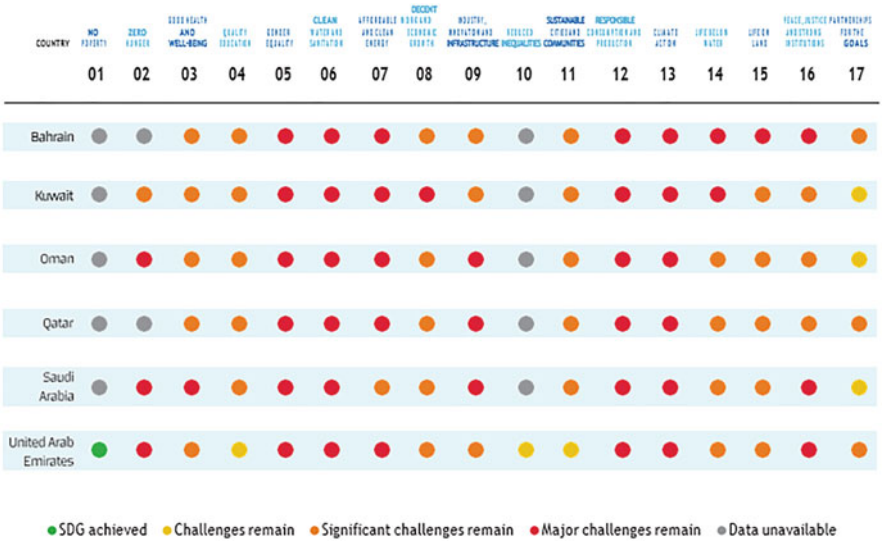

Fig. 1 SDG dashboard for the Gulf Cooperation Council

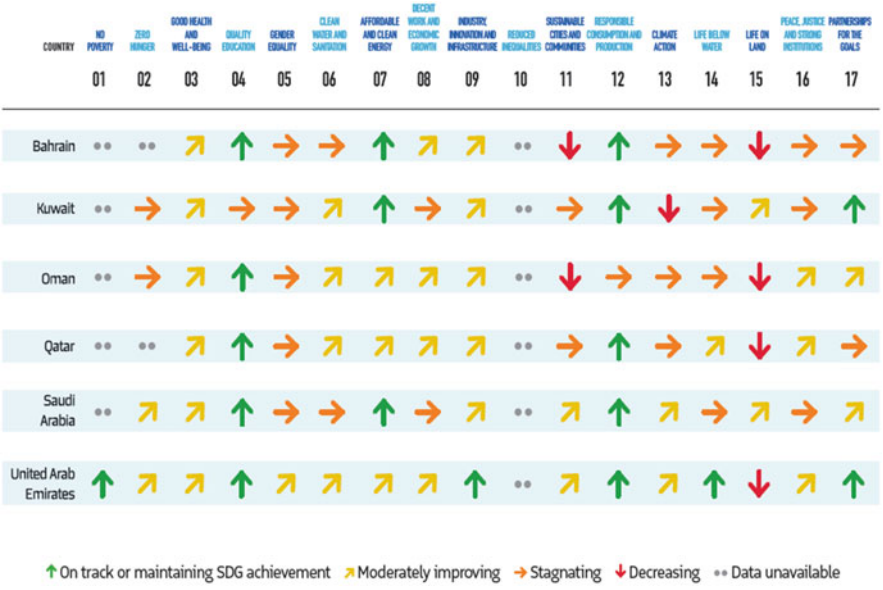

Fig. 2 SDG trend dashboard for the Gulf Cooperation Council

are depicted in Figs. 1 and 2. There are still serious issues with health-related indicators (prevalence of obesity), water scarcity (freshwater withdrawals as a proportion of all renewable water resources), clean energy (output of renewable

electricity), and air quality (annual mean particulate matter concentration), which are all signs of the health of the environment.

It can also be noticed from Figs. 1 and 2 that specifically for SDG 1 (Zero Poverty), the UAE is one of only three nations to receive a green score. A score of green on all indicators pertaining to eradicating poverty serves as the foundation for this. The GCC performs better than other subregions in terms of Goal 17 (Partnerships for the Goals). Furthermore, neither SDG 4 (Quality Education) nor SDG 11 (Sustainable Cities and Communities) receives red scores from any GCC member nations.

Nevertheless, there are still sizable data gaps regarding SDGs 1 and 10 (Reduced Inequalities) for the rest of the GCC, which makes it difficult to evaluate how well these nations are doing in terms of achieving these SDGs. On an indicator level, there are significant data gaps for other SDGs relating to child labor, new HIV infections, battle-related deaths, and marriage of girls under the age of 15.

Every GCC country, except Kuwait and Oman, is on track to achieve SDGs 4 (Quality Education) and 12 (Responsible Consumption and Production), according to the trend dashboard (Fig. 2). SDG 3 (Good Health and Well-Being), SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), and SDG 9 (Industry, Innovation, and Infrastructure) also show encouraging trends. In addition, partnerships (Statistical Performance Index) and markers of peace (political stability and a lack of terrorism) show that the region is progressing in the right direction. Positively, the prevalence of obesity is declining throughout the GCC. The Red List Index of species survival and public spending (government health and education spending) indicators both showed negative trends across the subregion with the exception of Saudi Arabia and Kuwait.

The Kingdom of Bahrain devotes all of its efforts to safeguarding the environment and natural resources, with the overarching goal of ensuring the sustainability of the development process across a range of industries. As stated in Bahrain's economic vision and strategy 2030, the National Strategic Structure Plan 2030, and the government's action program for the years 2015–2018, the Constitution and the Charter guarantee environmental protection and the achievement of a balance between the needs of development and the social and economic aspects. The Kingdom of Bahrain supports these initiatives to preserve the biodiversity with which people share their environment, to safeguard the continuity and sustainability of the natural balance, to develop the policies and programs that the government adheres to in this regard, and to safeguard the environment, its resources, and systems (Unilever, 2012; Malik & Mehmood, 2022).

The Kingdom of Bahrain has established many institutions, governmental agencies, and committees interested in developing programs, policies, and strategies to achieve sustainability in its various dimensions. Bahrain continued its commitment to the requirements of this agreement, with a keenness to spread public awareness and build national capacities in areas related to the environment. The Kingdom of Bahrain has taken many steps to adopt the 2030 Sustainable Development Goals, based on its experience and expertise in achieving the Millennium Development Goals before the 2015 deadline. The Kingdom of Bahrain has paid great attention to

these goals and commitment to achieving them since their adoption in 2000, which was translated into four national reports to monitor progress in achieving these goals (Aldulaimi et al., 2022a, 2022b, 2022c).

The fourth and final national report, prepared with the support of the United Nations Development Program (UNDP) in 2021 and the Economic and Social Commission for Western Asia (ESCWA), reflects the progress made over the past decade, demonstrating the results of the important steps taken by the Government of the Kingdom of Bahrain to diversify its economy to help increase productivity, raise living standards, and create job opportunities for citizens. This decade has witnessed great achievements and breakthroughs in the formation of many institutions that have promoted the citizen and provided systems for protection, social and health care, development of the quality of education and its outputs, treatment of social inequality, support of vulnerable segments of the population, and provision of economic empowerment opportunities for youth. Supporting the political and economic participation of Bahraini women, taking care of preserving environmental resources, and ensuring the sustainability of Bahrain's development path reflect the major progress made in this regard. It is worth mentioning what was mentioned in the fourth report by the United Nations Development Program office in the Kingdom of Bahrain, where it cited the extraordinary achievements over the past 15 years and its commitment to achieving the Millennium Development Goals and integrating them into national development plans and government action programs (Abdeldayem et al., 2022a, 2022b). Nearly 40% of the population of Bahrain is under the age of 25. Hence, the Kingdom seeks in this context to open new educational pathways for large segments of youth by enabling e-learning and integrating digital skills into the educational process. The World Bank study "Women, Business and Law 2020" has spoken about the tremendous improvements that the Kingdom has worked on in this regard and its 2021 score of 80%, which is higher than its 2020 score of 70.6% (Singh et al., 2022). Regarding gender equality, the Saudi delegation spoke about the great development that the Kingdom has worked on and its goal to raise the percentage of women's participation in the labor market (2022). In addition to the cutting-edge scientific and technological projects, the Kingdom is working on to protect life under the sea, mentioning the joint mission it carried out in collaboration with "OceanX," which lasted for 6 weeks on board the "Ocean Explorer" ship, which will result in new scientific research and broader knowledge about marine ecosystems in the Kingdom, as well as increased protection of coral reefs and the marine environment. Regarding safeguarding life on land, mention was made of the Kingdom's plans to prevent desertification and the Saudi Green Initiative, which aims to plant 10 billion trees locally and reduce carbon emissions by 278 million tons annually (Abdeldayem et al., 2022b). This goal contributes to the positive impact on many aspects of development in the United Arab Emirates, such as economic growth and poverty reduction. It includes the initiatives and policies put in place by the state to achieve this goal. Challenges facing this goal include an increase in the demand for food with an increase in population growth, which may increase the possibility of exposing the country to external risks that reduce the availability of food (Akerlof & Schiller, 2008).

The UAE embodies the highest forms of gender equality. One of the characteristics of non-developed countries is the marginalization of women at all levels, and this is something we do not see at all in the UAE. Rather, we find a long list of inspiring Emirati women who hold prestigious positions and write great achievements with the support of the wise leadership, and accordingly, the UAE's efforts in sustainable development for this goal focus on achieving gender equality and empowering women and girls. In terms of clean water and sanitation, water crisis is one of the biggest issues threatening the world, and the UAE is one of the water-poorest regions in the world. The UAE Water Security Strategy 2036, which focuses on achieving security, was introduced by the Ministry of Energy and Industry to fulfill the sixth goal of the Sustainable Development Goals in the United Arab Emirates. Challenges include having a flexible energy system that includes on-demand generation, storage, demand management, and networking, and it requires more research to ensure the stability of the system. The UAE has launched the "Atuma" electronic platform to manage energy data more efficiently and facilitate annual data collection for the ministry and relevant stakeholders. There has been growth in the economy, and decent work is done.

Also, the country has launched the unified online portal for skilled self-employment, which aims to support Emiratization efforts through linking national skills to various programs and services in the public and private sectors; the electronic portal provides a package of facilities and incentives for companies that use it to seek the help of national competencies. In 2017–2018, it launched a series of smart applications to raise efficiency and enhance the ease of providing services. With industry, innovation, and infrastructure, the UAE aims to become among the top ten countries in the world by the golden jubilee of the union in 2021, and preparations for this year have been made as part of unremitting efforts during the year 2020, which was called the year of preparation for the 50th year, and efforts have touched this ninth goal, as a set of initiatives have been launched and policies to support and enhance it, including Karia (2022) launch of the "Innovative Directory of Companies in the United Arab Emirates" in cooperation with the National Research Center, to highlight the ministry's role in implementing the Emirates National Strategy for Innovation 2017 and launch of the "Annual National Index for Corporate Social Responsibility" to monitor the path of companies operating in the UAE to ensure their contribution to corporate social responsibility initiatives (Sultan et al., 2022). In addition to providing support to widows, divorcees, and needy families, people of determination are also supported, and the state is concerned that everyone has equal opportunities, whether in education or work. To implement this goal, the state has developed several policies and initiatives, and the UAE is one of the countries that pays remarkable attention to this aspect (Abualigah et al., 2022). For example, there is a sustainable schools initiative that is considered supportive of this goal, and the UAE has also worked to achieve it, along with the following policies and initiatives: in 2017, the Emirates Comprehensive Plan Project, which aims to develop an integrated long-term plan to develop policies and a road map for the state that includes in its provisions environmental, urban, economic, and social axes; in 2017, the National Housing Initiative, which

aims to establish a regulatory framework for the housing process; and in 2018, developing of the national legal framework policy for partnership between the public and private sectors to develop the partnership policy between the two sectors (Samour et al., 2022); Almulhim & Cobbinah (2022).

5 Conclusions

Due to the complexity and interdependence of stakeholder needs in today's world, the leadership models examined for the purposes of this chapter confirm that while SL builds on TL, SL has a wider scope in the six Gulf Cooperation Council (GCC) members of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE). In particular, the comparison of leadership theories and the analysis of sustainable business practices support the notion that future leaders will need to fundamentally alter their ways of thinking and awareness. The emphasis on consciousness fits with some current trends in economic science, such as pointing out the flaws in supply and demand, market equilibrium, and rationality economic theories, which ignore psychological, social, and ecological realities.

Moreover, the SL model will need to be validated in business practice, and each SL leadership attribute will need to be defined in greater detail. The next step is to choose the most effective strategy for helping leaders develop these qualities. The 6C model's ultimate goal is to be used as a model for leadership development by organizations that are committed to achieving sustainable business transformation and making a positive impact on the development of sustainable economic systems.

References

Abdeldayem, M. M., Aldulaimi, S. H., & Alazzawi, A. (2021, November). Sustainable leadership and academic excellence: Arab culture perspective. In *2021 sustainable leadership and academic excellence international conference (SLAE)* (pp. 33–37). IEEE.

Abdeldayem, M. M., Aldulaimi, S., & Abo, K. M. (2022a). Implementing Green human resources management to promote sustainability development: Application from telecommunication companies in Kingdom of Bahrain. *Journal of Statistics Applications and Probability, 11*(1), 251–260.

Abdeldayem, M. M., Dulaimi, A., & Hameed, S. (2022b). Examining the impact of renewable energy technologies on sustainability development in the MENA region. *International Journal of Engineering Business Management, 14*, 1–13.

Abdelhakim, M. N, Abdeldayem, M., El Mistikawi, S., & Aldulaimi, S. (2022) Contribution of private companies in achieving sustainable development goals: Case studies from the UAE. *Seybold report*, *17*(6), 182–193.

Abualigah, A., Koburtay, T., Bourini, I., Badar, K., & Gerged, A. M. (2022). Towards sustainable development in the hospitality sector: Does green human resource management stimulate green creativity? A moderated mediation model. *Business Strategy and the Environment*.

Akerlof, G. A., & Schiller, R. J. (2008). *Animal spirits, how human psychology drives the economy and why it matters for global capitalism*. Princeton University Press.

Aldulaimi, S. H., Abdeldayem, M. M., Al-Sanjary, O. I., & Abdelhakim, M. (2022a, June). A paradigm of the sustainability and energy saving strategies in GCC. In *2022 ASU international conference in emerging technologies for sustainability and intelligent systems (ICETSIS)* (pp. 10–16). IEEE.

Aldulaimi, S. H., Abdeldayem, M. M., Jumaa, H. T., Mohamed, H. M., & Abdulrazaq, M. L. (2022b, June). Critical challenges of virtual learning environments (VLEs) and learning theories. In *2022 ASU international conference in emerging technologies for sustainability and intelligent systems (ICETSIS)* (pp. 29–36). IEEE.

Aldulaimi, S. H., Ali, B. J., Yas, Q. M., Abdeldayem, M. M., Aswad, A. R., & Hammad, A. M. (2022c, June). Application of big data analysis to foresight the future: A review of opportunities, approaches, and new research directions. In *2022 ASU international conference in emerging technologies for sustainability and intelligent systems (ICETSIS)* (pp. 346–354). IEEE.

Almulhim, A. I., & Cobbinah, P. B. (2022). Urbanization-environment conundrum: An invitation to sustainable development in Saudi Arabian cities. *International Journal of Sustainable Development and World Ecology*, 1–15.

Baqi, A., Aldulaimi, S. H., Abdeldayem, M. M., & Alazzawi, A. (2022, March). Proposing a multidimensional model to support organizational transformation and sustainable development decision in the Arab world. In *2022 international conference on decision aid sciences and applications (DASA)* (pp. 1775–1782).

de Haan, E. (2016). The leadership shadow: How to recognise and avoid derailment, hubris and overdrive. *Leadership, 12*(4), 504–512.

Dubrin, A. (2012). *Leadership: Research findings, practice and skills* (7th ed.). Houghton Mifflin.

Gerard, L., McMillan, J., & D'Annunzio-Green, N. (2017). Conceptualising sustainable leadership. *Industrial and Commercial Training, 49*, 116.

Hargreaves, A., & Fink, D. (2006). Redistributed leadership for sustainable professional learning communities. *Journal of school leadership, 16*(5), 550–565.

Iqbal, Q., Ahmad, N. H., Li, Z., & Li, Y. (2022). To walk in beauty: Sustainable leadership, frugal innovation and environmental performance. *Managerial and Decision Economics, 43*(3), 738–750.

Karia, N. (2022). A sustainable leadership model: Intelligence and innovation of knowledge resources. In *Sustainable development of human resources in a globalization period* (pp. 119–133). IGI Global.

Malik, H., & Mehmood, M. (2022). Impact of authentic leadership, sustainable leadership on sustainable growth with mediating role of organizational learning. *Academic Journal of Social Sciences (AJSS), 6*(1), 48–69.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., Altman, D., Antes, G., & Atkins, D. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine, 6*, e1000097.

Roberts, M. (2012). Transformational leadership. Worldview Thinking. Retrieved from www.worldviewthinking.com.

Samour, A., Baskaya, M. M., & Tursoy, T. (2022). The impact of financial development and FDI on renewable energy in the UAE: A path towards sustainable development. *Sustainability, 14*(3), 1208.

Senge, P. M. (2008). *The necessary revolution: How individuals and organizations are working together to create a sustainable world*. Doubleday.

Singh, H. P., Singh, A., Alam, F., & Agrawal, V. (2022). Impact of sustainable development goals on economic growth in Saudi Arabia: Role of education and training. *Sustainability, 14*(21), 14119.

Sultan, M. F., Shaikh, S. K., Tunio, M. N., & Asim, M. (2022). Sustainable leadership: A divine form to Lead and succeed in a holistic way. In *Sustainable development of human resources in a globalization period* (pp. 111–118). IGI Global.

Unilever. (2012). *Unilever sustainable living report*. Retrieved May 9, 2013, from www.unilever.com/sustainable-living/uslp/.

Visser, W., & Courtice, P. (2011). *Sustainability leadership: Linking theory and practice*. Retrieved from SSRN 1947221.

WBCSD (World Business Council for Sustainable Development). (2011). *Collaboration, innovation and transformation, ideas and inspiration for accelerating growth: a value chain approach*. Retrieved May 9, 2013, from www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=14257.

Innovation in Mining: A Case of a Diamond Mine

Nomkhosi Radebe

1 Introduction

The fourth industrial revolution (4IR) or Industry 4.0 has influenced the acceleration of innovation (Deloitte Touche Tohmatsu (Firm), 2018). According to Gruenhagen and Parker (2020), Calzada Olvera (2022), and Sánchez and Hartlieb (2020), the mining sector has long been viewed as conservative and slow to the adoption of change. The purpose of the research is to explore how innovation within a mature and traditional industry like mining is applicable. This will be studied through an understanding of why innovation is important in mining and impediments and enablers of innovation in this sector.

Calzada Olvera (2022) asserts how innovation has become imperative in helping mining companies achieve sustainability of operations and profitability. Innovation becomes a possible solution to the mining sector regarding the challenges they face such as the declining of minerals. According to Sambrook (2009), interest in innovation has since increased as businesses and markets become more dynamic. The importance of innovation as alluded by the author was further reinforced by one of the forefathers of innovation, Joseph Schumpeter, who argued that there should be continuous innovation in organisations so as to renew the value of their assets. The following research questions arose:

RQ1. Why is innovation important within the mining industry?
RQ2. What drives innovation in the mining industry?
RQ3. What are the barriers to innovation within the mining industry?

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The contribution of the chapter includes highlighting the importance of innovation in improving the efficiency and effectiveness of the organisation, which was evident both in the field and in the literature review. The barriers of innovation were found to be resource constraints and unsupportive culture amongst others. Furthermore, innovation was driven by processes and systems that were adjusted to accommodate innovation.

2 Literature Review

2.1 Innovation

Ganzer et al. (2017, p. 322) described innovation as "the actions and processes that **disrupt** the economic system while **allowing the emergence of novelty**". Sánchez and Hartlieb (2020, p. 1386), on the other hand, define innovation as a **process of change** through which a new idea or solution is applied in a good, service or reproductive procedure to **create value** and meet new requirements from customers and higher safety or environmental standards amongst other goals. If innovation is about change, novelty and value creation, is innovation significant therefore to an industry that is characterised as being at maturity stage and slow to transformation?

Buchheim et al. (2020) argue that when investigating innovation in any frame, distinguishing the different types of innovation becomes mandatory. Process innovation, product innovation, technological innovation, administrative innovation, technical innovation (a combination of product and process), incremental innovation and radical innovation were some of the mentioned innovation types (Afuah, 2020). Gruenhagen and Parker (2020) promote technological innovation as the innovation type that mining companies ought to commit to in future as it increases productivity and improves health and safety conditions.

Mitchell and Coles (2003) spoke about how business model innovation assisted in achieving competitive advantage. These authors concur with the view of Bashir and Verma (2017) that business model innovation as compared to improving the actual product or service tends to take longer to copy and may not be as easy since it takes much longer to understand someone's business model, and by the time you do, new customers' relationships are secured. Calzada Olvera (2022), on the other hand, is of the opinion that innovation through adopting technology from a third party is more frequent in mining.

2.2 Importance of Innovation

Klomp and Van Leeuwen (1999) consider innovation as an essential economic activity where innovative companies perform better in sales growth than

non-innovative counterparts. Stieglitz and Foss (2009) alluded to the importance of innovation as the critical characteristic differentiator to being an entrepreneur. Calzada Olvera (2022) listed the importance of innovation as follows: increasing efficiency, profitability, ability to comply with strict regulations and radically transform mining processes. This was further corroborated by Sánchez and Hartlieb (2020) when they echoed the same sentiments that innovation is vital in mining as it helps improve efficiency in their processes, reduces costs and further increases social and environmental impact.

Razavi et al. (2016) reiterate the importance of innovation when explaining how one cannot speak about competition or growth without citing innovation. These sentiments were shared by Sánchez and Hartlieb (2020) who attested to the importance of innovation in maintaining competition within the industry. Buchheim et al. (2020) emphasised the use of innovation by organisations to stay competitive. Rao et al. (2001) assert how innovation is essential in improving productivity. This is true to any organisation and industry such as mining where competition is rife.

2.3 Drivers of Innovation

Schiefer et al. (2009) elaborated on their article about innovation drivers being both *internal* and *external* drivers. They explained internal drivers as the **firm's size**, **firm experience**, **an in-depth understanding of the firm** and **structure of decisional processes**. They further described external factors as the **growing demand** and the **size of the market**.

Seshadri and Tripathy (2006) mention that the critical driver of organisational renewal is innovation.

2.4 Innovation Barriers

Gluszczuk (2013) points out the following: *Cost factors* include being too expensive, lack of finance and riskiness. *Knowledge factors* entail lack of qualified personnel and management attitude. *Market factors* involve uncertain demand for innovative goods or services. *Institutional factors* cover aspects such as lack of infrastructure, legislation, and regulations. *Cognitive barrier* is when managers who use a specific business model find it hard to understand the new business model. *Structural barrier* results from conflict with existing assets and business models. *Other reasons* include factors such as no need to innovate because of lack of demand.

3 Research Methodology

In this research, data was collected using a qualitative research method through face-to-face interviews and observations. There were 43 face-to-face interviews from the different departments, which were conducted on-site with representation from all the hierarchical levels to facilitate *data and methodical triangulation.* The participants consisted of executive committee members, senior managers, middle managers and a supervisor. Interviews were conducted at the premises of the mine, and participants were called in according to their availability. The initial interview schedules would get modified daily as availability of participants changed. The grounded theory rules of data collection were followed where the initially collected data was immediately analysed. Data was analysed using ATLAS.ti software after the data reduction stage.

4 Results

The sampled number of participants for the study was 50 participants; however, 43 were successfully interviewed and analysed. Therefore, the response rate was 86% of the study sample, which was high enough to produce valid data and ultimately credible research results.

4.1 Innovation

Five respondents suggested that innovation involves the generation of new solutions to improve operations to mitigate both internal and external challenges. An interviewee [P19] pointed out: *"... innovation is vital as a way of* ***developing solutions*** *to deal with both internal and external challenges"*. Another IT analyst in middle management indicated: "G*enerally,* ***employees come up with new ideas and provide the business case*** *and submit requests for capital approval to take the ideas further for implementation"* [P26].

The interview field data from two participants revealed that innovation encompasses a continual process of generating new solutions to improve operations to accomplish corporate goals. A mining manager at the level of senior management highlighted: *"There is one thing unique about our company which I have seen in the* ***past few years*** *that our* ***corporate strategy promotes the trying out of new things*** *in the work environment"* [P28]. A financial accountant confirmed: *"Innovation is* ***continual learning and unlearning of certain things*** *you are exposed to. So, one can't be innovative if you are not ready to* ***embrace new things****"* [P14].

The field data showed that the deployment of new ideas or solutions in operations assisted in overcoming corporate challenges by ensuring optimal use of the resources. [P39] affirmed: "*As a company we seek* ***to do more with fewer resources***

to reduce the associated costs". The focus of managing operations and applying new solutions is to optimise the utilisation of organisational resources in pursuing the expectation of various stakeholders. Regarding responding to stakeholders, [P19] made the following statement: *"You need innovation to be able to* ***meet the expectations of various stakeholders*** *and the biggest underlying factor is that customer sentiments change continuously"*.

4.2 Importance of Innovation

The results from the current study regarding the importance of innovation were diverse range of factors that triggered the company to bolster and accelerate its innovation commitment, investment and ultimate success. The identified reasons for innovation include **driving strategies, cost reduction, adaptation to change, fighting competition, improvement of efficiency and effectiveness, enhancing safety and hygiene, acquiring new technology, improvement of profitability, customer satisfaction** and **corporate social responsibilit**y.

4.2.1 Fighting Competition

There were eight participants who acknowledged the role of innovation in competing against rival businesses' manufacturing synthetic diamonds. The shared view was that new models are necessary to develop strategies that build a competitive edge. Five out of eight participants commented on the competition from companies' mining natural diamonds. According to the participants, innovative methods are necessary to reduce costs of mining and processing: *"We are closely looking at our natural diamonds against the laboratory fabricated synthetic diamonds in an effort* ***to gain competitive advantage****"* [P34]. A senior manager, business intelligence, with a mining engineering background said, *". . . we mine natural diamonds and others from the west are now making synthetic diamonds.* ***Artificial diamonds*** *are now in the market for low-income earners. We need to keep up with trends in the world to remain on the side of the economic laws"* [P4].

4.3 Drivers of Innovation

The findings of the current study revealed that the success of an organisation in fulfilling its defined purpose was a function of the leadership's ability to integrate resources and processes in different operating models executed by different departments. These generic capabilities are employed by the corporate leadership to exploit business opportunities.

4.3.1 Leadership

From the findings, it was noted that leadership was vital for the successful implementation of strategy to exploit business opportunities. The leadership is expected to be open-minded as they provide guidance and support. P33 shared that support from management was a key enabler of innovation *since HODs can include the innovation focus in the output agreement*. The leadership role is essential for the effective integration of organisational resources to facilitate the attainment of strategic corporate goals.

4.3.2 Technological Resources

It was mentioned in the results of the current study that technology was an enabler of innovation within the mining company. The technological resources include new equipment, information technology and technical expertise. [P24] shared that installed equipment *enables us to effectively deliver our innovative ideas.* The findings also suggested that no innovation can thrive without IT as well as the need for continuous research and development. There was another view that indicated that there should be *a technology framework that evaluates all technologies that we feel can add value.* The role of people with technological know-how was also recommended.

4.3.3 Structure, Processes and Systems

The field data of the current study suggested that innovation was enhanced by a proper structure and processes and systems as platforms for collaboration, adjustment and redesign of operating models. It was further revealed that good processes and systems are essential components of a business model. As hard components, processes and systems provide a platform for the human capital to execute assigned tasks. Another view accentuated the importance of clear structure for leadership, communication and support for innovation. [P17] supported that *the benefits of good structure are that people have clear roles and make quick decision making*, and the presence of a good structure was aligned to well-defined responsibilities, decision-making and smooth flow of organisational creativity.

4.3.4 Corporate Culture

The findings of the current study acknowledged corporate culture as an enabler of innovation in the company. The safety culture was perceived to be a trigger of introducing new ways of operation to achieve zero harm in the workplace. The results revealed that culture should be liberal to induce creative thinking, especially

when the environment is easy and free for employees to express themselves. When there is a shared vision by the employees that is radiated in the strategy focus, employees can embrace the culture. [P24] talked about sharing *the positive diamond story of life to current internal and external stakeholders.* It was also revealed that a culture that supports and motivates workers to contribute unique ideas can be a driver of business renewal.

4.4 Barriers of Innovation

The outcome of the field research study showed that the innovation process was impeded by several obstacles that existed within the company. The factors that were analysed from the field data include resistance to change, increased risk exposure, insufficient resources, unsupportive culture, unsupportive culture, inadequate change management process and fear of job losses.

4.4.1 Insufficient Resources

The results shared how the resource constraints threatened the introduction and implementation of new improvements. A senior mining manager affirmed this narrative when he said, *"The other challenge could be money because you might find that the* ***financial demand or the cost element as a pillar on the strategy may be a huge burden****. Sometimes for you to improve, you need to spend money and then save"* [P22]. It was found that the two major resources included finance and human capital. Some participants mentioned that monetary constraints affected the approval of new projects and financial investment for the execution of the projects or innovations.

4.4.2 Unsupportive Culture

The results showed that unsupportive culture could be an impediment to the innovative initiatives. The main issues raised include cultural rigidity and toxic competition in functional areas. The participants commented that the slow cultural change or lack of it affected how culture was embraced in their workspace. Some business activities were performed in the same way for a long time without willingness to embrace change. [P6] shared: "*4 years ago, one senior manager asked me to run with an idea. I had to ask to use his email to pull through. I do not like that culture because it discourages innovators from lower levels*". Some participants believed that the culture of the company was static because it used the same old methods that should have been improved a long time ago. The other view revealed that cultural rigidity and lack of support therefore harboured the risk of diamond theft. [P27] shared: "*We are actually starting to see the effect of actually being stuck in our*

traditional ways". This was supported by the view around gender, which pushed male more than female employees.

4.4.3 Unsupportive Structure

The results showed that some unsupportive structures and systems of the organisation affected the rate of innovation in the company. The main issues suggested include bureaucratic practices, silo philosophy, poor work designs, unfair rewarding and a restrictive work environment discouraging experimentation. Some participants indicated that bureaucracy-stifled innovation, closed-door policy and absence of structural support for innovation affected the efforts by some employees to contribute renewal ideas. Systematic and structural red tapes cause a hindrance to novelty as alluded by eight participants. A senior manager in the support department pointed out the following: "*There is one **to do with the culture**; if someone from lower levels comes up with an idea, the reception is lukewarm. Like, 4 years ago, one senior manager asked me to run with an idea. I asked to use his email to pull through. I do not like that culture because it discourages innovators from lower levels"* [P6].

5 Discussion

5.1 Innovation

Findings from the previous chapter described what innovation was, which spoke to the innovation-**generating new solutions** to help **overcome** the **challenges** that organisations faced, which was a consensus that was shared by every participant. This viewpoint concurred with that of Ganzer et al. (2017) who described innovation as the emergency of novelty. However, support from the organisation in achieving this was mandatory. This support included the provision of resources. **Process innovation** and **technological innovation** were the innovation types that were discovered to be in existence at the mine, which confirmed the listing of the above by Buchheim et al. (2020) as some of the innovation types that were found in the mining sector.

5.2 Importance of Innovation

The researcher requested the participants to elaborate on why innovation was so critical to the organisation's success. The understanding was necessary to try and justify the size of the financial investment to foster innovation. The findings revealed that the culture of this organisation embedded the understanding and implementation of the strategy. The evidence supported that functional teams had a good grasp of the

vision and mission of the organisation and their integral role in pursuing them. With the assistance of the change management team, the business intelligence (BI) department interpreted and disseminated corporate strategy using a language that employees understood in the organisation.

Innovation contributed to **efficiency and effectiveness** improvement. Examples given were truck turnaround time, speed of production, accurate reporting, quality of processes, improved productivity and recruitment turnaround. Observations were made that most participants from the core departments were clear on the importance of innovating their processes and systems to achieve maximised efficiency and effectiveness. This field finding was supported by the utterances by Calzada Olvera (2022) and Sánchez and Hartlieb (2020), who collaborated the contribution of innovation to the improvement of an organisation's efficiency, effectiveness, productivity and ultimately profitability of the organisation.

Enhancing safety and hygiene was highlighted as one of the core pillars of the corporate strategy that was pivotal to organisational performance. Spearheaded by the security department, technology and systems were continuously to maximise operations of the mine. The safety and hygiene culture was observed from the mine's entrance point to the rear of the premise. During the visits to mine to conduct interviews, safety induction training sessions were conducted involving all new employees, business partners and visitors. There were speed limits and *triple zero-tolerance signs* of consciousness against accidents or incidences in the work environment as one approaches the mine. The speed limits and signs were a constant reminder of the importance of adherence to safety precautions whilst at the work premises. The practice was a different demonstration of high safety culture in the organisation. Gruenhagen and Parker (2020) specifically highlighted technological innovation as an innovation type that organisations should commit to as it was important not only to help increase productivity but also to help improve health and safety conditions.

5.3 Drivers of Innovation

Innovation is important at the mine because without continuous innovation, the organisation at large will be stagnant. **Leadership** that has foresight and open-mindedness becomes key in ensuring the success of any innovative initiative within the organisation. This can be made even more of a success through incorporating it into strategy of the company. These generic capabilities are employed by the corporate leadership to exploit business opportunities.

Technological resources empowered employees to effectively deliver innovative solutions. This further encouraged people with technological know-how to be highly recommended. This view was supported by Gann and Salter (2000), who highlighted the importance of an organisation having technological capability.

The availability of **supportive processes, systems and structure** enables the successful implementation of innovation as the adjustment of the above combination

necessitated innovation to thrive. This is so because human capital will be able to successfully execute assigned tasks. Schiefer et al. (2009) supported having a structure of decisional processes.

5.4 Innovation Barriers

The outcomes of the field research study showed that the innovation process was impeded by several obstacles that existed within the company. The findings confirmed the following factors: resource constraints, human capital, unsupportive culture and unsupportive structures.

The results stated how the ***resource constraints*** threatened the introduction and implementation of new improvements. Two major resources were found, namely finance and human capital. It was also revealed that monetary constraints affected the approval of new projects and financial investment for the execution of projects or innovations. These views affirmed the results based on their study on innovation. The field data further indicated that **human capital** was adversely affected by factors such as employee turnover, limited essential skills, lack of diversity, lack of employee engagement and lack of specialists. The above factors were supported by Gluszczuk (2013), who highlighted the impact of knowledge factors, which include lack of qualified personnel and management attitude. The premature departure of well-qualified employees in search of new opportunities affected the implementation of new ideas. Meanwhile, there is representation of the BI department at executive level where budget allocation gets discussed and approved. This gives BI the ability to influence how they can channel the budget for the benefit of innovation.

The results showed that ***unsupportive culture*** could be an impediment to the innovative initiatives. The main issues raised include cultural rigidity and toxic competition in functional areas. The findings showed that the slow cultural change or lack of it affected how innovation was embraced in their workspace. It was shared that some business activities were performed in the same way for a long time without willingness to embrace change. This was supported by the belief that the **culture of the company was static** because it used the same old methods that should have been improved a long time ago. Challenges to innovation efforts were also experienced from business partners who struggled to comply with the expectations of the company due to cultural differences; for example, partners came with their employees, their own mindset and safety expectations. The literature review attested to the same viewpoint on how managers who are used to a certain business model would find it difficult and even prohibit the adoption of a new business model. Sivertsson and Tell (2015) describe this as a cognitive barrier. The BI department needs to continue working together with the change management to overcome this obstacle as cultural tendencies are systematic issues embedded in the organisation for as long as they existed. To overcome what has been known as the norm is not easy and certainly takes a long time.

6 Study Limitations

The research was cross sectional; perhaps, if it was a longitudinal and a comparative case study, more in-depth conclusions could have been drawn. The study cannot be generalised to other sectors as it is only applicable to the mining sector.

7 Conclusion

In conclusion, innovation within the mining industry is crucial even though the sector itself is characterised as being slow to transformation. It is pertinent therefore for organisations to realise the importance of innovation, which includes alleviation of competition and reduction of costs amongst other reasons. Furthermore, successful implementation of innovation will have a direct impact on the effectiveness of the organisation, which will include system and process improvement. On another note, academics will need to further explore the type(s) of innovation that are prevalent within the mining sector, which ultimately propels the successful employment of innovation. Additionally, academics can further explore if the same innovation drivers apply to other industries that are quicker with the adoption of innovation.

The research having highlighted the different aspects of innovation, i.e. the drivers of innovation, importance of innovation and barriers to innovation supported by both evidence from the field and literature review, confirms that the issues raised are pertinent when implementing innovation within the mining sector.

References

Afuah, A. (2020). Innovation management-strategies, implementation, and profits.

Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management Decision, 47*(8), 1323–1339. https://doi.org/10.1108/00251740910984578

Bashir, M., & Verma, R. (2017). Why business model innovation is the new competitive advantage. *IUP Journal of Business Strategy, 14*(1), 7–17.

Buchheim, L., Krieger, A., & Arndt, S. (2020). Innovation types in public sector organizations: A systematic review of the literature. *Management Review Quarterly, 70*(4), 509–533.

Calzada Olvera, B. (2022). Innovation in mining: What are the challenges and opportunities along the value chain for Latin American suppliers? *Mineral Economics, 35*(1), 35–51.

Deloitte Touche Tohmatsu (Firm). (2018). *The fourth industrial revolution is here: Are you ready?*

Gann, D. M., & Salter, A. J. (2000). Innovation in project-based, service-enhanced firms: The construction of complex products and systems. *Research Policy, 29*(7–8), 955–972.

Ganzer, P. P., Chais, C., & Munhoz Olea, P. (2017). Product, process, marketing and organizational innovation in industries of the flat knitting sector. *RAI Revista de Administração e Inovação, 14*(4), 321–332.

Gluszczuk, D. (2013). Barriers to innovation activities in industrial enterprises by polish regions in 2004-2006 and 2008-2010. Research Papers of the Wroclaw University of Economics/ PraceNaukoweUniwersytetuEkonomicznego we Wroclawiu (vol 286, pp. 181–189).

Gruenhagen, J. H., & Parker, R. (2020). Factors driving or impeding the diffusion and adoption of innovation in mining: A systematic review of the literature. *Resources Policy, 65*, 101540.

Klomp, L., & Van Leeuwen, G. (1999). The importance of innovation for company performance. *Netherlands Official Statistics, 14*(2), 26–35.

Mitchell, D., & Coles, C. (2003). The ultimate competitive advantage of continuing business model innovation. *Journal of Business Strategy*.

Rao, S., Ahmad, A., Horsman, W., & Kaptein-Russell, P. (2001). The importance of innovation for productivity. *International Productivity Monitor, 2*(SPRING), 11–18.

Razavi, S. M. H., Nargesi, G. R., Hajihoseini, H., & Akbari, M. (2016). The impact of technological innovation capabilities on competitive performance of Iranian ICT firms. *Iranian Journal of Management Studies, 9*(4), 855–882.

Sánchez, F., & Hartlieb, P. (2020). Innovation in the mining industry: Technological trends and a case study of the challenges of disruptive innovation. *Mining, Metallurgy & Exploration, 37*(5), 1385–1399.

Schiefer, G., Fritz, M., Capitanio, F., Coppola, A. &Pascucci, S. (2009). Indications for drivers of innovation in the food sector. *British Food Journal*.

Seshadri, D. V. R., & Tripathy, A. (2006). Innovation through intrapreneurship: The road less travelled. Vikalpa: *The Journal for Decision Makers, 31*(1), 17–29. Retrieved from http://search.ebscohost.com/login.aspx? direct=true&db=bth&AN=20500302&site=ehost-live

Sivertsson, O., & Tell, J. (2015). Barriers to business model innovation in Swedish agriculture. *Sustainability, 7*(2), 1957–1969.

Stieglitz, N., & Foss, N. J. (2009). Opportunities and new business models: Transaction cost and property rights perspectives on entrepreneurship. In *Economic institutions of strategy* (pp. 67–96). Emerald Group Publishing Limited.

The Use of Knowledge in Innovation Creation in Sustainable Teal Organizations

Agnieszka Rzepka, Magdalena Maciaszczyk, and Magdalena Czerwińska

1 Introduction

Facing Economy 4.0, the management and quality science, faces enormous challenges, prompting the search for revolutionary solutions to ensure that companies would be able to meet the demands of surroundings. This means fundamental changes in organizational structures as well as in the speed and creativity of the organization itself, leading to such solutions that would foster innovation. In a certain sense and extent, these requirements seem to be met by the so-called teal companies, which are characterized by self-organization and self-management and which create the possibility to function in decentralized, flat organizational structures (Laloux, 2015). All workers form teams comprising of agile employees that are resistant to stress and capable of conducting several undertakings at the same time, with an ability to find themselves and act even if their functions and company demands are changed. One of the characteristics of such an organization is flexibility reflected in facing new challenges that require an immediate response.

This chapter assumes that in the changing reality, it is necessary for each organization to gain knowledge quickly, both in terms of its scope and form and using it in appropriate organizational structures. It is assumed that this will be done faster and more intensely in self-managing teams of teal organizations cooperating with numerous agile organizations operating in business environment, creating interorganizational networks which favor the creation of soft management factors (Borowiecki & Olesiński, 2019), such as knowledge.

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The main objectives of the chapter are (1) to identify sources of knowledge of self-managing, cooperating organizations; (2) to demonstrate the purposefulness of the creation of agility of these organizations; and (3) to indicate the methods enabling the establishment of relations between business organizations and customers.

2 Theoretical Background

2.1 Knowledge Creation

The increase in the role and importance of knowledge is associated with expanding social, political, and economic opportunities for its use in social, legislative, and profit-making spheres (Sabat, 2018). This opportunity arises when in the economic process the use of limited material resources is increasingly associated with the adoption of soft management factors, including knowledge. Material resources are of a certain size, whereas intangible resources can be generated without limitations, and this encourages an increasingly better use of hard factors. Hence, the growing interest of politicians and governments in the creation of knowledge and its circulation is being observed, both in the economy and in social life.

The creation of knowledge is connected with innovation processes occurring in politics, culture, and business (Kazadi et al., 2016; Alshanty & Emeagwali, 2019). The knowledge society is a society of a new era, a postindustrial era, an era of services. The extent of the collective, administrative, and business-related changes that are taking place even makes it necessary to define this area as the next, fourth economic revolution. Huge competition in the global economy, additionally supported by market fluctuations, especially in customer demand and scarcity of resources, has a major impact on the development of enterprises. The concept of Industry 4.0 may be one of the solutions allowing to overcome the emerging barriers and ensure the development of these entities (Ślusarczyk, 2019).

In this situation, knowledge becomes an important instrument in creating changes in organizations and its importance increases. It allows to analyze the changes taking place and indicate their directions, tendencies, and interdependencies.

2.2 Innovation

Innovation of a given enterprise depends on a whole range of factors. High-risk and high-potential innovation ideas require well-coordinated innovation management and innovation capacity building (Rzepka, 2017). An enterprise is able to become innovative (Rzepka, 2023) if it is market oriented, has research and development-focused strategy, promotes growth, monitors changes in business environment,

cooperates with customers, and thus creates high returns of investment. Not only resources of an enterprise matters, but also its organizational structure and attributes.

In a dynamically changing economy, innovation in companies often becomes a question of a company's survival. However, innovation is a specific resource with expected long-term benefits.

There is a close relationship between innovation of a given enterprise and its attributes (Formularze Sprawozdawcze GUS Na Rok, 2020; Kocot et al., 2021), like type, size of a company, intensity of competition, market structure, factors governing the production of knowledge such as relevance, technological opportunities, and resource endowment (Abdu & Jibir, 2018; Hussen & Çokgezen, 2020; Emre Yildiz et al., 2021).

The tendency of an enterprise to implement innovation means a willingness to become innovative (Maciaszczyk et al., 2023). Both the capacity and tendency are being shaped by the external influences, interorganizational relations, internal resources, size of a company, its market share and diversification, and demand-pull and technology-push indicators (Czerwińska et al., 2023). If knowledge is used together with technological potential, the innovation effectiveness increases.

2.3 Conditions for the Development of Teal Organizations

The postindustrial era, the era of services, leads to extensive changes in organizational structures and to modifications in their functioning. The idea of teal organizations can be a reference point in locating the scope and direction of these changes.

In literature, it has been emphasized that teal organization is a manifestation of a new approach to the management of organizations based on self-organization and brings specific benefits to companies that decide to "work differently" (Laloux, 2015) on the basis of soft factors such as trust, effective communication, and relationships.

The basic element that bonds the teal organization's employees together is their independence, which fosters their creativity and leads to the idea of self-management with a limited role of managers serving as coaches and mentors. Individual teams of employees cooperate with other teams of a given organization as well as other organizations. The organizational structure is flat and decentralized (Laloux, 2015). It is clear that such units of staff members should work as intensively as possible with other selected units in order to meet business challenges. This leads to the creation of a cooperation network that forms the most important part of the organization's environment (Rzepka, 2018).

2.4 Methods for Identifying Needs

Profound modifications in the rules of functioning of the Economy 4.0 lead to transformations of the social and political sphere of life. The employment structure triggers a reduction in employment in agriculture and industry, which creates a potentially large amount of people willing to provide new forms of services. Economic development generally results in an increase in household incomes and therefore opportunities not only to spend money but also to search for new earning methods. Consumers search for a new offer of goods and services, and, as a consequence, a market of sensations is developing (Kostera, 2012; Pine et al., 1999). The experience market introduces a new element—a memory service that becomes a part of the product. Companies specializing in providing services in the experience market charge their services high because of the "transformational" value of the experience, e.g., related to educational or aesthetic value. These are often organizations based on a team of experts or artists (Kostera, 2012).

On the basis of the above, there are grounds for further development of the market to a market of transformation creating more sophisticated opportunities to satisfy needs, although perhaps it should be said that these will be typical needs at a new stage of human development, creating an opportunity to continuously satisfy them in the 4.0 era, such as RFID or AI and AR.

One of the key aspects is to understand factors determining customers' and potential stakeholders' perceptions of the brand, the product, and the relationship between them. Research conducted by KPMG (Karasek, 2023) indicated "pillars" shaping customers' experience. The experience economy, which is an offer suited to customer, does not deal with ordinary goods or services and is an advanced form of the service market (Pine et al., 1999).

The main methods of experience economy management implementation (Hjorth, 2007) include directness and subjectivity. The market of transformation adds the aspect of benefits brought with time of consumption. The experience economy focuses on the level of the client's experience here and now, while the transformation market reaches the issues of supporting the client's self—fulfillment and achieving a higher level of awareness (Hawkins, 2012).

2.5 Agility

Companies that wish to compete successfully on the market must adapt their structure and rules of operations to constant uncertainty, transient occasions, and nonstandard competition behavior. This possibility is presented in an idea of an agile company (Olesiński et al., 2017).

The necessity of quick reactions implies the necessity of constant readiness for change. This is called "agility." Of special importance is the agility in self-governed

organizations that prepare to deal with the challenges of contemporaneity (Walter, 2021).

Agility presents itself as the ability of a company to face the advancements through gaining the ability to survive in a market environment full of various dangers (Harsch & Festing, 2020; Sharifi & Zhang, 1999). Such organization obtains competitive advantage through quick and intelligent advantage taking over opportunities in market environment.

At present, companies trying to take more agile approach are deciding on developing five areas:

- Strategic partnership
- Addressing the customers' needs
- Systems and processes allowing quick reaction
- Raising employees' qualifications and gaining knowledge
- Information technology (Olak, 2017)

To sum up, agile organizations have certain specific features such as swiftness and flexibility (Tarzibashi & Ozyapici, 2019; Yamin & Gunasekaran, 1999). Equally important (Sharifi & Zhang, 1999) is effective reaction to changes and uncertainty. It is worth noticing that especially in the modern, dynamically changing business setting, companies will and should adjust to the potential of their staff and do everything to acquire and sustain their agility (Rzepka, 2019a).

3 Method and Research Sample

In order to analyze the discussed factors, the results of own research were used. In the period from February to May 2020, the authors conducted a study on the impact of soft factors on interorganizational cooperation in SMEs in the Podkarpackie region. The research was carried out among the SME sector enterprises concentrated within the Aviation Valley Cluster and the Business Council operating by the State Higher School of Technology and Economics in Jaroslaw, Poland. The survey covered those enterprises that agreed to participate in the survey. The surveyed enterprises were divided into several types (micro, small, and medium and large). The research process consisted of three stages: stage I, aiming at checking the level of managers' awareness of the importance of soft factors in business management, was carried out in 231 enterprises; the questionnaire was filled in person or by mail. Stage II, carried out in 200 enterprises, aimed to identify the components of soft factors influencing interorganizational cooperation of enterprises through personal interviews with owners, managers, and employees and analyze documentation supporting management forms. The third stage was carried out in 100 enterprises, further focusing on the same topic with detailed research questions.

Statistical analysis of the data obtained from the surveys was carried out using the STATISTICA 10. Type of questions and the categories of answers included in the questionnaire determined the qualitative nature of the variables under analysis.

Therefore, the results of the interview were presented as numbers and percentages, and Pearson's $\chi 2$ nonparametric independence test was used to assess the interrelationships between the examined characteristics.

Almost 2/3 of the respondents indicated that their company had been operating for more than 8 years. Companies operating "from 4 to 7 years" constituted 16.3%, while 14.4% of companies operated "from 1 to 3 years." 3.5% included entities whose business activity did not exceed 1 year. As far as the nature of the respondents' business was concerned, the largest percentage were representatives of service companies—32.7% of responses. Industrial production employed 29.7% of people. In trade companies, 28.2% of people worked. Slightly less than every tenth respondent represented other activities of the company, including education, administration, insurance, or health service. Nearly 50% of the enterprises covered by the survey were medium-sized companies that employed between 10 and 49 employees. Every fourth company employed up to 9 employees. 14.4% had 50–249 employees. Companies with more than 250 employees constituted 13.4% of the total.

Respondents between 26 and 35 years old constituted 32.2%, and between 36 and 45 years old 29.2%. Slightly less than every fourth person surveyed was under 25. The age above 45 was reached by 14.9% of the respondents. Due to the fact that the most numerous group of respondents were people between 26 and 35 years of age, their working experience was short. Therefore, almost half of the respondents admitted being at a particular position for less than 5 years. Work experience of 25% of respondents oscillates between 6 and 10 years. The remaining answers ranged between 7.4 and 9.4%.

4 Survey Results

Research aimed at determining the degree of cooperation of Podkarpackie enterprises with other organizations and institutions in order to exchange knowledge and information. Juxtaposition of the results of the research was presented in Table 1. Enterprises were asked about cooperation with advisory companies, scientific centers, and government agencies and local organizations. A significant group of enterprises stated that their company never established a cooperation—78.2% with any government agency, 56.9% not with the voivodship office, and 67.3% never with any research center. What is shocking is the fact that 24.8% stated that their company had never contacted another enterprise, 24.7% a consulting company, and 36.1% and 40.1%, respectively, even a commune or province office.

44.6% of the surveyed entities were relatively small and operated as, e.g., single person conducting business activity, and 50.5% operated just on a local scale; it can be understood that the interest in interorganizational cooperation was not their target.

A completely different picture is given by the analysis of 73.2% of respondents that confirmed cooperation with other companies. 73.3% cooperated with consulting companies, 63.9% with commune, and 59.9% with province authorities.

Table 1 Cooperation of companies with other organizations and institutions in respect of the exchange of knowledge and information ($N = 202$, data in %)

	Never	Once every 2 years	Once a year	Once a quarter	Once a month	Few times a week	Once a week
Enterprise	24.8	5.4	21.8	12.9	15.3	13.9	5.9
Advisory company	34.7	5.4	27.7	11.4	13.4	4.5	3.0
Scientific center	67.3	4.0	15.3	5.9	5.0	1.5	1.0
Commune	36.1	7.9	19.8	10.9	11.4	9.9	4.0
Province	40.1	10.9	21.8	12.4	6.9	5.0	3.0
Voivodship	56.9	11.9	18.8	5.0	3.5	2.5	1.5
Government agency	78.2	6.4	7.9	2.5	2.5	2.0	0.5

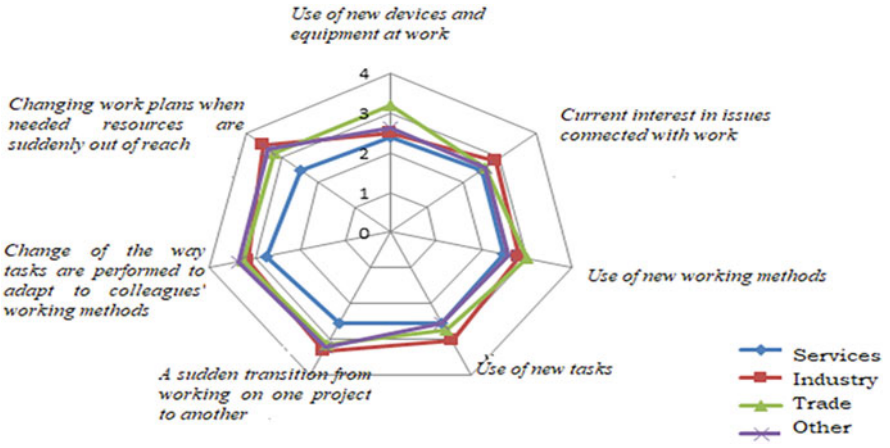

Fig. 1 The rate at which employees of the surveyed companies adapt to the given situations ($N = 202$)

The results of the research inclined us to believe that enterprises which are more willing to establish interorganizational relations in order to acquire intellectual capital and gain knowledge are more open, creative, dynamic, and therefore rather bigger than smaller, operating on a wider than local scale.

Moreover, the research showed that the surveyed companies cooperated on average with only 4.14 enterprises. Due to the fact that ¾ of the surveyed companies established relations with other companies, it may be assumed that some of the surveyed companies cooperate even with several dozen enterprises. Quite a large percentage of respondents never entered into relations (apart from the requirement of necessity) with employees of other organizations or institutions. For some, it occurs once in a few years. Therefore, such employees had to establish certain forms of adaptation to the situations (Fig. 1). The key elements determining the above

adaptation include the change of current work plans in a situation when the necessary resources are suddenly unavailable, and a sudden transition from working on one project to another (Borowiecki et al., 2021).

In teal organizations, there is no fixed hierarchy, and relationships are imbued with empathy and mutual respect. Teal firms are constantly developing and therefore changing their management style. A smooth adaptation to certain conditions is not possible, and this affects the building of relationships, trust, or even exchange of information. All management styles concerned with human relationships exist simultaneously in various organizations but that which is focused on personal fulfillment, honesty, and authenticity only guarantees a great flexibility in action and a fast pace of changes, which leads to efficiency. The focus on development and computerization in the organization results from the specifics of enterprises, but above all, the management style presented, which translates into the implementation and application of principles found in teal organizations. Employees want to work in a flat hierarchy, share knowledge and duties, and maintain work-life balance, whereas for their management, the most crucial are profits, money, and real results. It seems justified to assume that employees who are more open to external contacts and more willing to implement creative and innovative solutions may effectively use knowledge and information obtained from outside to meet requirements of the management.

5 Conclusions

Today, on a business level, the introduction of innovation can be characterized by optimizing work, introducing facilities, or improving communication, but this is not a closed catalogue. On the contrary, innovations in a company are an open catalogue of solutions inspired by the needs of their potential customers and are most often presented through products, services, processes, methods of organization, communication, or marketing.

The positive impact of business cooperation is primarily related to increased access to complementary and specific network resources. The benefits also include joint, collaborative spending on R&D and knowledge transfer (Leten et al., 2013; Klimas, 2014; Zobel & Hagedoorn, 2020; Ritala & Stefan, 2021). In addition, establishing relationships with other organizations contributes to expanding the amount of knowledge available and also improves the absorptive capacity of the organization, resulting in higher levels of innovation activity (Rzepka, 2019b).

The idea of teal organizations is used to varying degrees in practice, depending on the circumstances. However, the more autonomous employees are, the more creative they are. Managers who can transform themselves into coaches or mentors inspire and motivate and act to support employees in achieving their goals.

When, for example, a goods manufacturer employs young people full of ideas, this will always create the conditions for independent functioning. The degree of independence varies, but there is always room for creative behavior leading to

innovation (Karatepe et al., 2020; Shafique et al., 2019; Lee et al., 2020). Since data and information in teams working in decentralized structures are not transmitted horizontally, the need arises to acquire it through cooperation within the team, but above all by establishing relationships in the organization's environment with other organizations, thus creating interorganizational networks that foster knowledge creation. When this soft management factor is used the more often and to a greater extent, the more it grows and the more useful it becomes in the functioning of the organization.

In this chapter, we particularly draw attention to the desirability and need to shape relationships between producers and consumers. Quite a challenge facing today's management science practice and theory is the concept of developing an agile yet theoretical organization. Corporate development is becoming one of the strategic areas. There is now an opportunity for a significant and dynamic development of the market for goods and services in order to meet the increasingly diverse needs of consumers, but also to create and seek the needs from the market for goods and services to the market for experiences and the market for transformation made possible by Economy 4.0.

Increasing the availability of services and products, personalizing them, adapting business models to changing trends, and creating solutions that improve our quality of life are often the key to creating innovative solutions. Despite the risks associated with the creation and implementation of new solutions, innovation is an important value driver, including for a family business, leading to the building of competitive advantage and the strengthening of market position.

References

Abdu, M., & Jibir, A. (2018). Determinants of firms innovation in Nigeria. *Kasetsart Journal of Social Sciences, 39*, 448–456. https://doi.org/10.1016/j.kjss.2017.07.006

Alshanty, A. M., & Emeagwali, O. L. (2019). Market-sensing capability, knowledge creation and innovation: The moderating role of entrepreneurial-orientation. *Journal of Innovation & Knowledge, 4*, 171–178. https://doi.org/10.1016/j.jik.2019.02.002

Borowiecki, R., & Olesiński, Z. (2019). Uwarunkowania kreacji turkusowych organizacji w Polsce. *Przegląd Organizacji*, 11–17. https://doi.org/10.33141/po.2019.10.2

Borowiecki, R., Olesiński, Z., & Rzepka, A. (2021). Evolution of organization management in light of economy 4.0 challenges. In J. Duda & A. Gąsior (Eds.), *Industry 4.0 A global perspective* (pp. 1–15). Routledge. ISBN 978-1-00-318637-3.

Czerwińska, M., Kusio, T., & Borowiecki, R. (2023). Agnieszka Rzepka open innovation and virtualization. In *Innovation in the digital economy new approaches to management for industry 5.0*. Routledge. ISBN 978-1-03-246993-5.

Emre Yildiz, H., Murtic, A., Klofsten, M., Zander, U., & Richtnér, A. (2021). Individual and contextual determinants of innovation performance: A micro-foundations perspective. *Technovation, 99*, 102130. https://doi.org/10.1016/j.technovation.2020.102130

Formularze Sprawozdawcze GUS Na Rok. (2020). Retrieved January 20, 2023, from http://form.stat.gov.pl/formularze/2020/index.htm.

Harsch, K., & Festing, M. (2020). Dynamic talent management capabilities and organizational agility—A qualitative exploration. *Human Resource Management, 59*, 43–61.

Hawkins, D. R. (2012). *Przekraczanie poziomów świadomości. Transcending the levels of consciousness*. Warszawa. ISBN 978-83-62842-02-5.

Hjorth, D. (2007). *Entrepreneurship and the experience economy*. Copenhagen Business School Press DK. ISBN 978-87-630-0205-9.

Hussen, M. S., & Çokgezen, M. (2020). Analysis of factors affecting firm innovation: An empirical investigation for Ethiopian firms. *Journal of African Business, 21*, 169–192. https://doi.org/10.1080/15228916.2019.1625020

Karasek, J. *Raport: Zarządzanie doświadczeniami klienta (CX) w erze RODO—Jak Polacy dbają o ochronę informacji o sobie?—KPMG Poland*. Retrieved January 20, 2023., from https://home.kpmg/pl/pl/home/insights/2018/04/raport-zarzadzanie-doswiadczeniami-klienta-cx-w-erze-rodo-jak-polacy-dbaja-o-ochrone-informacji-o-sobie.html.

Karatepe, O. M., Aboramadan, M., & Dahleez, K. A. (2020). Does climate for creativity mediate the impact of servant leadership on management innovation and innovative behavior in the hotel industry? *International Journal of Contemporary Hospitality Management, 32*, 2497–2517. https://doi.org/10.1108/IJCHM-03-2020-0219

Kazadi, K., Lievens, A., & Mahr, D. (2016). Stakeholder co-creation during the innovation process: Identifying capabilities for knowledge creation among multiple stakeholders. *Journal of Business Research, 69*, 525–540.

Klimas, P. (2014). *Sieci innowacji: Implikacje bliskości organizacyjnej*. Prace Naukowe/ Uniwersytet Ekonomiczny w Katowicach.

Kocot, D., Wiench, P., & Maciaszczyk, M. (2021). Inter-organization relationships on virtual level in terms of employee agility as determinant of industry 4.0 era. In A. Rzepka, J. Prachowski, Z. Olesiński, & E. Jędrych (Eds.), *Self-management, entrepreneurial culture, and economy 4.0* (pp. 102–117). Routledge. ISBN 978-1-00-321304-8.

Kostera, M. (2012). Zarządzanie Na Rynku Doznań,[w:] B. Glinka, M. Kostera (Red.). In B. Glinka & M. Kostera (Eds.), *Nowe kierunki w orgnizacji i zarządzaniu: Organizacje, konteksty, procesy zarządzania* (pp. 361–375). ISBN 978-83-264-0761-1.

Laloux, F. (2015). *Pracować inaczej. Nowatorski model organizacji inspirowany kolejnym etapem rozwoju ludzkiej świadomości. Reinventing organizations: A guide to creating organizations inspired by the next stage of human consciousness*. Wydawnictwo Studio EMKA. ISBN 978-83-64437-93-9.

Lee, A., Legood, A., Hughes, D., Tian, A. W., Newman, A., & Knight, C. (2020). Leadership, creativity and innovation: A meta-analytic review. *European Journal of Work and Organizational Psychology, 29*, 1–35. https://doi.org/10.1080/1359432X.2019.1661837

Leten, B., Vanhaverbeke, W., Roijakkers, N., Clerix, A., & Van Helleputte, J. (2013). IP models to orchestrate innovation ecosystems: IMEC, a public research Institute in Nano-Electronics. *California Management Review, 55*, 51–64. https://doi.org/10.1525/cmr.2013.55.4.51

Maciaszczyk, M., Makieła, Z., & Miśkiewicz, R. (2023). Industry 5.0: A new reality, new challenges. In A. Rzepka (Ed.), *Innovation in the digital economy new approaches to management for industry 5.0* (pp. 51–61). Routledge. ISBN 978-1-03-246993-5.

Olak, A. (2017). "Zwinność" pracownicza na tle wyzwań współczesnych przedsiębiorstw. *Przedsiębiorczość i Zarządzanie, 18*, 55–67.

Olesiński, Z., Rzepka, A., & Olak, A. (2017). *Zarządzanie międzyorganizacyjne w zwinnych przedsiębiorstwach*. Texter Sp. z o.o.. ISBN 978-83-7790-449-7.

Pine, B. J., Pine, J., & Gilmore, J. H. (1999). *The experience economy: Work is theatre & every business a stage*. Harvard Business Press. ISBN 978-0-87584-819-8.

Pollard, D. (2001). Becoming knowledge-powered: Planning the transformation. In V. Sugumaran (Ed.), *Intelligent support systems: Knowledge management* (pp. 196–213). IGI Global. ISBN 978-1-931777-00-1.

Ritala, P., & Stefan, I. (2021). A paradox within the paradox of openness: The knowledge leveraging conundrum in open innovation. *Industrial Marketing Management, 93*, 281–292. https://doi.org/10.1016/j.indmarman.2021.01.011

Rzepka, A. (2017). Innovative character of the contemporary Enterprise and determinants of innovation. In *New trends in process control and production management* (p. 596). CRC Press. ISBN 978-1-138-05885-9.

Rzepka, A. (2018). Soft management factors and organizations—Outcome of research. In B. Mihalčová, P. Szaryszová, L. Štofová, M. Pružinský, & B. Gontkovičová (Eds.), *Production management and business development* (pp. 205–210). CRC Press. ISBN 978-0-429-46866-7.

Rzepka, A. (2019a). Innovation, inter-organizational relation, and co-operation between Enterprises in Podkarpackie Region in Poland. *Procedia Manufacturing, 30*, 642–649. https://doi.org/10.1016/j.promfg.2019.02.091

Rzepka, A. (2019b). Relacje międzyorganizacyjne w zwinnych przedsiębiorstwach. In A. Jaki & S. Kruk (Eds.), *Zarządzanie restrukturyzacją: Innowacyjność i konkurencyjność w obliczu zmian* (pp. 151–161). Towarzystwo Naukowe Organizacji i Kierownictwa "Dom Organizatora". ISBN 978-83-7285-881-8.

Rzepka, A. (2020). Turkusowe organizacje w Gruzji. In Z. Olesiński (Ed.), *Składniki turkusowych organizacji* (pp. 293–306). Difin SA. ISBN 978-83-8085-250-1.

Rzepka, A. (2023). *Innovation in the digital economy: New approaches to management for industry 5.0*. Routledge. ISBN 978-1-03-246993-5.

Sabat, A. (2018). *Wspieranie procesów biznesowych organizacji w aspekcie zarządzania wiedzą. Studia i Materiały Wydziału Zarządzania i Administracji Wyższej Szkoły Pedagogicznej im* (pp. 211–223). Jana Kochanowskiego w Kielcach.

Shafique, I., Ahmad, B., & Kalyar, M. N. (2019). How ethical leadership influences creativity and organizational innovation: Examining the underlying mechanisms. *European Journal of Innovation Management, 23*, 114–133. https://doi.org/10.1108/EJIM-12-2018-0269

Sharifi, H., & Zhang, Z. (1999). A methodology for achieving agility in manufacturing Organisations: An introduction. *International Journal of Production Economics, 62*, 7–22. https://doi.org/10.1016/S0925-5273(98)00217-5

Ślusarczyk, B. (2019). *Potencjalne rezultaty wprowadzania koncepcji Przemysłu 4.0 w przedsiębiorstwach* (pp. 4–10). Przegląd Organizacji. https://doi.org/10.33141/po.2019.1.1

Tarzibashi, O. F. F., & Ozyapici, H. (2019). The impact of the magnitude of overhead costs on the difference between ABC and TDABC systems. *Foundations of Management, 11*, 81–92. https://doi.org/10.2478/fman-2019-0007

Walter, A.-T. (2021). Organizational agility: Ill-defined and somewhat confusing? A systematic literature review and conceptualization. *Management Review Quarterly, 71*, 343–391.

Yamin, S., & Gunasekaran, A. (1999). Organisational quality—A cognitive approach to quality management. *The TQM Magazine, 11*, 180–187. https://doi.org/10.1108/09544789910262752

Zobel, A.-K., & Hagedoorn, J. (2020). Implications of open innovation for organizational boundaries and the governance of contractual relations. *Academy of Management Perspectives, 34*, 400–423. https://doi.org/10.5465/amp.2016.0175

Spin Trouble: An Insight on Sustainability of Garment Exporters in the Context of the Business Crisis in Tirupur City, Tamil Nadu

S. Gokilavani and Aasha Sujit

1 Introduction

India has developed over the years as one of the largest economies of the world. It has become one of the major players in the emerging global business. The Indian apparel industry is among the fastest growing and top industries of the sector in the international market. The textile industry has two broad segments—the traditional sector comprising handlooms, handicrafts, and sericulture using traditional tools and methods and modern sector consisting of spinning mills, composite mills, and garment factories, which adopt modern technology and methods. Garment manufacturing industry of our country not only provides huge employment opportunities but is also a major exporter. But in the recent past, the growth rate of Indian garment exports has not been declining. Changes in fashion and trends, skill gap, short lead time, and global competition have all contributed to the decline in the garment exports.

1.1 Garment Exporters in Tirupur City, Tamil Nadu

Tirupur, in Tamil Nadu in South India, is the base of a textile and garment industry, which exports too many international companies. The industry manufactures garments such as T-shirts, nightwear, children's clothes, and sportswear. The area of Tirupur is known for growing cotton, and there are hundreds of spinning mills

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producing yarn in the nearby parts of Tamil Nadu, which has made Tirupur the center for textiles. In the financial year 2021–2022, exports from Tirupur totaled to ₹33,525 crores, while in the previous year, it was around ₹25,000.

1.2 Business Crisis of Garment Exporters in Tirupur City, Tamil Nadu

Tirupur Garment Exporters, once known as the major players and prime exporters of garments in the global market, are grappling with a downtrend. According to industry insiders, the order for the readymade garments for shipment in December 2022 and January 2023 is 40% lower than last year. The US and European buyers place orders only for the basic garments and not the fashionable products. European apparel brand demand has declined by 25% due to fallout of the Russia—Ukraine War. The garment hub which annually exports ₹35,000 crores worth of goods now fears that in the next financial year 2023, exports will drop by 20–25%.

1.3 Issues Leading to the Business Crisis

- Steep hike in the cotton yarn prices, which is due to the shortage of yarn in the domestic market.
- Decline in exports and threat to closure of business are other issues faced by this industry in Tirupur as they are not able to cope with the rise in yarn price and the new fierce competitors on the rise such as Bangladesh and Vietnam.
- The pandemic effect is also witnessed by the garment exporters of Tirupur, and many migrant workers had to leave the work.
- These industries can raise loan facilities, but it is yet deficit to meet all their costs.
- The importers have more expectations from the Tirupur exporters such as competitive price, shorter lead time, and quality of goods.

2 Review of Literature

Dixit (2019) in their article titled "A Critical Analysis of Indian Textile Industry: An Insight into Inclusive Growth and Social Responsibility" have analyzed the inclusive development and social obligations of the textile sector. The researchers studied the way in which this sector has contributed to inclusive development by using both primary and secondary data. The researchers reveal in their article that the textile sector has been contributing towards employment generation and inclusiveness but

being an unorganized structure, they are not playing a positive role in social responsibility.

Mohanraj et al. (2016) in their research paper titled "A Study on Manufacturing Lead Time in Apparel Industry with Special Reference to Apparel Exporters in Tirupur City" have analyzed the impact on lead time in various stages of apparel manufacturing. The researchers have studied the challenges faced by garment manufacturers during production process. The research was conducted based on primary data collected through a structured questionnaire from 100 garment exporters situated in Tirupur. The researchers concluded that the lead time was one of the most important factors that helped the companies to gain a competitive edge in the global competitive environment.

Yohannes Admassu Gelaw (2021) article titled Experimental Study and Improving the Productivity of Assembly Line Balancing in Teleja Garment Manufacturing in Ethiopia was designed to analyze and improve the assembly line in the case of Teleja Garment Manufacturing and sales. This research included both qualitative and quantitative approaches using primary and secondary data. The researcher concluded that improper utilization and improper implementation of line balancing in the sewing section have significantly affected.

3 Research Gap

After a thorough review of literature, the following research gap was identified. Among the massive amount of research done on the garment industries across the globe, few research on the business crisis of Indian textiles which are increasing over the years due to various factors especially in relation to Tirupur exporters have been conducted. The research also probes into the importer's expectation from Tirupur exporters, which could revive their business.

4 Objectives of the Study

1. To understand the contributions of garment exporters towards the economy
2. To analyze the factors impacting the business of Tirupur exporters
3. To appraise the importer's expectations from Tirupur exporters

5 Statement of the Problem

Tirupur city in Tamil Nadu has been known for flourishing exports in garment industries. Tirupur export industries continue to grow in apparel exports. But in the recent past, Tirupur garment industry has been facing spin trouble. This industry

is experiencing business crisis due to various reasons such as skyrocketing yarn prices, which is the main raw material to produce apparels for export. This study attempts to analyze the various factors impacting the business crisis and the expectations of the importers from Tirupur garment industry.

6 Methodology

This study is an empirical research conducted through primary and secondary data. The primary data included 15 Tirupur exporters, which was collected with the help of structured questionnaire and telephonic interviewing. The study is limited to garment exporters of Tirupur city, Tamil Nadu.

7 Tools for Analysis

The following statistical tools were used in the study to analyze the collected data:

1. Factor analysis
2. Rank analysis

7.1 Data Analysis and Interpretation

7.1.1 Factor Analysis of Impacting the Business of Tirupur Exporters

The dynamics of the clothing company are having an impact on Tirupur exporters' business. Based on all the criteria included in the study, it is impossible to identify the significant impacting factors. Based on the organization in Tirupur's opinion, an effort was made to identify the key variables affecting the export sector in Tirupur.

In order to lessen the complexity of the data, factor analysis is used in the context of data reduction. On data, the Kaiser-Meyer-Olkin and Bartlett's test (KMO) is run to evaluate the use of factor analysis. The KMO test is presented in the table given (Table 1).

The sample size is sufficient to apply the test thanks to the KMO test result of 0.642, which is closer to unity (1), and Barlett's test guarantees the significance of

Table 1 Showing Kaiser-Meyer-Olkin test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.642
Bartlett's test of sphericity	Approximately chi-square	652.261
	Difference	91
	Significance	0.000

Table 2 Communalities of impacting the business of Tirupur exporters

Factors	Initial	Extraction
Hike in yarn price	1.000	0.815
Pandemic effect	1.000	0.568
Unskilled labor	1.000	0.553
Deficit loan facilities	1.000	0.682
Short lead time	1.000	0.612
Threat to closure	1.000	0.731
Migrant workers	1.000	0.556
Decline in export	1.000	0.789
New fierce competitors	1.000	0.586
Pressure from importers	1.000	0.653

Principal component analysis is the extraction technique

the correlation matrix. The table of communities is shown below; the communities represent an item's contribution to the factors extracted (Table 2).

According to the communalities values, which range from 0.553 to 0.815, every item contributes more than 50% of the data to the components identified. The number of factors that are larger than or equal to is determined by the eigenvalues. The table of eigenvalues is shown here (Table 3).

It is clear from the table that five factors—increasing yarn prices, closure threats, declining exports, inadequate loan facilities, and short lead times—are responsible for extracting 86% of the data from the study's factors.

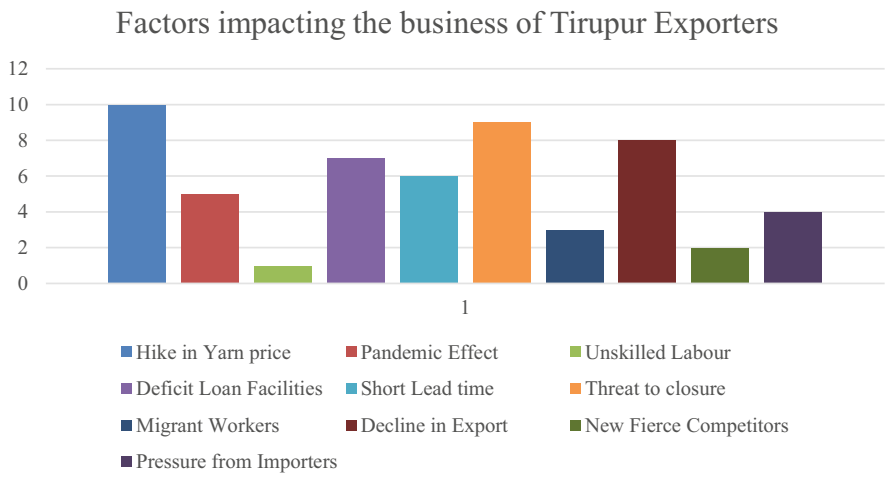

Chart shows the factors impacting the business of Tirupur exporters

Table 3 Eigenvalues impacting the business of Tirupur exporters

	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
Component	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
Hike in yarn price	4.108	31.601	31.601	4.108	31.601	31.601	3.247	35.324	35.324
Threat to closure	2.110	16.230	47.831	2.110	16.230	47.831	1.844	15.523	50.847
Decline in export	1.278	9.831	57.662	1.278	9.831	57.662	1.733	12.385	63.232
Deficit loan facilities	1.198	9.213	66.875	1.198	9.213	66.875	1.468	11.892	75.124
Short lead time	1.028	7.910	74.785	1.028	7.910	74.785	1.429	10.895	86.019
Pandemic effect	0.828	5.911	78.479						
Migrant workers	0.802	5.729	84.208						
Unskilled labor	0.539	3.847	88.055						
New fierce competitors	0.403	2.882	90.937						
Pressure from importers	0.368	2.625	93.562						

Principal component analysis is the extraction technique

7.1.2 Garrett's Ranking

From the viewpoint of the exporters from Tirupur, respondents ranked the importer's expectations. The following items were considered for Garrett's ranking analysis in this study:

1. Online documentation—FR1
2. Pre-shipment cargo inspection—FR2
3. Hassle-free trade policies—FR3
4. Prompt reply—FR4
5. Quality of work—FR5
6. Trendy and fashionable design—FR6
7. Competitive price—FR7
8. Efficient supply chain management—FR8
9. Real-time tracking with notifications—FR9
10. Lead time—FR10

The Garrett's ranking technique is used to determine which are the most significant/preferred importer's expectations from Tirupur exporters. The aforementioned items were rated by the respondents, and the rankings are translated into percentile ratings as follows:

$$P = \frac{100\ (R - 0.5)}{N}$$

P = Position of the percentile
R = The respondents' rankings
N is the quantity of ranks assigned

The percentile scores are obtained from Garrett's table and are indicated by the letter "X" for these percentile places (P). Then, using the number of respondents who gave the items the ranks 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10, we can calculate the product "X.FR" and its sum, which is "X.FR," and we can find these values in the given table (Table 4).

7.1.3 Interpretations

According to the aforementioned table, the majority of respondents chose competitive costs as the most important factor, followed by lead time and quality of work. From this, it can be inferred that the importer's top three goals for Tirupur exporters were the ones listed above.

Table 4 Garrett's ranking to rank the importer's expectation from Tirupur exporters

Rank	1	2	3	4	5	6	7	8	9	10		
Score (X)	82	70	63	58	52	48	42	37	30	18	Total	Rank
FR1	0	0	1	1	1	2	2	4	2	2	**15**	
XFR1	0	0	63	58	52	96	84	148	60	36	**597**	**7**
FR2	0	1	0	1	2	1	1	2	3	4	**15**	
XFR2	0	70	0	58	104	48	42	74	90	72	**558**	**9**
FR3	0	1	3	2	7	1	1	0	0	0	**15**	
XFR3	0	70	189	116	364	48	42	0	0	0	**829**	**5**
FR4	0	0	0	0	0	0	0	0	7	8	**15**	
XFR4	0	0	0	0	0	0	0	0	210	144	**354**	**10**
FR5	2	4	8	1	0	0	0	0	0	0	**15**	
XFR5	164	280	504	58	0	0	0	0	0	0	**1006**	**3**
FR6	1	2	3	5	3	1	0	0	0	0	**15**	
XFR6	82	140	189	290	156	48	0	0	0	0	**905**	**4**
FR7	8	4	3	0	0	0	0	0	0	0	**15**	
XFR7	656	280	189	0	0	0	0	0	0	0	**1125**	**1**
FR8	0	0	0	1	1	2	2	4	3	2	**15**	
XFR8	0	0	0	58	52	96	84	148	90	36	**564**	**8**
FR9	0	1	1	1	4	5	1	1	1	0	**15**	
XFR9	0	70	63	58	208	240	42	37	30	0	**748**	**6**
FR10	3	8	4	0	0	0	0	0	0	0	**15**	
XFR10	246	560	252	0	0	0	0	0	0	0	**1058**	**2**

8 Summary of Findings

- According to the research, the following five factors—which account for 86% of the data extracted from the factors under study—have contributed to the financial crisis in the Tirupur garment industry: an increase in yarn prices, closure threats, a decline in exports, insufficient loan facilities, and short lead times.
- According to the study, the majority of respondents ranked competitive costs as the most important factor, followed by lead time and job quality. From this, it can be inferred that the importer's top three goals for Tirupur exporters were the ones listed above.

9 Conclusions

Textile industries are major contributors to the country's economy and are also key players in the global markets. Tirupur city in Tamil Nadu has been known for growing exports in garment industries. This industry continues to flourish in apparel exports. But in the recent years, Tirupur garment industry has been facing several challenges, which has led to major business crisis. Factors such as steep increase in

the prices of yarn cotton, pandemic effect, and high competition among others have contributed to the decline in the exports. Besides this, the expectation of the importers is also increasing. Quick action with necessary steps must be taken in order to rejuvenate the textile industry as they are a symbol of the rich heritage of India.

10 Suggestions

Tirupur garment industries which are considered as giant factories are facing acute business crisis; hence, the government is suggested to give priority to these industries, which are major exporters of garments. Through this research, it was found that steep hike in yarn prices was the main factor resulting in business crisis in Tirupur exporters. The government can consider the domestic industries in relation to supply of raw material on a credit basis.

The government is instructed to pay attention to these businesses, which are significant garment exporters, as Tirupur's garment industries, which are regarded as giant factories, are currently experiencing a severe financial crisis. Through this investigation, it was discovered that the main cause of the financial crisis of exporters from Tirupur was the sharp increase in yarn prices. The domestic industry may be taken into account by the government when determining the supply of raw materials on a credit basis.

10.1 Future Research

This study is limited to the factors resulting in business crisis in Tirupur garment industries. There is a future scope for the researcher to identify the potential ways to overcome the crisis and show resilience and be able to come out of this crisis like they have done in the past.

The focus of the current study is on the elements contributing to the financial crisis in Tirupur garment industries. The researcher has the ability to find future solutions to the issue, demonstrate resiliency, and be able to recover from this catastrophe as they did in the past.

References

Dixit, P. (2019). A critical analysis of Indian textile industry: An insight into inclusive growth and social responsibility. *Russian Journal of Agricultural and Socio-Economic Sciences, 88*, 53–61. https://doi.org/10.18551/rjoas.2019-04.08

Gelaw, Y. A. (2021). Experimental study and improving the productivity of assembly line balancing in Teleja Garment Manufacturing in Ethiopia.

Mohanraj, S., Venkatedan, R., & Varune Sri, M. (2016). A study on manufacturing lead time in apparel industry with special reference to apparel exporters in Tirupur city. *PARIPEX - Indian Journal of Research, 5*(4), 173–175.

Redefining Organizational Sustainability Through Revamping Digital Capital

Jais V. Thomas and M. Mallika Sankar

1 Introduction

Organizational sustainability (OS) is the ability of an organization to maintain and be consistent in its mode of operandi, which in turn leads to an increase in performance, and profitability, enhancing customer and worker satisfaction as well as competitiveness among its peers. Organizational sustainability has been divided into three categories: environmental, economic, and social factors that impact the business development of all sectors. Various dimensions associated with organizational culture (e.g., attitudes, norms, assumptions) give a sense of identity and determine behavior. The latter include general approaches concerning the organizational impact on the natural environment (environmental sustainability) or adding economic and social factors to digitalization or adoption of digital technologies (digitalization), which can cause profound transformations of the business structure.

This research study deals with a conceptual framework that analyzes the political, cultural, personal, economic, and social factors under organizational sustainability and how this is increasing the digital capital of the industry.

1.1 Literature Review

Theoretical constructs are formulated in the purview of materializing organizational sustainability as follows:

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- Digital capital
- Digital access
- Digital competence
- Offline outcomes
- Digital divide
- Organizational sustainability

1.2 Digital Capital

The previous sections reviewed the main approaches present in the literature around the application of organizational sustainability as a specific capital that includes all the attributes described by Bourdieu and Colbert and Kurucz, especially in terms of digital competency and digital access.

The digital environment and already existent capitals, namely social, economic, political, personal, and cultural capital, find a new way of dealing with digital inequalities and pave the way to, namely, digital capital. Digital capital is a bridge between online activities and offline outcomes and makes observable outcomes to the online activities and offline environments through its engagement along with social, cultural, personal, economic, and political capital.

The engagement with five other capitals, namely with social, cultural, personal, economic, and political capitals, along with digital capital, proceeds to offline outcomes predominately through interaction with another set of capitals.

The economic, political, cultural, social, and personal capitals engage to the offline domains, and their interaction and engagement to the online activities evolve to the new capital, namely digital capital, and the digital capital is the historical accumulation of external and internal technological capabilities along with the digital access. Emphasized that not only the mere digital access but also the digital skill does make the things to be done professionally well in the work environment and significantly and positively contributes to the work easier. Has classified the access to the digital capital accumulation process in four levels such as motivational, physical, skills, and usage, and a shift of attention from physical access to skills and usage is observed.

Among the few attempts to define the concept of digital capital, refers to the concept, but he does not provide theoretical justifications of the reasons why it should be interpreted as a specific and autonomous capital. Even though he mentioned this concept, the ways he applied it tend to reduce it to a subcomponent of cultural capital. He argues that digital capital "has a relation with the three forms of cultural capital: the embodied, the instrumental, and the institutional."

Similarly, proposed the digital capital and other forms of capital, namely economic, cultural, social, and personal capital, as offline capitals and association of the same to the digital capital in the online environment.

One of the first attempts to specifically define digital capital has been provided by, who refers to digital capital as a predetermined set of dispositions that influences how people engage with digital technology, and further he forwarded that the specificity of the digital capital can absolutely result in the specific goal achievement.

By contrast, the starting point adopted by this work to define digital capital is that provided first by in their study to define digital capital as one of the important factors in terms of the accumulation of digital competencies (information, communication, safety, content creation, and problem-solving) and digital technology.

As per, digital capital is not only the result of individual digital competencies, and it is the historical accumulation of both digital competencies (individual internalized abilities and individual attitudes) and digital access (external resources) that leads to the formation of the capital in the online domain out of the offline activities, namely digital capital. The procedure is a double loop that denotes investing and transferring the existing offline capitals into digital capital, and succeeding process is that the cumulating digital capital is to be invested in the offline realm.

1.3 Digital Competence

Defines digital competency as digital literacy, media literacy, ICT literacy, evolving digital skills, computer skills, and Internet skills that are used to identify and analyze how the user should be able to achieve with digital tools and technology. Optioned that the digital access itself would not agree on digital competency upskilling, and at the same time digital skills are essential to have digital competency achievement. Pointed out that the technological interest of the student would instigate an affinity to the technology-rich disciplines rather than that of the students who does seldom possess the technological affinity. Tried to figure out that the ICT skills are in alignment with or even influenced by their socioeconomic conditions and individual motivational factors. The notion of two levels of digital competency in terms of inequality has been forwarded and named as two dimensions of digital inequality, namely the skills and autonomy of the Internet by. The promotion of ICT skills among students would enhance the digital skill as proposed by. Tried to identify information literacy such as information consciousness and ethics, and further, namely, the information knowledge and ability would affect the digital competency of students. Explored digital competence in upper secondary schools and examined the factors that influence students' digital competency when entering upper secondary.

1.4 Digital Access

Has revealed that the personal and positional categories are there in the access nature of having/having not the Internet in the respective life and there is significant differences in the digital access to technology. Further, the novel findings of the study shed light on the theoretical implications of the mode of access and kinds of ICT access suggested by. Pointed out that the students having digital access have higher deployment of cognitive engagement and those who do not express lower level of cognitive engagement in the knowledge-acquiring process.

1.5 Digital Divide and Offline Outcomes

Focused on Internet access disparities as a result of socioeconomic and cultural factors, and the first level of digital divide was coined as access of digital devices in 2001. Consequently, indicated that the barriers of first level of digital divide were overcome by the socially privileged individuals who leveraged the benefits out of it. Nonetheless, with the proliferation of ICTs and the expansion of the Internet, there are a number of research over first level and several researchers modified the first level of digital divide concept to include the various applications of the Internet, and consequently the research led to the acquisition of varying levels of digital skills, later accepted as the second level of the digital divide. This second level demonstrated digital "stratification" as well as disparities in Internet use and online involvement. Researchers have also established a third level of the digital divide that brings about the disparities in the advantages and tangible consequences and outcomes in the offline environment that users may get from ICT use (van Deursen & Helsper, 2015). Summoned the existing levels of the digital divide and inequalities in terms of Internet access (first digital divide) and its successive level, namely digital skills (second digital divide), proceeded by the third level of digital divide in terms of benefits and opportunities based on access and use of ICTs (third digital divide) along with sociocultural aspect of the people.

The previous review focused on the offline outcomes given in the following three dimensions and identified the robust strategy; shared leadership; change capability; equal digital access; operational excellence; knowledge acquisition; positive perception of the technology; changes in culture, politics, and other social factors; reducing both social and digital inequality; cut down on the risk; digital client behavior; digital resources; digital organizational structure; skill development (digital literacy); changes in employee attitude; E-social networks; increased customer engagement and retention; increased productivity and service levels; increase in sales and revenues; knowledge; attitudes and self-efficacy; and digital competition in the organizational sustainable development (van Deursen & Helsper, 2015).

The offline outcomes in the work environment are looped in the process through skills, use, access, and motivation, and again it is being updated to the offline resources and the process is being reiterated enhancing more offline outcomes and benefits through online engagements (van Deursen & Helsper, 2015).

The internalized ability and aptitude as well as externalized resources can be accumulated by the individual and used to gain benefits from using ICTs. Postulated that the digital capital in the engagement with other capitals in the online environment can have its looping effect on the environment of the offline settings, which is termed or named as the third level of digital divide, and digital divide along with sociodemographic is proposed.

1.6 Digital Organizational Culture and Organizational Sustainability

Has analyzed and proposed the very factor of the social sustainability as sustainable development by imparting technology in the community developing agenda. Have explained the conceptual framework of social sustainability including societal sustainable factors. Organizational sustainable development is often defined as "the ability to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs". The customary practice to use the triple bottom line (TBL) approach is used to define the same concept, and operationalizing the definition can be used to construct approaches to assess the sustainability of organization building-up models (e.g., Wiesner et al., 2018). The TBL approach stipulates that corporations should not only focus on the economic value but simultaneously consider the social and environmental value in the respective organizational settings as per the nature of the organization and mission and vision of the same upheld. Furthermore, the field of sustainable enterprise excellence (Carayannis et al., 2014; Edgeman & Eskildsen, 2014) points out the principles such as business model innovation, continuous improvements, and effective management (e.g., Grayson et al., 2018; Schaltegger & Burritt, 2005). According to the Chartered Institute of Personnel and Development (CIPD, 2012), the essence of sustainability in an organizational context is "the principle of enhancing the societal, environmental, and economic systems within which a business operates." This introduces the concept of a three-way focus for organizations striving for sustainability. This is reflected also by Colbert and Kurucz (2007), who state that sustainability "implies a simultaneous focus on economic, social, and environmental performance." This notion may of course relate to the growth of the so-called triple bottom line accounting, which will be explored later in this chapter.

2 Objectives of the Study

1. To identify the moderating role of the digital divide in the formation of sustainable factors of the organization through offline outcomes
2. To analyze digital capital and its association with organizational sustainability
3. To develop a conceptual framework for digital capital and organizational sustainability by adopting organizational sustainability model (OSM)
4. To identify the impact of digital capital on organizational sustainability factors
5. To examine the association between offline outcomes and organizational sustainability

3 Methodology

The chapter focuses on literature reviews and is conceptual in nature. The relevant information for the research study has been collected from various secondary sources, such as books, newspapers, articles, journals, and archives. The chapter has been working on the model of organizational sustainability through digital capital—a conceptual framework.

The conceptual framework is drawn from the literature on wording, digital capital, offline outcomes, organizational sustainability, digital access, and digital competence. The literature of the timeframe of 2005–2022 is taken for conceptual framework formulation using the keywords offline outcomes and digital capital in databases of Scopus, Google Scholar, and Web of Science. The literature about digital capital along with offline outcome preferences is taken significantly to the study concerned and delimits the literature of digital capital in the pretext of sustainability.

3.1 Organizational Sustainability Model (OSM)

The organizational sustainability model (OSM) has been developed in this research study. Proposes some of the offline outcomes, namely environmental factors, cultural factors, personal factors, social factors, economic factors, and political factors, that monitor the organizational sustainability in business operations. van Deursen and Helsper (2015) also identifies the online and offline outcomes such as robust strategy; shared leadership; change capability; equal digital access; operational excellence; knowledge acquisition; positive perception of technology; changes in culture, politics, and other social factors; reducing both social and digital inequality; cut down on the risk; digital client behavior; digital resources; digital organizational structure; skill development (digital literacy); changes in employee attitude; E-social networks; increased customer engagement and retention; increased productivity and

service levels; increase in sales and revenues; knowledge; attitudes and self-efficacy; and digital competition in the organizational sustainable development.

4 Significance of the Study

The distinct and significant role of digital divide existing among the employees of organization attracts a research inquiry into the levels of digital engagement and use of digital skill set in carrying out defined job roles. The catalytic adherence to the technology along with the digital competence on the work forges ahead the digital capital formation among the employees of the organization. The study investigates a presumed mediating/moderating role of digital divide in the formation of offline outcomes leading to the organizational sustainability through digital capital as an independent factor. The digital capital incorporates a vast array of capabilities, is centered on human skills, and is a collection of digital competences and digital technologies. The research tries to pitch a novel approach to traverse in the organizational sustainability through technology and engagement of the digital capital.

5 Results and Discussion

The study on the digital capital and traversing the levels of attainment of digital divide postulate a further study in the wrapping together of the domains of online and offline outcomes of technology in the organization. The talent, technology, and organization can be more leveraged in an optimum level to enhance the sustainability of any organization. The economic, social, and environmental realms of sustainability can be extending its boundaries to an inclusive paradigm of collaborating the organizational sustainability and its aligned organizational sustainability factors.

This research discusses the new organizational sustainability model design that brings about a pool of organizational sustainable indicators or factors. Primarily, the future study can have an empirical study and literature on each of the sustainable factors taken separately and an inquiry significantly on each factor, namely robust strategy; shared leadership; change capability; equal digital access; operational excellence; knowledge acquisition; positive perception on the technology; changes in culture, politics, and other social factors; reducing both social and digital inequality; cut down on the risk; digital client behavior; digital resources; digital organizational structure; skill development (digital literacy); changes in employee attitude; E-social networks; increased customer engagement and retention; increased productivity and service levels; increase in sales and revenue; knowledge; attitudes and self-efficacy; and digital competition.

Secondly, the future study can include the digital divide as a significant variable to associate with digital capital to cater to the offline outcomes and prominently

associate the third level of a digital divide to the offline outcomes in the process of organizational sustainability.

This study tries to find out the scope of digital capital in organizational sustainability in a conceptual way, and the future study can be broader in terms of sustainable factors associated with digital capital in the formation of organizational sustainability.

6 Conclusion

The digital divide measuring its level varying from access to digital skills and offline outcomes (benefits and opportunities due to digital capital) revolutionizes the technology, organization, and people interaction. The surpassing levels of access to digital skills to offline outcomes vividly narrow down a research inquiry and the digital capital along with organizational sustainability significantly and particularly inspect the sustainable factors that cater to the culture and nature of the organization of being sustainable in existence and being. The concept of digital capital proposed here interacts with the three levels of the digital divide. The components related to access directly interact with the first level of the digital divide, whereas the organizational sustainability dialogues with the second and third levels. As a result, digital capital factors such as digital access and digital competences determine not only the quantity and quality of online and offline outcomes but also the tangible outcomes achieved from ICT usage, thus influencing the third level of the digital divide.

Furthermore, as noted, digital capital can be defined as bridge capital because it is influenced by online and offline capitals (that determine individuals' competences, skills, and accessibility), which in turn are combined into a digital experience that produces measurable outcomes in terms of social, cultural, economic, political, and personal benefits. This means that this bridge enables translating the digital experience into new opportunities and life chances in both the online and offline outcomes. Digital capital is, therefore, needed not only to access and enjoy the digital experience but also to capitalize on digital use to acquire benefits that could improve the quality of sustainable organization practices.

References

Carayannis, E. G., Grigoroudis, E., Sindakis, S., & Walter, C. (2014). Business model innovation as an antecedent of sustainable enterprise excellence and resilience. *Journal of the Knowledge Economy, 5*, 440–463. https://doi.org/10.1007/s13132-014-0206-7

Chartered Institute of Personnel and Development (CIPD). (2012).

Colbert, B., & Kurucz, E. (2007). Three conceptions of triple bottom line business sustainability and the role for HRM. *Human Resource Planning, 30*(1), 21–29.

Edgeman, R., & Eskildsen, J. (2014). Modeling and assessing sustainable enterprise excellence. *Business Strategy and the Environment, 23*, 173–187. https://doi.org/10.1002/bse.1779

Grayson, D., Coulter, C., & Lee, M. (2018). *All in*. Routledge.
Schaltegger, S., & Burritt, R. (2005). Corporate sustainability. In H. Folmer & T. Tietenberg (Eds.), *The international yearbook of environmental and resource economics 2005/06. A survey of current issues* (pp. 185–222). Edward Elgar.
van Deursen, A. J. A. M., & Helsper, E. J. (2015). The third-level digital divide: Who benefits most from being online? *Communication and Information Technologies Annual, 10*, 29–52.
Wiesner, R., Chadee, D., & Best, P. (2018). Managing change toward environmental sustainability: A conceptual model in small and medium enterprises. *Organization and Environment, 31*, 152–177. https://doi.org/10.1177/1086026616689292

Sustainable Development: Evolving Consumer Perspective Towards Environmentally Friendly Products

P. Sathya and G. Sugunavalli

1 Introduction

In today's economy, every individual has an opportunity to engage in green marketing or sustainable marketing. When we involve in recycling of any products, i.e. aluminium cans, hybrid automobiles, and batteries, this is one form of approaching green marketing. Each of the examples illustrates the conditions under environmentally friendly manner. The decision to engage in an environmentally friendly approach at one stage increases the potential for consumers to act in an ecological manner. Innovations in "green" products emphasise product offerings that are environmentally friendly, like organic vegetables, recycled stationery, jute materials, bamboo products, and coconut by-products which are not harmful to the environment. The growth and development of green marketing pave way to minimise the adverse effects on the physical environment. Various efforts to consume, produce, distribute, promote, package, and reclaim products in a manner of responsive ecological concerns may improve the growth of green marketing. Whilst attitudes vary across generations, countries, and industries, 85% of consumers have become "greener" in their purchasing in recent years. The companies must act now to invest, innovate, and transform their business models for sustainable products and services (Simon-Kucher & Partners, 2021).

Sustainable development of products is seen as the ultimate vision of all nations throughout the world to achieve the sustainable goals. Sustainability plan contributes

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to more sustainable environment for future generations. Sustainability is developing as a key market driver with the potential to create values and profitability signalling a significant shift away from the conventional focus on products and efficiency. Green marketing inculcates both a discipline and a collection of procedures for appealing to consumers, and it encompasses the operational activities such as designing, pricing, promotion, inception to sales, and availability of product or service.

As we have seen the perception of customers on sustainability differs, a successful segmentation and companies requires studying, understanding those differences, and developing innovative sustainable products. For example, (1) few people perceive personal care and family health as important sustainability, which motivates them to purchase organic foods and nontoxic personal care and household items. (2) For few, most important sustainability means to save money and live economically, which leads to energy consumption and waste reduction. (3) Many consumers are adoring about nature and the outdoors, which they focus on preserving environment for the sake of environmental benefits for present and future such as priorities on humanitarian issues, and seek out green or sustainable products from companies that provide fair pay and healthy working environment. (4) Few people prioritise the humane treatment of animals, which may lead them to vegan lifestyle that in turn creates lower carbon footprints. A substantial portion of global consumers are willing to pay more for sustainability as demand grows for environmentally friendly products, which demonstrates that there is a market for mission-driven green (Simon-Kucher & Partners, 2021). Once the demand grows for sustainable products and they become the expectation rather than the exception, companies must transform their business models to (a) change of reduced energy use, (b) reduced driving, (c) reduced use of plastic water bottles, and (d) reduced meat consumption, which will serve to drive expectations for affordable sustainable alternates.

Companies must meet current demands to prove their sustainability credentials and continue to make it a central part of their value proposition to fulfil the consumer's needs or expectations, wherein sustainability will become table stacks and hygiene factors. The necessity to combine economic and environmental elements in decision-making through policies that retain the value of agricultural development and environmental conservation is a constant theme throughout this sustainable development plan. The main focus of green marketing is to preserve the environment and sustainable development of current and future generations. This study focuses on evolving a consumer's perception towards environmentally friendly products.

2 Objectives

1. To examine the reasons for buying select environmental friendly products
2. To analyse the level of perception on environmental friendly products
3. To understand the individual attributes towards environmental friendly products

3 Review of Literature

Author and year	Title	Description
Karmel Toryanto and Indriani (2022)	Green marketing orientation towards competitive advantage and marketing performance of non-food SMEs in Java	Using a five-point Likert scale questionnaire, data was collected from sectors such as personal care, accessories, souvenirs, apparel, and home life. The authors found that green marketing orientation has a favourable impact on competitive and marketing performance
Vilkaite-Vaitone et al. (2022)	Measuring green marketing: scale development and validation	The authors have tested the six-factor model against the four-factor models using confirmatory factor analysis (CFA) with a sample of marketing managers. The results of CFA have indicated that the revised version of the four-factor model appears to be the most tenable solution as it shows the best fit for the data
Padmaja Vani (2022)	A study on consumer perception towards green marketing with reference to Bengaluru	This review will attempt to investigate Bengaluru consumers' perceptions and preferences for green marketing practices and products. To collect primary data from the sample respondents, a convenient sampling technique was used in conjunction with a structured questionnaire. The author found that there is a strong correlation between marketing strategies, product factors, consumer green values, and perception. It is also found that consumer awareness of green marketing has a significant impact on consumer purchasing behaviour
Priti (2021)	Green marketing: An evolving phenomenon	Green marketing methods are used to create environmentally sustainable products. The usage of biodegradable parts, packaging, and green supply chain management that reduce pollutants and also have a good influence on the environment
Zaman (2021)	A critical review and directions for the use of eco-friendly products in Bangladesh	Going green is all about sustainability, and it enhances quality of life in terms of age, mortality, sickness, etc., and because of the contaminated environment, the outcome demonstrates the use of eco-friendly items in daily life, as well as the sustainability of quality of life

(continued)

Author and year	Title	Description
Liao et al. (2020)	Examining the moderating efforts of green marketing and green psychological benefits on customers' green attitude, value, and purchase intention	The research aims to investigate the effects of green consumer value and attitude towards green products. Green customers' perceived value included environmental worth as well as their attitude towards green items
Gijare (2020)	Green marketing, a journey towards sustainable environment: An Indian overview	Consumers' attitudes on their lifestyle have shifted as their understanding of environmental issues has grown. Green marketing demands consumers to want a clean and healthy environment and to be prepared to pay for it
Dharmalingam and Palanisamy (2019)	Consumer's perception towards green products with reference to Vellore district	Consumers are willing to change their habits in order to reduce their environmental impact. This review is an attempt to investigate consumer perceptions of green products in the Vellore district. This study found that age, education, and income all have a significant impact on people's perceptions of green products. According to the study, consumers have a positive impact on green products. It also reveals that consumers' choice of green household products is influenced by their level of education
Mahaptra (2013)	A study on consumer's perception for green products: An empirical study from India	This review empirically investigates Indian consumers' attitudes towards the environment in general. The structured questionnaire was completed by 162 Indian consumers. The current study attempted to comprehend the factors that influence environmentally conscious behaviour for green products. According to the study's findings, the majority of respondents appeared to be familiar with the concept of green. Furthermore, government officials should work to raise consumer awareness and positive perceptions of green products

4 Research Methodology

The descriptive study was undertaken to learn more about sustainable development and green practices on environmentally friendly items. To achieve the study's goal, both primary and secondary data were used. A structured questionnaire was used to collect primary data from 50 respondents. Secondary data was gathered from a variety of sources, including magazines, the internet, journals, and books. Simple percentage analysis, weighted average score method, Henry Garrett ranking method, and chi-square analysis were the statistical tools applied in this research.

5 Data Analysis and Interpretation

People all around the world are becoming more conscious of the importance of environmental protection and changing their purchasing habits to support a more sustainable environment. Companies are emerging along with greener practices in a sustainable manner. Entrepreneurs in this field of environmentally friendly products are leading a sustainable existence in a greener world.

5.1 Socio-Demographic Factors

The socio-demographic factors such as gender, age group, occupation, and income of the respondents are shown below:

Table 1 shows the socio-demographic factors of the respondents. The table reveals that 64% (32 out of 50) of the respondents of the study are female consumers. Most of the respondents (66%) of the study belong to the age group of 26–45 years. 32% of respondents are clerical workers, and 36% of respondents' income levels are below Rs. 15,000. Mainly a consumer focuses on the innovative design and functional performance more than on their green credentials that reverberate with its target market, which helps to overcome the concern of some men that green products are feminine. Some men associate sustainability with femininity, leading them to avoid sustainable options. But if a brand is already strongly associated with masculinity, this effect can be mitigated (White et al., 2019).

Table 2 depicts how the users were aware of environmental friendly products. The table reveals that 28% of the environmental friendly product consumers got aware through the internet, and 26% of consumers got aware about environmental friendly products through television and friends and relatives. According to White et al. (2019), harnessing the power of social influence is one of the most effective ways to elicit pro-environmental behaviours/self-efficacy in consumption of green products as well, and also telling online shoppers that other people were buying

Table 1 Socio-demographic profile of environmental friendly users

	Number of respondents	Percentage
Gender		
Male	18	36
Female	32	64
Age group		
Below 25 years	9	18
26–35 years	17	34
36–45 years	16	32
46–55 years	5	10
Above 56 years	3	6
Occupation		
Manager	11	22
Professional	11	22
Advance clerical	1	2
Clerical	16	32
Home duties	11	22
Income level		
Below Rs. 15,000	18	36
Rs. 16,000–25,000	14	28
Rs. 26,000–35,000	8	16
Rs. 36,000–45,000	3	6
Above 46,000	7	14

Source: Primary data

Table 2 Awareness about environmental friendly products

Factors	Number of respondents	Percentage
Television	13	26
Advertisement	10	20
Internet	14	28
Friends and relatives	13	26
Total	**50**	**100**

Source: Primary data

eco-friendly products led to a 65% increase in making at least one sustainable purchase.

H0 There is no significant relationship between income and purchase of environmental friendly products.

Table 3 shows the purchase of environmental friendly products/sustainability products by the consumers. The table reveals that 22% of the consumers purchase bamboo-based environmental friendly products; 18% of the consumers purchase palm tree-based, coconut-based, and wooden-based environmental friendly products; and 12% of the consumers purchase jute-based and recycled stationery-based environmental friendly products. The chi-square analysis result reveals that the p value (0.422) is greater than the critical value (0.05) at 5% significance level.

Table 3 Purchase of environmental friendly products

Type of products	Number of respondents	Percentage	Income and purchase of environmental friendly products
Jute—bags/pouches/folder files/laundry basket	6	12	**Chi-square** Calculated value—20.261 *p* value—0.422 Level of significance—5%
Palm tree—plates/ winnowing basket/boxes	9	18	
Coconut—coir mats/ dishwasher	9	18	
Wooden—spoons and bowls/toys/cutting board	9	18	
Bamboo—toothbrush/comb/ chairs/baskets	11	22	
Recycle stationery—pen/ pencil	6	12	
Total	**50**	**100**	

Source: Primary data

Table 4 Source of buying environmental friendly products

Factors	Number of respondents	Percentage
Departmental stores	23	46
Retail shops	5	10
Directly from manufacturers	7	14
Online shopping through websites	15	30
Total	**50**	**100**

Source: Primary data

Table 5 Frequency of buying environmental friendly products

Factors	Number of respondents	Percentage	Gender and frequency of buying
Once in a week	1	2	**Chi-square** Calculated value—6.301 *p* value—0.197 Level of significance—5%
Once in a month	11	22	
Once every 3 months	6	12	
Once in a year	6	12	
As and when required	26	52	
Total	**50**	**100**	

Source: Primary data

Hence, null hypothesis is not rejected. It is inferred that there is no significant relationship between income and purchase of environmental friendly products.

Table 4 data reveals that majority of the consumers purchase environmental friendly products through departmental stores and online shopping through websites.

H0 There is no significant relationship between gender and frequency of buying environmental friendly products.

Table 6 Reasons for buying environmental friendly products (Garrett ranking)

Factors	75	60	50	39	24	Total score	Average	Rank
Product feature	750	600	0	780	240	2370	47.4	4
Reusable products	750	1200	0	390	288	2628	52.56	1
Economical	750	480	500	390	240	2360	47.2	5
Healthier to family	750	0	1100	390	192	2432	48.64	3
Preserve the environment	750	720	900	0	240	2610	52.2	2

Source: Primary data

Table 5 shows frequency of buying environmental friendly products by the consumers. The result revels that 52% of the respondents buy environmental friendly products as and when they are in need, and 22% of the respondents buy once in a month. The chi-square result reveals that the *p* value (0.197) is greater than the critical value (0.05) at 5% level of significance. Hence, null hypothesis is not rejected. It is inferred that there is no significant relationship between gender and frequency of buying environmental friendly products.

5.2 Reasons for Buying Environmental Friendly Products

Effective control of the generation, storage, treatment, recycling and reuse, transport, recovery, and disposal of hazardous wastes is of supreme importance for proper health, environmental shield and natural resource management, and sustainable development[1]. People are more likely to engage in buying of green products when they derive positive feelings from doing so. This core precept is often overlooked when it comes to sustainability (White et al., 2019). The most significant factors such as personal benefit, price, convenience of use, performance, availability, concern for environment, and health concern have significant influence on willing to pay for/buy green products (Mahaptra, 2013).

Table 6 shows the reasons for buying environmental friendly products by the consumers. Garrett ranking technique result reveals that reusable products were ranked 1 with average (52.56) followed by assignment of subsequent ranks to preserve the environment (52.2), healthier to family (48.64), product feature (47.4), and economical (47.2). It is found that the respondents are giving more importance to the attributes such as recycling of products, environmental conservation, and health consciousness than products' feature and price.

[1] https://sdgs.un.org/topics/chemicals-and-waste.

Table 7 Perception on environmental friendly products

Factors	SA	A	N	DA	SDA	Score total	Weighted score	Rank
Environmental friendly products have good value	27	16	7	0	0	220	4.4	1
Confident to use in day-to-day life	22	23	5	0	0	218	4.36	2
Quality of product with respect to environment	23	23	3	1	0	217	4.34	3

Source: Primary data

5.3 Green Perception: Environmental Friendly Products

Measuring consumer perception has become a catchword, which clearly states how well the consumer understands about any products and services offered. The people were more concerned as environmental issues continue to affect human activities and society. Most of the companies have started using sustainable development framework (green marketing), and they acknowledge green products which are environmentally friendly. It clearly states that "people buy products that are less damaging to the environment so that they feel better" (Padmaja Vani, 2022). Five-point Likert scale (SA—strongly agree, A—agree, N—neutral, DA—disagree, and SDA—strongly disagree) is used to analyse the perception of consumers towards green products/environmental friendly products.

Table 7 exhibits consumer's perception on environmental friendly products. Weighted average technique result reveals that the consumers perceive environmental friendly products to have good value as a prior factor with a weighted score of 4.4 followed by confident to use in day-to-day life (weighted score 4.36) and quality of product with respect to environment (weighted score 4.34).

5.4 Green Attitude: Environmental Friendly Products

The severity of global biodiversity loss and degradation of ecosystems stress the negative impact that this situation has on food security, nutrition, access to water, and health of the rural poor and people worldwide[2]. Certain categories of products with sustainability claims showed twice the growth of their traditional counterparts. From the earlier literatures, it is observed that few consumers who report positive attitudes towards eco-friendly products and services follow through with their wallets (White et al., 2019). Yet there is a frustrating paradox that remains at the heart of green business. The attitude of consumers towards green products/environmental friendly products is analysed below.

[2] https://sdgs.un.org/topics/biodiversity-and-ecosystems.

Table 8 Attitude towards environmental friendly products

Factors	SA	A	N	DA	SDA	Score total	Weighted score	Rank
Aware of eco-friendly products and its relative rites	21	19	8	2	0	209	4.18	3
Proud to adapt greener lifestyle	17	28	4	1	0	211	4.22	2
Buying environmental friendly products gives satisfaction	20	26	4	0	0	216	4.32	1
Ready to pay an extra money for environmental friendly products	16	23	10	0	0	204	4.08	4

Source: Primary data

Table 9 Satisfaction on the usage of environmental friendly products

Factors	Number of respondents	Percentage
Highly satisfied	2	4
Satisfied	1	2
Neutral	27	54
Dissatisfied	20	40
Highly dissatisfied	0	0
Total	**50**	**100**

Source: Primary data

Table 8 explains the consumer's attitude towards environmental friendly products. The weighted average technique result reveals that the consumers agreed that buying environmental friendly products gives them satisfaction on usage with a weighted score of 4.32 followed by proud to adapt greener lifestyle (weighted score 4.22), aware of eco-friendly products and its relative rites (weighted score 4.18), and ready to pay an extra money for environmental friendly products (weighted score 4.08).

5.5 Satisfaction on Usage of Environmental Friendly Products

According to GreenPrint's Business of Sustainability Index, 75% of millennials are willing to pay more for an environmentally sustainable product, compared to 63% of Gen Z, 64% of Gen X, and 57% of boomers (Green Print Environmental Technology Company, 2021). It is on the other side of coin how companies' green products elevate to satisfy the needs and wants of the consumers. The consumers' satisfaction towards usage of environmental friendly products is presented below.

Table 9 shows consumers' satisfaction on usage of environmental friendly products. The table reveals that 54% of the consumers stated that they are neutral in satisfaction of environmental friendly products, and 40% of the respondents are dissatisfied with the green products.

6 Findings of the Study

1. Women are solely concerned with the well-being of their families, and the majority of environmentally conscious buyers are female.
2. The majority of environmentally friendly consumers belong to the age group of 26 and 45 years, and these elderly consumers are also the ones who take care of their families.
3. A growing number of consumers are office graduates who emphasise the purchasing of environmentally friendly products to satisfy their family's demands.
4. The average consumer's income is Rs. 15,000. It is found that income is not a barrier to purchasing ecologically friendly products.
5. As we live in a technological era, everyone is active in online activities; in this study, most of the consumers are aware of the green products through the internet.
6. Many creative bamboo-based products are in the market, and more consumers are drawn to acquiring bamboo-based ecologically friendly items.
7. Currently, all products are sold in department stores, and people purchase these products in department stores.
8. Currently, there are various stores nearby, offering consumers to purchase things as and when they are required.
9. Given that environmentally friendly products improve the environment, the majority of consumers stated neutral satisfaction.
10. In terms of consumers, product perception varies from person to person, with a weighted average score of 4.4 provided for environmentally friendly products with good value.
11. Despite the fact that people's attitudes about comparable perceptions fluctuate, consumers agreed that purchasing environmentally friendly products yields a satisfying result, with a weighted average score of 4.32.
12. Garrett ranking results show that reusable products have a significant prime factor for buying sustainable development products followed by environmental preservation, family health, product functionality, and economic value of products.
13. The chi-square result depicts that there is no significant association between gender and frequency of using environmentally friendly items.
14. The chi-square analysis reveals that there is no significant association between income and purchasing of environmentally friendly products.

7 Conclusion

The Indian economy has specified specific purposeful steps for sustainable environment in numerous industries in the current quarter, which incorporates the concept of environmentally friendly items to be in a sustainable development. The promotion of

ecologically friendly products is referred to as green marketing. To protect the environment from hazards, many countries are changing towards environmentally friendly products; these green concepts enable consumers to operate in an environmentally sustainable manner. This study found that the respondents are giving more importance to the attributes such as recycling of products, environmental conservation, and health consciousness than the features and price of the environmentally friendly products. Income level of consumers is not a barrier to purchasing ecologically friendly products. Most consumers perceive environmental friendly products to have good value added to their hazard-free life, and they are very much confident to make use of the quality of product with respect to environment in their day-to-day life, which will pave way to achieve responsible consumption and production. The consumers' attitudes towards environmentally friendly products are positive, which is a good sign for achievement of sustainable development and green economy. A sustainable environment is profitable, economical, and cleaner in the long term, because businesses must expand in reaction to customer behaviour, and environmental concerns are growing by the day. But in terms of the actual utilisation/usage of environmentally friendly product perspective, this study found that the majority of respondents are not satisfied with the environmentally friendly products. So, the companies must build trust and loyalty by clearly demonstrating that they share environmental goals and better quality products and services to navigate the business of sustainability so that they will be best positioned for future success. Companies can enlist advocates to promote the positive elements of the product or action.

Emerging practice of green economy can help to provide some imperative insights and much-needed clarity regarding the types of green economy policy measures, their scope with regard to various segments and national precedence, and their institutional blockade, peril, and execution costs. Governments must reaffirm the magnitude of waste management and prioritise attention to be given to waste deterrence and minimisation, reuse, and recycling. Providing subsidies to companies for development of environmentally sound disposal facilities, including technology to convert waste into energy, will help them to manufacture high-quality sustainable products, which may improvise the utilisation and satisfaction of consumers at a faster pace. It is also recommended that policy makers must concentrate on making people's commitments to eco-friendly behaviour public through merely making sustainable behaviours more evident to others and organising or using healthy competition between social groups. It is concluded that by extending areas of life without producing pollution, these green products have forced a huge shift in business. As a result, green consumption/green economy promote long-term development and can steer economic enlargement, employment, and poverty eradication whilst maintaining the healthy functioning of the Earth's ecosystem.

References

Dharmalingam, R., & Palanisamy, V. (2019). Consumer's perception towards green products with reference to Vellore district. *International Journal of Engineering and Advanced Technology, 9*(1), 5340–5344. https://doi.org/10.35940/ijeat.A2970.109119

Gijare, J. (2020). Green marketing a journey towards sustainable environment: An Indian overview. *International Journal of Research in Finance and Marketing, 10*(1). Retrieved from http://euroasiapub.org/current.php?title=IJRFM.

Green Print Environmental Technology Company. (2021, February). Green Print's Business of Sustainability Index. *The survey*.

Karmel Toryanto, C. J., & Indriani, F. (2022). Green marketing orientation towards competitive advantage and marketing performance of non-food SMEs in Java. *International Journal of Scientific Research and Management, 10*(02), 3062–3062. https://doi.org/10.18535/ijsrm/v10i2.em06

Liao, Y. K., Wu, W. Y., & Pham, T. T. (2020). Examining the moderating effects of green marketing and green psychological benefits on customers' green attitude. *Value and purchase intention Sustainability, 12*(18), 7461. https://doi.org/10.3390/su12187461

Mahaptra, S. (2013). A study on consumer's perception for green products: An empirical study from India. *International Journal of Management & Information Technology, 7*(1), 924–933.

Padmaja Vani, M. (2022). A study on consumer perception towards green marketing with reference to Bengaluru. *Journal of Positive School of Psychology, 6*(3), 7391–7400.

Priti, C. (2021). Green marketing: An evolving phenomenon. *International Journal on Recent Trends in Business and Tourism, 5*(2), 25–31. https://doi.org/10.31674/ijrtbt.2021.v05i02.005

Simon-Kucher & Partners. (2021). https://www.businesswire.com/news/home/20211014005090/en/Recent-Study-Reveals-More-Than-a-Third-of-Global-Consumers-Are-Willing-to-Pay-More-for-Sustainability-as-Demand-Grows-for-Environmentally-Friendly-Alternatives.

Vilkaite-Vaitone, N., Skackauskiene, I., & Díaz-Meneses, G. (2022). Measuring green marketing: Scale development and validation. *Energies, 15*(3), 718. https://doi.org/10.3390/en15030718

White, K., Hardisty, D. J., & Habib, R. (2019). *Consumer behavior: The elusive green consumer*. Retrieved from https://hbr.org/2019/07/the-elusive-green-consumer.

Zaman, M. U. (2021). A critical review and directions for the use of eco-friendly products in Bangladesh. *International Journal of Progressive Sciences and Technologies, 27*(1), 67–75. https://doi.org/10.52155/ijpsat.v27.1.3154

Does Financial Literacy Affect the Millennial's Investment Preferences?

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1 Introduction

Investment is a way to fight poverty in society and achieve economic equality. People must allocate their income to achieve financial well-being and financial stability after retirement amid limited government ability to cover retirement costs (Chen et al., 2023). There are many investment alternatives. Some simple investment alternatives, such as gold and property, can be accessed easily. However, many more complicated investment alternatives exist, such as bonds, stocks, and mutual funds.

Specifically, investment in a company's stock is an efficient way to encourage economic equality. A person with limited funds can own company shares and enjoy growth and profits generated proportional to the shares owned. Financial literacy is crucial for making informed financial decisions. OECD defines *financial literacy* as a combination of awareness, knowledge, abilities, attitudes, and behaviors needed to make solid financial decisions, which lead to well-being (Ansari et al., 2023). Financial literacy facilitates sound financial decision-making, fast-paced economic development, and improved personal financial health (Potrich et al., 2018). It also increases the rate of securities market participation (Chen et al., 2023; Hermansson et al., 2022). According to OECD, strengthening financial literacy has become a vital component of global policy-making due to the rapid digitalization of financial products and services. Sound financial literacy means a greater awareness of economic functions and improved use of financial information, which improves one's financial well-being (Lin & Bates, 2022).

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Financial literacy is very important for the millennial generation for their well-being. According to D'Netto (2012), millennials, or Gen Z, were born between 1980 and 2000. Millennials' age is known as "digital natives" or the first generation who are technology literate. This generation is considered confident, independent, and goal oriented. Recent technological development brings millennials to new investment vehicles in financial technology (Baruna et al., 2023), such as peer-to-peer lending, crowdfunding, cryptocurrency, and NFTs (Arifah & Dalimunthe, 2020). Millennials need to save a portion of their income and invest it to achieve financial well-being. Thus, some studies evaluate millennials' investment behavior (see GFLEC (2017), Prudential Insight (2018), and Chairunnisa and Dalimunthe (2021)).

This study aims to evaluate how financial literacy affects investment choice preferences among Indonesia's millennials. The millennial generation is an important group in the Indonesian economy. In 2022, the millennial generation estimated covered 34.45% of Indonesia's population. Millennial is a vital group economically because it includes those in early to middle carrier. Potrich et al. (2018) describes financial literacy in three dimensions: financial attitude, behavior, and knowledge. Thus, this study uses the three dimensions of financial literacy to measure financial literacy. This research also evaluates the role of risk attitude as a mediating variable. Social science researchers define a moderator as a variable that interferes with the relationship between the independent and the appropriate dependent variable (Awang, 2015).

This chapter consists of five parts: (1) an introduction to describe the background of the study, (2) a literature review, (3) methods, (4) results and discussion, and (5) a conclusion.

2 Literature Review

2.1 Financial Literacy and Investment Behavior

Many studies show that financial literacy results in better decision-making (see Chen et al. (2023), Kawamura et al. (2021), Grohmann (2018), and Jiang et al. (2020)). Better financial decision-making is found in retirement financial planning (Kawamura et al., 2021), better investment diversification (Jiang et al., 2020), greater participation in the capital market (Hermansson et al., 2022), better borrowing behavior (Chen et al., 2023), and better cash flow management (Ahn & Nam, 2022). Research in financial literacy covers a wide range of countries and regions, such as middle-class people in Bangkok (Grohmann, 2018), the Chinese capital market (Jiang et al., 2020), Japanese households (Potrich et al., 2018), the Spanish millennial generation (Ahn & Nam, 2022), and nationwide data from the USA (Chen et al., 2023).

There are two measurements of financial literacy commonly used in the study of this topic, basic financial literacy and advanced financial literacy. The basic financial literacy measurement, known as the "big three" questions, consists of three true-false

questions about basic financial concepts. This measurement was used in research conducted by Arifah and Dalimunthe (2020), Grohmann (2018), and Jiang et al. (2020). This measurement is simple and easy to apply, and the result is easy to compare. Nițoi et al. (2022) compared this measurement result from several country studies. Only 8.27% of Romanians correctly answered all "big three" questions. This result is lower compared to developed countries such as France (30.9%), the Netherlands (44.80%), Germany (53.90%), the USA (30.20%), Japan (27%), or some other developing countries.

The second measurement is the advanced financial literacy concept. Financial literacy is treated as a construct consisting of several dimensions. This measurement is more difficult to apply since researchers have yet to agree upon the advanced financial literacy concept. There are differences between studies regarding the dimensions used. OECD defines *financial literacy* as a combination of five dimensions consisting of (a) awareness, (b) knowledge, (c) abilities, (d) attitudes, and (e) behaviors. However, knowledge and ability are often regarded as similar concepts. Furthermore, the most common dimensions used in previous studies are financial knowledge, financial attitude, and financial behavior. The advanced financial literacy concept was used in research conducted by Chairunnisa and Dalimunthe (2021), Grohmann (2018), and Jiang et al. (2020).

When we look deeper into each dimension of the advanced financial literacy concept, researchers generally pose questions rather than statements (Talwar et al., 2021). We also found a broad range of indicators for each dimension. Chen et al. (2023) elaborated financial knowledge in three aspects: understanding financial concepts, properly managing money for various uses, and coping with financial problems. Rajna et al. (2011) defined *financial attitude* as applying financial principles to create and manage value through sound decision-making and resource management. Talwar et al. (2021) operated financial attitudes into six indicators consisting of (a) investor financial anxiety, (b) optimism, (c) extent of financial security, (d) degree of deliberative thinking, (e) depth of interest in the financial issue, and (f) need for precautionary savings. Kawamura et al. (2021) evaluated financial behavior in terms of preferences and beliefs. Rey-Ares et al. (2021) defined financial behavior as financial decisions related to investment and indebtedness.

2.2 Mediating Role of Risk Attitude

The mediating variable in this study is risk attitude. Rohrmann (2005) defines risk attitude as a person's orientation to take or avoid risk when deciding how to proceed in situations with uncertain outcomes. Hillson and Webster (2004) stated that the attitude toward risk is a person's underlying mindset in doing something that can positively or negatively impact the outcome. In other words, risk attitude refers to how a person responds to uncertain circumstances.

Many studies found a significant effect on attitude toward risk and investment decisions. According to Barasinska et al. (2012), more risk-averse households tend

to hold incomplete portfolios consisting mainly of a few risk-free assets. Aren and Zengin (2016) found that risk and financial literacy are significant for an investment choice. Kawamura et al. (2021) found that risk aversion plays a role in financial choices even though they found counterintuitive findings that people with a high level of financial literacy tend to take too many risks and hold naïve financial attitudes. In other words, financial literacy tends to cause people to become reckless toward some financial aspects. The risk attitudes of market participants have an important influence on market behavior (Bottasso et al., 2022).

3 Methods

We developed five models in this study to answer research questions. Each model has different dependent variables, as shown in Eqs. (1)–(5):

$$Y1 = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_1X_4 + b_6X_2X_4 + b_7X_3X_4 + e. \quad (1)$$

$$Y2 = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_1X_4 + b_6X_2X_4 + b_7X_3X_4 + e. \quad (2)$$

$$Y3 = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_1X_4 + b_6X_2X_4 + b_7X_3X_4 + e. \quad (3)$$

$$Y4 = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_1X_4 + b_6X_2X_4 + b_7X_3X_4 + e. \quad (4)$$

$$Y5 = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_1X_4 + b_6X_2X_4 + b_7X_3X_4 + e. \quad (5)$$

Where:
Y_1: Investment choices on bank's time deposits
Y_2: Investment choices on gold
Y_3: Investment choices on real estate
Y_4: Investment choices on mutual funds
Y_1: Investment choices on the company's stock
X_1: Financial knowledge
X_2: Financial attitude
X_3: Financial behavior
X_4: Risk attitude
X_1X_4: Moderating variable of financial knowledge and risk attitude
X_2X_4: Moderating variable of financial attitude and risk attitude
X_3X_4: Moderating behavior of financial knowledge and risk attitude
e: *Error*
Figure 1 shows the research design.

The measurement of financial literacy uses a measuring instrument in the form of a research questionnaire developed by the Organization for Economic Cooperation and Development (OECD). Potrich et al. (2018) found a valid model for financial literacy, which is measured as a combination of these financial behaviors, attitudes, and knowledge. This study's measurement of attitudes toward risk was adapted from

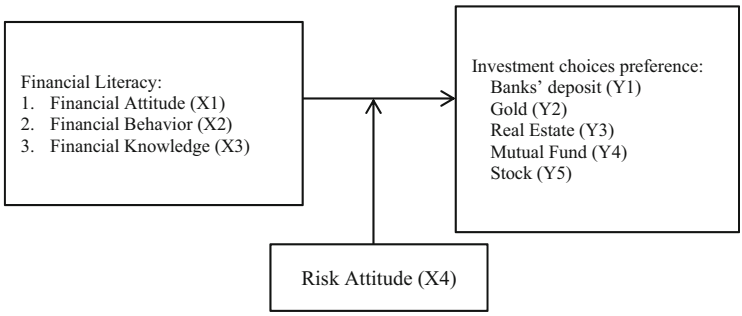

Fig. 1 Research model. Source: Created by researcher

the Risk Orientation Questionnaire (ROQ) developed by Rohrmann (1998). This measurement had previously been used by Josephin (2016).

In this study, we used the millennial generation as a unit of analysis. We generated 247 respondents who filled out the questionnaires. All respondents are citizens domiciled in Indonesia but are not limited to certain areas. We developed a questionnaire in the online form using Google Forms, distributed through social media networks and chat groups on the LINE, WhatsApp, and Instagram applications.

Before conducting the primary research, we did a mini-survey to figure out investment instruments preferable to the millennial generation. The mini-survey aims to find the five instruments most in demand by the millennial generation. The survey was distributed to several friends willing to fill out the survey, and 45 responses were obtained. From the many choices of investment instruments, both financial and nonfinancial assets, five instruments were selected with the most choices, sorted from least risky to risky, namely deposits, gold, property, mutual funds, and stocks.

We used several statistical analysis techniques to process the data: descriptive analysis, validity and reliability tests, classical assumption tests (normality, multicollinearity, autocorrelation, and heteroscedasticity), and multiple linear regression tests with moderating variables.

4 Result and Discussion

4.1 Validity and Reliability Test

This study uses ten questions to measure financial attitude, three questions to measure financial behavior, and three questions to measure risk attitude. Validity was measured using KMO and Bartlett's test. All variables based on the test results below have test results that are said to be valid and reliable variables. A variable is

Table 1 The result of the validity and reliability test

Financial literacy dimensions	KMO	Barlett test of sphericity	Conclusion	Cronbach alpa	Conclusion
Financial attitude	0.866	0.000	Valid	0.892	Reliable
Financial behavior	0.755	0.000	Valid	0.916	Reliable
Risk attitude	0.635	0.000	Valid	0.754	Reliable

Source: Created by researcher

Table 2 F-test and R2 of each model

	Y1	Y2	Y3	Y4	Y5
	Bank deposit	Gold	Real estate	Mutual funds	Stocks
F-value	0.629	1.588	1.048	3.312	6.395
Sign. prob	0.732	0.140	0.398	0.002	0.000
R square	0.018	0.044	0.030	0.088	0.158

Source: Created by researcher

valid if it has a sample adequacy value with a KMO value >0.60 and passes Barlett's test of sphericity with a value <0.05.

Meanwhile, a variable is reliable if it has a Cronbach alpha >0.6. Table 1 summarizes the results of the validity and reliability test for each variable. The dimensions of financial knowledge are not tested for validity and reliability because they are true and false questions.

Furthermore, testing the model's classical assumptions is also carried out. We use the Durbin-Watson test to detect autocorrelation or misspecification problems. Meanwhile, testing for multicollinearity was carried out with the VIF test. We concluded that the five models met the requirements of the classical assumption.

4.2 Data Analysis

The data in this study were processed using the multiple linear regression method. Table 2 presents the results of the F-test and the coefficient of determination (R2) of each model. The R^2 test was conducted to measure how far the ability of the independent variable can explain the variation of the dependent variable. The F statistic test was conducted to determine if all the independent variables included in the model have a combined effect on the dependent variable. The results of the F-test in this study are as follows.

Table 3 shows the F-test for each model. It shows that the first three models have a sig value of >0.1 (i.e., 0.732 for bank deposits as DV, 0.140 for gold as DV, and 0.398 for real estate as DV). This finding means that each model cannot explain millennials' investment preferences toward bank deposits, gold, and real estate. However, the last two models show a sig value <0.05 (i.e., 0.002 for mutual funds as DV and 0.000 for the company's stock as DV). In other words, financial literacy

Table 3 Regression results for each model

Variables	Y1 Bank deposit	Y2 Gold	Y3 Real estate	Y4 Mutual funds	Y5 Stocks
Financial knowledge	0.201	0.106	0.659	0.012*	0.000*
Financial attitude	0.625	0.136	0.311	0.020*	0.034*
Financial behavior	0.435	0.471	0.882	0.674	0.645
Risk attitude	0.556	0.805	0.056	0.174	0.001*
Financial knowledge *Risk attitude	0.527	0.144	0.363	0.591	0.089
Financial attitude *Risk attitude	0.298	0.985	0.924	0.028*	0.373
Financial behavior *Risk attitude	0.591	0.050	0.712	0.193	0.331

Source: Created by researcher

explains millennial preferences toward investment in mutual funds and stocks but cannot explain investment in bank's time deposits, gold, and real estate.

The results of the t-test in Table 3 show that all dimensions of financial literacy and risk attitude have no significant effect on the preference of millennials to invest in bank deposit (Y1), gold (Y2), or property (Y3). We also found no moderating effect on each relationship. Meanwhile, the fourth model shows that financial knowledge and attitude significantly affect millennials' preference to invest in mutual funds. In contrast, financial behavior and risk attitude do not show a significant effect. From the fifth model (stock investment choice preference, Y5), we conclude that financial knowledge, financial attitude, and risk attitude significantly affect millennials' preference to invest in stocks. In contrast, financial behavior does not show a significant effect.

5 Conclusion

The results of this study indicate that each dimension of financial literacy has a different effect on millennial age investment preferences. The first dimension is financial knowledge. We found that financial knowledge positively affects each investment choice preference, but that effect is statistically significant only on more complex investments choice, stocks, and mutual funds. The second dimension of financial literacy—financial attitude—shows a similar finding. However, the third aspect of financial literacy—financial behavior—shows an insignificant effect on all investment choices. Furthermore, this study found that risk attitude shows a positive and significant effect on investment choice in stocks but not on all other investment choices. When we evaluate the moderating effect of risk attitude, we found that risk attitude has no moderating role in each relationship unless on the effect of financial attitude on mutual funds choice. We suggest that the government places financial education on the national education agenda from high school. Thus, the next

generation can be better prepared to invest in their early career in more complex investment alternatives such as stocks and mutual funds. This policy will encourage economic equity in society because investing in a company's stock will distribute the company's growth among its shareholders proportionally to each share. The weakness of this study is that it does not include investment alternatives such as cryptocurrencies and NFTs. It should be an exciting topic for further study.

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References

Ahn, S. Y., & Nam, Y. (2022). Does mobile payment use lead to overspending? The moderating role of financial knowledge. *Computers in Human Behavior, 134*, 107319. https://doi.org/10.1016/j.chb.2022.107319

Ansari, Y., Albarrak, M. S., Sherfudeen, N., & Aman, A. (2023). Examining the relationship between financial literacy and demographic factors and the overconfidence of Saudi investors. *Finance Research Letters, 52*, 103582. https://doi.org/10.1016/j.frl.2022.103582

Aren, S., & Zengin, A. N. (2016). Pengaruh Literasi Keuangan dan Presepsi Risiko terhadap Pilihan Investasi. *Procedia-Social Behavioral Science, 235*, 656–663.

Arifah, J. N., & Dalimunthe, Z. (2020). The impact of financial literacy on the investment decision of non-donation-based crowdfunding in Indonesia. *International Journal of Business and Society, 21*(3), 1045–1057. https://doi.org/10.33736/ijbs.3310.2020

Awang, Z. (2015). *Analyzing the moderating variable*. MPWS Publisher.

Barasinska, N., Schäfer, D., & Stephan, A. (2012). Individual risk attitudes and the composition of financial portfolios: Evidence from German household portfolios. *The Quarterly Review of Economics and Finance, 52*(1), 1–14. https://doi.org/10.1016/j.qref.2011.10.001

Baruna, S. S. A., Dalimunthe, Z., & Triono, R. A. (2023). Factors affecting investor switching intention to Fintech peer-to-peer lending. In B. Alareeni & A. Hamdan (Eds.), *Sustainable finance, digitalization and the role of technology. ICBT 2021. Lecture notes in networks and systems* (Vol. 487). Springer. https://doi.org/10.1007/978-3-031-08084-5_7

Bottasso, A., Duchêne, S., Guerci, E., Hanaki, N., & Noussair, C. N. (2022). Higher order risk attitudes of financial experts. *Journal of Behavioral and Experimental Finance, 34*, 100658. https://doi.org/10.1016/j.jbef.2022.100658

Chairunnisa, A., & Dalimunthe, Z. (2021). Indonesian stock's influencer phenomenon: Did financial literacy on millennial age reduce herding behavior? *Jurnal Akuntansi dan Keuangan, 2021*(23), 62–68. https://doi.org/10.9744/jak.23.2.62-68

Chen, H., Dai, Y., & Guo, D. (2023). Financial literacy as a determinant of market participation: New evidence from China using IV-GMM. *International Review of Economics & Finance, 84*, 611–623. https://doi.org/10.1016/j.iref.2022.11.034

D'Netto, B. (2012). Generation Y: Human resource management implications. *Journal of Business and Policy Research*. Retrieved from http://www.wbiconpro.com/452-Brian.pdf.

GFLEC. (2017). *Millennial and financial literacy: A global perspective*. Global Financial Literacy Excellence Center, The George Washington University School of Business.

Grohmann, A. (2018). Financial literacy and financial behavior: Evidence from the emerging Asian middle class. *Pacific-Basin Finance Journal, 48*, 129–143. https://doi.org/10.1016/j.pacfin.2018.01.007

Hermansson, C., Jonsson, S., & Liu, L. (2022). The medium is the message: Learning channels, financial literacy, and stock market participation. *International Review of Financial Analysis, 79*, 101996. https://doi.org/10.1016/j.irfa.2021.101996

Hillson, D., & Webster, R. M. (2004). *Understanding and managing risk attitude* (pp. 1–11). Gower Publishing Limited.

Jiang, J., Liao, L., Wang, Z., & Xiang, H. (2020). Financial literacy and retail investors' financial welfare: Evidence from mutual fund investment outcomes in China. *Pacific-Basin Finance Journal, 59*, 101242. https://doi.org/10.1016/j.pacfin.2019.101242

Josephin, N. (2016). *Pengaruh literasi keuangan, sikap terhadap risiko dan kepuasan keuangan terhadap intensi menabung pada karyawan dewasa muda. Skripsi*. Fakultas Psikologi, Universitas Indonesia.

Kawamura, T., Mori, T., Motonishi, T., & Ogawa, K. (2021). Is financial literacy dangerous? Financial literacy, behavioral factors, and financial choices of households. *Journal of the Japanese and International Economies, 60*, 101131. https://doi.org/10.1016/j.jjie.2021.101131

Lin, C.-A., & Bates, T. C. (2022). Smart people know how the economy works: Cognitive ability, economic knowledge, and financial literacy. *Intelligence, 93*, 101667. https://doi.org/10.1016/j.intell.2022.101667

Nițoi, M., Clichici, D., Zeldea, C., Pochea, M., & Ciocîrlan, C. (2022). Financial well-being and financial literacy in Romania: A survey dataset. *Data in Brief, 43*, 108413. https://doi.org/10.1016/j.dib.2022.108413

Potrich, A. C. G., Vieira, K. M., & Kirch, G. (2018). How well do women do when it comes to financial literacy? Proposition of an indicator and analysis of gender differences. *Journal of Behavioral and Experimental Finance, 17*, 28–41. https://doi.org/10.1016/j.jbef.2017.12.005

Prudential Insight. (2018). Millennials and investing: What you need to know. *Prudential Investment Manager*.

Rajna, A., Ezat, S. W. P., Al Junid, S., & Moshiri, H. (2011). Financial management attitude and practice among the medical practitioners in public and private medical service in Malaysia. *International Journal of Business and Management, 6*(8), 105–113.

Rey-Ares, L., Fernández-López, S., Castro-González, S., & Rodeiro-Pazos, D. (2021). Does self-control constitute a driver of millennials' financial behaviors and attitudes? *Journal of Behavioral and Experimental Economics, 93*, 101702. https://doi.org/10.1016/j.socec.2021.101702

Rohrmann, B. (1998). The risk notion: Epistemological and empirical considerations. In D. M. G. Stewart & R. E. Melcers (Eds.), *Integrated risk assessment* (pp. 39–46).

Rohrmann, B. (2005). *Risk attitude scale: Concept and questionnaires*. University of Melbourne.

Talwar, M., Talwar, S., Kaur, P., Tripathy, N., & Dhir, A. (2021). Has financial attitude impacted the trading activity of retail investors during the COVID-19 pandemic? *Journal of Retailing and Consumer Services, 58*, 102341. https://doi.org/10.1016/j.jretconser.2020.102341

A Study on E-Banking Services and Its Growth Among the Educated Teenagers in Bangalore

M. M. Nirmala and Neelu S. Kumar

1 Introduction

A bank is a monetary establishment that manages cash. It accepts deposits from the public and lends the same to those who are in need of it. It is a dealer in money and credit. A modern bank performs a variety of functions, which include wealth management, currency exchange, safe deposit boxes, etc. It plays an essential role in the social and economic development of a country (The Economic Times, 2023). Generally, commercial banks will help to make the financial activities of their customers easy and smooth by accepting deposits, providing loans and advances, etc.

E-banking is a means of banking in which an individual controls transaction electronically via the Internet. Adoption of e-banking provides an opportunity for the co-creation of customer values (Carranza et al., 2021). Banking services are provided to the individual at their doorstep whether it is at home, office, travelling, etc. with the use of technology. There is no limitation on time and place. It is available anywhere at any time. E-banking, that is, electronic banking, is also known as electronic fund transfer (EFT). Here, the funds are directly transferred from one account to another instead of using cash or cheque.

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1.1 Types of E-Banking Services

- **ATM**—It is often referred to as an automated teller machine or ATM. It is an unattended electronic equipment in a public area. A credit card can be used to check the balance of an account, advance or withdraw funds, and access a customer's bank account directly. The client's account number is on a plastic card with a magnetic stripe that is used. After providing their personal identification number (PIN), they can complete their transactions.
- **Internet banking**—People can use their desktops and laptops to conduct financial operations. A network service provider connects PCs directly to a bank's host computer system so that customer support requests can be handled instantly. People can use their PCs to check their account balance, purchase tickets online, make payments for bills, apply for loans, etc.
- **Card facility**—The banks provide their clients the option of using debit and credit cards. When someone uses a debit card, the money is taken directly out of their checking account; however, when they use a credit card, the purchase is made using a line of credit, and they will be paid later. People can buy a variety of goods and services with these cards.
- **NEFT/RTGS**—RTGS is for real-time gross settlement system, whereas NEFT stands for national electronic fund transfer system. They are digital payment platforms that let users move money across banks. Fund transfers are handled in batches under NEFT, whereas with RTGS, they are settled in hourly time slots.
- Mobile banking is a service that financial institutions offer to their clients that allows them to conduct financial transactions using their mobile phones. It is often accessible around-the-clock. People can pay their bills, transfer money, reserve tickets online, buy a variety of goods and services, etc.
- A type of mobile banking is SMS banking. Some financial organizations use this service to send SMS warnings and notifications to their consumers. Through this, clients can use SMS to conduct financial transactions (short message service). Telephone banking—These are the services provided by financial institutions, which help the customers to make transactions over the telephones. Only some financial institutions provide 24-h service. But the use of telephone banking services has been declining since mobile banking and Internet banking have come into existence.

The major issue discussed in the chapter is as follows: The point of investigation in this research is e-banking services in general and awareness of e-banking services among educated teenagers at college level. E-banking is incredibly rapid and has had a major effect on the economic development of the country. Individuals, groups, and companies can perform their banking transactions from home, place of work, educational institutions, etc. in a cost-effective manner.

E-banking is the way in which individuals can make their transactions from anywhere at any time. According to, Internet banking is the place a client can get to his or her financial balance by means of the Internet utilizing (PC) or cell phone

and Internet browser. In today's busy world, people hardly have time for their personal errands. Here, Internet banking acts as a means of rescue in every individual's life. The emergence of e-banking can be traced back to the early 1980s, and people have been making full use of it. People do not have to wait in queues anymore. Transactions can be carried out from anywhere. This research has been carried out in Bangalore, and the data has been collected from educated teenagers of colleges, Palace Road. 83% of global banking clients are totally pleased with online banking, according to research conducted by.

The main objective of the research is to examine the awareness of e-banking among the educated teenagers, particularly college students. Less efforts were taken in this field of study. The existing literatures portrait the following:

Dixit and Saroj (1970) studied the acceptance of e-banking among adult consumers. It was found that the users of the Internet have increased drastically, but most of them hesitate from providing personal information as they do not trust the websites. It was concluded that factors such as trust, familiarity, security concerns, awareness of e-banking, and privacy increase the adoption and acceptance of e-banking among adult consumers. Sathye (1999) attempted to study the adoption of Internet banking by Australian consumers. The respondents were individuals as well as people in the business firms. The results showed that lack of awareness and security concerns were the major reasons for not adopting Internet banking by the consumers in Australia. They were also unaware of the benefits of Internet banking, which was one of the hindrances to the adoption of Internet banking. Liao and Cheung (2002) studied the attitudes of customers towards the willingness to use Internet e-retail banking. This research was conducted in Singapore due to its well-developed infrastructure with small physical and telecommunication costs. These two costs highlighted the difference between traditional and Internet banking. Results showed that Internet e-retail banking declined due to the decrease in the demand side. Sohail and Shanmugham (2003) discovered the customers' preferences of e-banking and the factors that affected their usage of e-banking services in Malaysia. It was found that there were no disparities due to age and educational qualifications among the e-banking users, but there were some differences due to demographic variables. Laforet and Li (2005) characterized that Chinese mobile banking users were mostly males. They were not necessarily young and highly educated. The problem of security was the most important factor that influenced Chinese men to adopt e-banking. The major obstacles of online banking were computer and technological skills and the banking culture among the Chinese. The barriers of mobile banking adoption were lack of awareness and the benefits of it. Poon (2007) conducted a study in Malaysia using a questionnaire with a Likert scale on 324 respondents. The ten attributes that were tested include usage, accessibility, feature availability, design, security, privacy, bank management and image, content, speed, and fees and charges. The results showed that all the above attributes played an important role in the adoption of e-banking services. Accessibility, convenience, and design are sources of satisfaction, whereas privacy and security are sources of dissatisfaction. All these attributes are essential depending on the age group, income, and education level of the users. Casalo et al. (2007) found out that

bank managers aim at customer loyalty and positive word of mouth. Due to increased competence in electronic commerce, the importance of these concepts is, even more, greater in online banking. It was concluded that fulfillment with past communications with the bank site positively affected both client loyalty and positive word of mouth. In order to please the customers, banks need to update their websites regularly and identify the basic needs of their customers. Nyangosi et al. (2009) in his study has made an attempt to collect the opinions of clients and customers regarding the importance of e-banking and the infinite technologies that are used in e-banking in India and Kenya. He also studied the trends of e-banking indicators used in India and Kenya and segregated the data collection into two so as to know the different attitudes of people in both countries towards e-banking. Lastly, it was concluded that the customers in both countries have developed a positive attitude towards e-banking services, and they attach much importance to its emergence. Giordani et al. (2009) through their study show that Greek commercial banks charge fees from their clients and customers for performing online transactions. They also studied that ATM fees are comparatively less than branch fees. Finally, they concluded that Internet fees are even less than both ATM and branch fees. Haque et al. (2009) in their study investigated the factors that determine the consumer's perception of e-banking transactions in Malaysia. The study showed that secure transactions had a major impact on the perception of consumers. The other three factors such as service quality, regulatory framework, and sufficient mechanism were rejected.

2 Materials and Methods

This study is based on both primary and secondary data. The secondary data had been collected through various sources such as journals, articles, books, and Internet sources. The study aims at understanding the awareness of e-banking services among educated teenagers, particularly students of colleges in Bangalore. A structured question schedule had been prepared and used for the primary data collection. The sample size of the study is 50 students belonging to the age group of 17–19 years to evaluate the same. Random sampling method has been used for the study. The results will then be analyzed through simple statistical methods for an in-depth understanding of the study.

3 Results and Discussion

In this research, an attempt has been made to study the personal background of all the respondents. Variables such as name, age, gender, education qualification, nativity, place of residence, religion, and caste have been taken into consideration. The results have been analyzed through simple statistical methods for an in-depth understanding

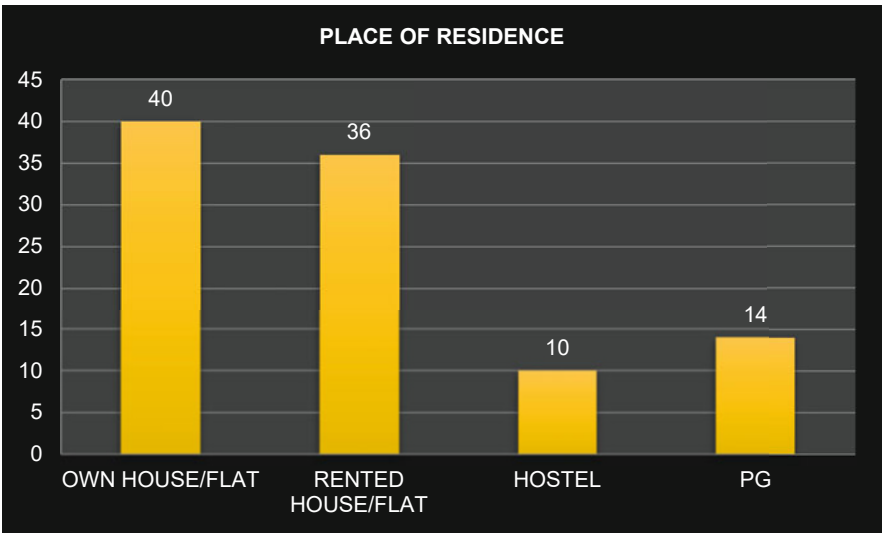

Fig. 1 Place of residence of the respondents

of the study. The usage of bar graphs has been made to portray the variables, and a brief explanation has been provided for a better apprehension.

Gender plays a very important role in the society. It is a term that refers to social or cultural distinctions and roles associated with being male or female. Gender identity is the extent to which one identifies as being either masculine or feminine.

In this study, gender has been taken as one of the most important variables to understand the usage of e-banking services by males and females in detail. Forty-eight percent of the respondents are males, while 52% of them are females. The data reveals that females are more in number in colleges than males. Females were spontaneous enough to agree to fill in the questionnaire, whereas the males were not. The females were more active and quicker in giving responses.

The data could be collected only from two courses, that is, BA and BID, because the research area was restricted to colleges in Bangalore. Due to this, there are no respondents from the other two courses, that is, BSc and B.Com. There are 80% respondents who belong to the BA course, and the rest 20% belong to the BID course. The reason is that BA has students who belong to first, second, and third years and has large number of sections per class, whereas BID has students who belong to first and second years only and has a smaller number of sections per class.

It is seen that only 12% of the respondents are from rural background, while the rest 88% are from the urban background. Due to urbanization, everyone is moving to cities and towns from districts and villages. Many people are adapting to the urban lifestyle, while some still prefer to follow their old ways of living. Hence, the students from rural background are less in number (Fig. 1).

The following bar graph depicts the place of residence of the respondents. It is seen that most of the respondents have their own house/flat, that is, 40% of them.

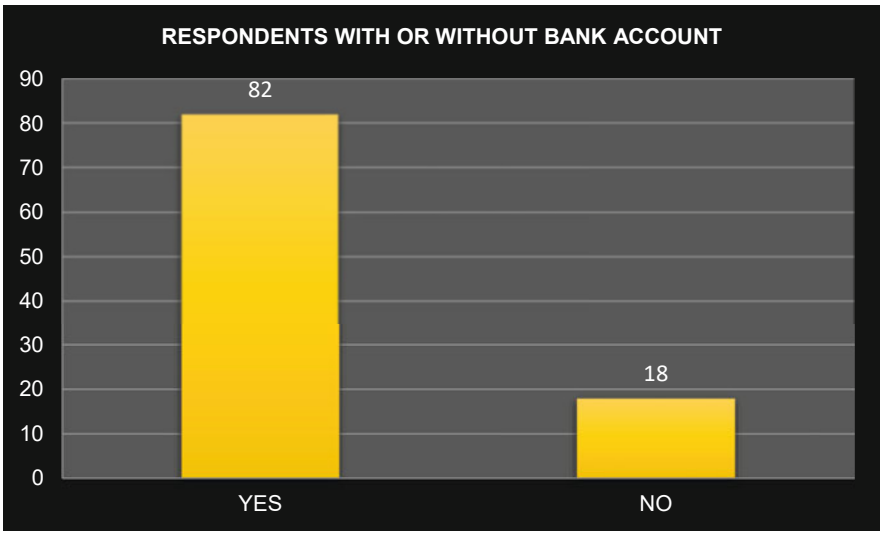

Fig. 2 Internet bank account

Many of the respondents reside in rented house/flat, which is 36% of them. Only some of the respondents stay in PG and hostel, that is, 14% and 10%, respectively.

After analyzing the personal background of all the respondents, an attempt has been made to study the awareness and usage of e-banking services among all the respondents.

All the respondents are aware of e-banking services. India is a developing country, and each one is going through the process of modernization. Every individual is adapting to new ways of life. Hence, there is no table/figure for whether or not respondents are aware of e-banking services, since cent percent of them are aware of it whether they make use of it or not (Fig. 2).

This bar graph shows that out of the 50 respondents, only 41 of them have an Internet banking account, while the rest nine of them do not have an Internet banking account. The reasons for both are mentioned in the bar graphs below. Therefore, 82% of the respondents have a bank account, and the leftover 18% of them do not have a bank account (Fig. 3).

From the earlier bar graph, it was seen that 18% of them do not have Internet banking accounts. Out of these, 10% of them said that they do not have a bank account because they are concerned about their security. They fear the fact that their money will not be kept safely, and they might lose it. The study conducted by Sathye (1999) also mentions that the consumers in Australia do not have Internet banking because they have security concerns. Four percent of the respondents think that Internet banking accounts are of no value. They believe in using cash instead of online transactions. Two percent of the respondents mentioned that they do not have the time to open a bank account. This might be due to the pressure these age groups (18–22) have these days, whether it is related to studies or taking up other

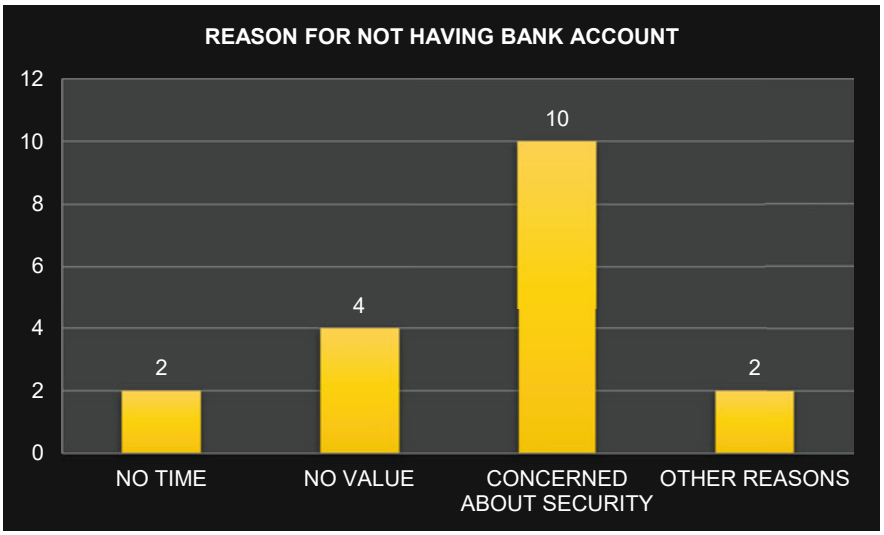

Fig. 3 Reasons for not having a bank account

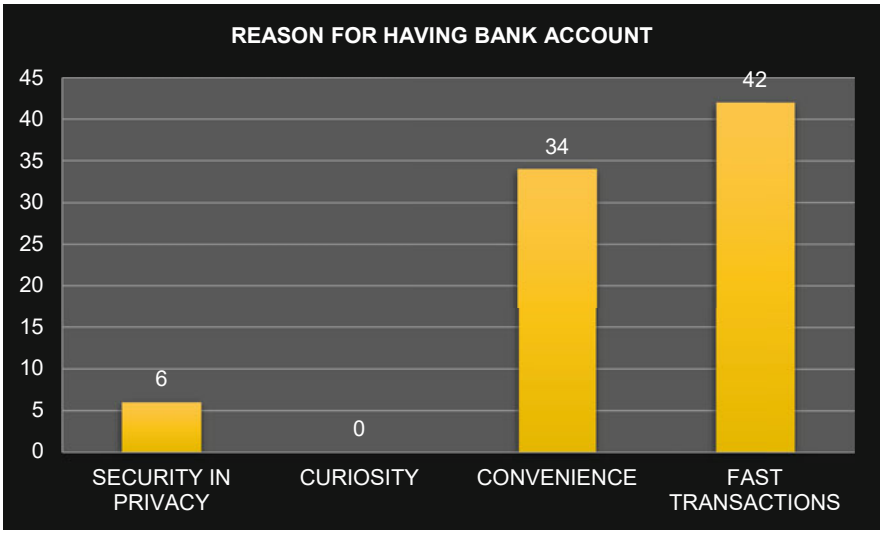

Fig. 4 Reason for having a bank account

responsibilities. The other 2% of respondents have miscellaneous reasons for not having bank accounts (Fig. 4).

This bar graph gives an insight into the reasons for the 82% of respondents for having a bank account. Forty-two percent of them have a bank account only because they can do fast transactions, and 34% of them have it because they feel it is convenient. This can be due to the kind of age group they fall, in which they

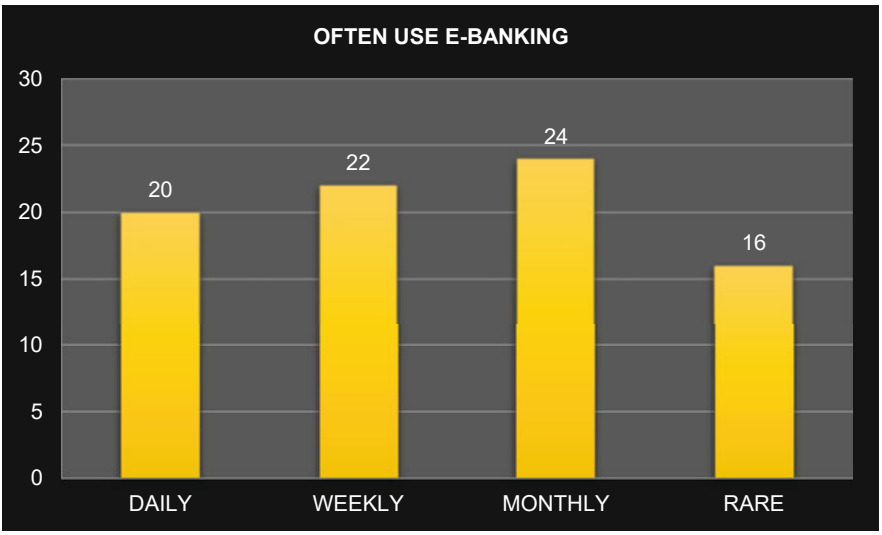

Fig. 5 Often use e-banking

spend a lot and do not carry hard cash to all the places they go. They find it easier to make payments through online transactions rather than giving cash in hand. Six percent of them feel that their money is safe through bank accounts. There are a lot of cases these days where people are robbed and there is always a fear of losing valuables. Therefore, having a bank account makes things easier for them, and they worry less (Fig. 5).

The following graph explains how often the respondents make use of e-banking. Nearly 24% of them use e-banking services monthly, while 22% and 20% of them use it weekly and daily, respectively. Therefore, 66% of them use it on a regular basis, and the rest 16% of them use e-banking very rarely (Fig. 6).

The above bar graph shows the attributes that are valued the most by individuals in choosing a bank for their bank account. Poon (2007) conducted research in Malaysia. Ten attributes were tested in his study, which more or less include the same attributes that have been specified in the bar graph given. His study concluded that all the ten attributes (usage, accessibility, features, security, design, bank management and image, content, speed, and fees and charges) played an important role in the adoption of e-banking services. In this bar graph, it can be seen that 38% of the respondents look out for the trust factor so that they have faith that their money will be safe. Thirty percent of them choose banks by keeping in mind the kind of services that are provided by them so that they can make easy and quick transactions. Fourteen percent of them choose the banks by their usage of technology. Technology has turned every difficult task into an easy one and has made life much simpler for humans (Fig. 7).

The following bar graph showcases the kind of services that are used the most by the respondents who have an Internet banking account. Forty-two percent of them

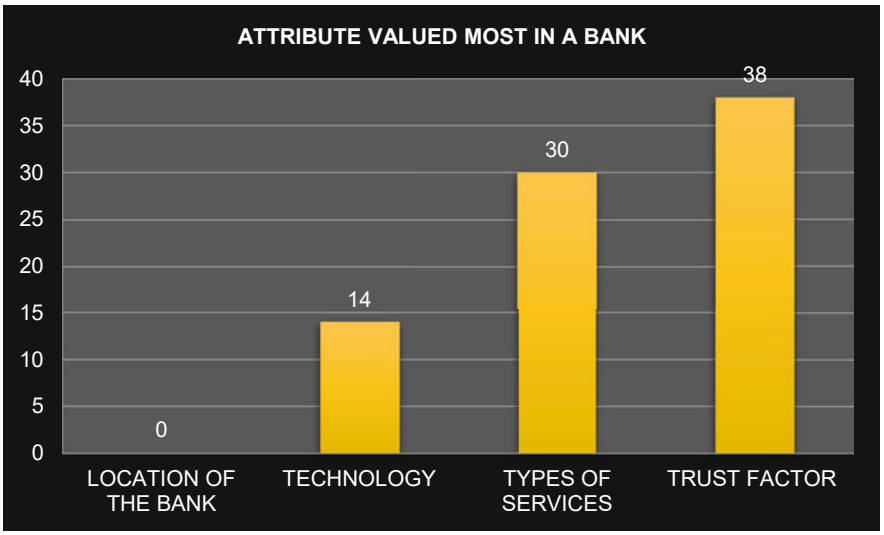

Fig. 6 Attribute valued most by the respondents

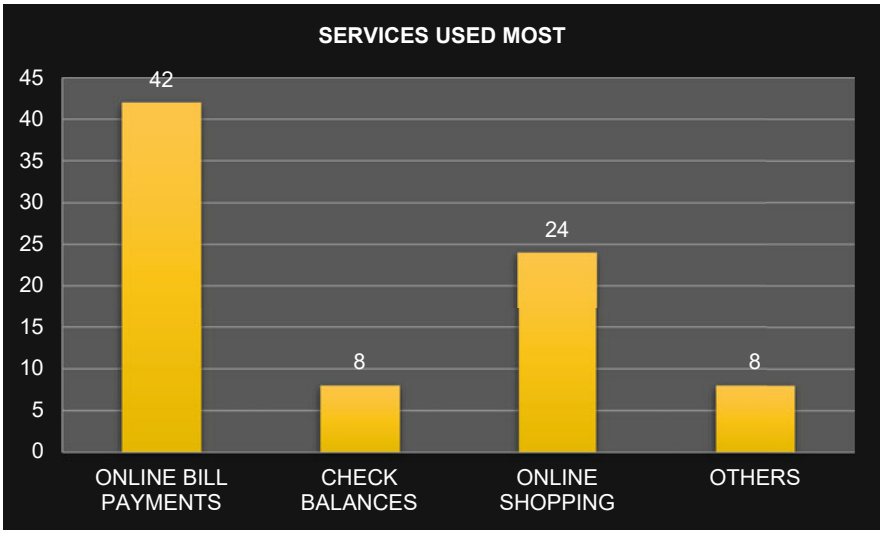

Fig. 7 Internet banking services used mostly

use it to make online bill payments. As mentioned earlier, the age group of 18–22 years spends a lot and they prefer to have e-banking accounts rather than carrying hard cash everywhere. It is easier for them to keep a note of how much they have spent, and they do not have to always worry about carrying a lot of cash with them. Twenty-four percent of them use it for online shopping since people do not prefer to go to the stores nowadays. Everything is available online. Around 8% of

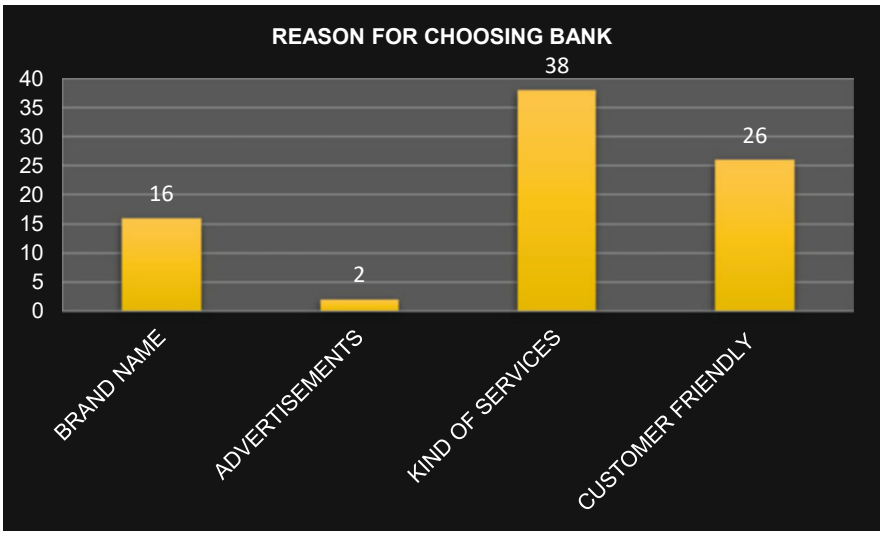

Fig. 8 Reason for choosing a bank

them use e-banking services in order to check balances, while the rest 8% of them use it for various other purposes (Fig. 8).

The bar graph depicts the reasons for choosing a bank as their bank account. Thirty-eight percent of the respondents keep in mind the kind of services that are provided to them in particular banks. They feel that the bank which provides proper assurance and has always been there for giving any type of assistance can be chosen as their bank. Twenty-six percent of them choose banks that are customer friendly. This is because people like being respected and treated well wherever they go. Sixteen percent of them choose banks which have been established since time immemorial and have a name. They do not have to think twice before opening an account because such kind of banks have a certain level of dignity and are famous enough to be known for their services by everyone. Two percent of the respondents choose banks according to the advertisements on television, radio, newspapers, etc. Advertisements could be misleading too. They might sometimes just out it for promotional purposes or might turn out to be fraud.

Seventy-eight percent of the respondents feel that e-banking is much better than branch banking. E-banking enables individuals to conduct online transactions without having to visit the bank. People prefer e-banking over branch banking because it uses less amount of time as compared to branch banking; it has high interest rates and lower fees.

The responses also show that 48% of the respondents have not faced any problems while conducting online transactions. They have had smooth transactions, which has always given them a positive lookout on e-banking. The other 34% of them have come across problems, and this has made them a little conscious about

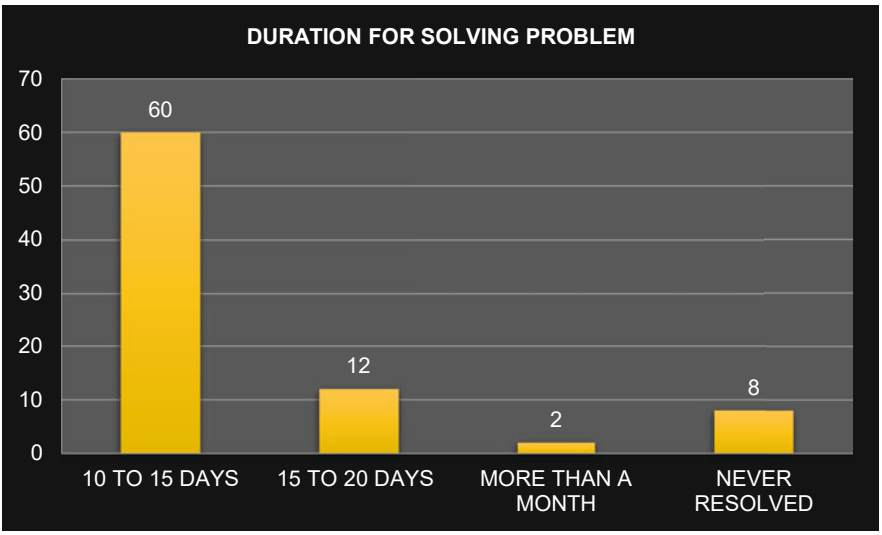

Fig. 9 Duration for solving problem

conducting online transactions. They become very cautious while performing transactions (Fig. 9).

The above bar graph shows the duration it takes according to the respondents to solve a transactional problem. Most of them, that is, 60% of them, feel that it takes just 10–15 days to solve these problems, and they gain back their faith in online transactions. About 12% of them feel that it takes almost 15–20 days to solve banking problems maybe because they might have had to face severe issues while conducting transactional activities. Two percent of the people think that it takes more than a month, and 8% of them feel that it is never resolved. Their opinion on e-banking is negative due to having unresolved issues (Fig. 10).

The final bar graph showcases the scale on which respondents find e-banking convenient. Sixty-four percent of them find it highly convenient since it helps in fast transactions, gives assurance about security, has good service quality, etc. Fourteen percent of them find it convenient on an average basis because they might have faced issues, which were solved later. Around 4% of them do not find e-banking services convenient because the issues that they came across were unresolved.

4 Conclusion

This research has made an attempt to study the awareness and usage of e-banking services among educated teenagers of colleges in Bangalore. E-banking services play a very vital role in the contemporary society, and it is necessary for the banking industries' development and to build an innovative infrastructure in the banking

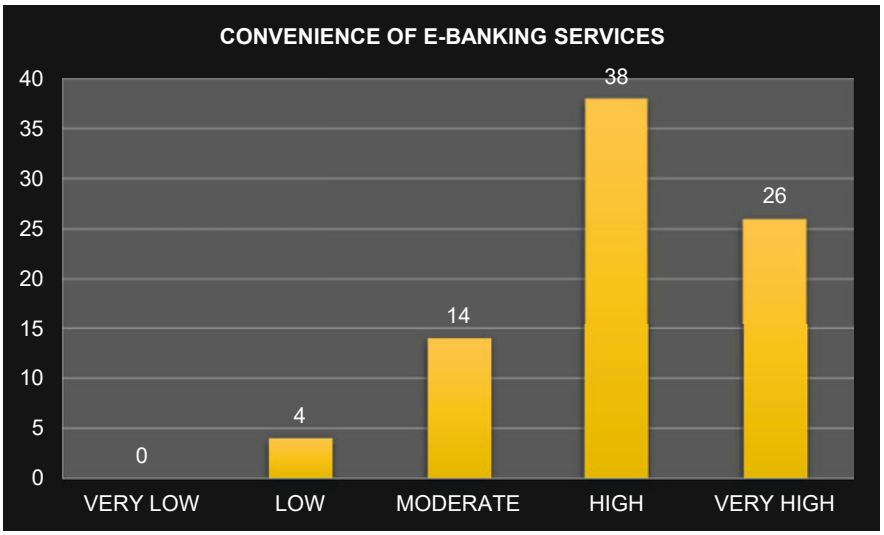

Fig. 10 Convenience of e-banking services

services. The United Nations Sustainable Development Goal 9 mentions about the innovative developments in the financial service sector. G20 reports also stress on the point of financial inclusion of youth, particularly educated teenagers and students.

In this context, it is the need of the society and responsibility of the authorities to promote e-banking. But the analysis of this study shows that around 20% of the educated teenagers of colleges in Bangalore were not having a bank account, and the majority among them stated the reason for not having a bank account is that they were concerned about the security of a bank account. Even though they are educated, they are concerned about the security of a bank account. In this case, the authorities have to take steps and formulate policies accordingly to create awareness among students about the benefits and security of having a bank account.

The analysis of this study shows that students with bank account find e-banking better than branch banking because fast transactions can be done through it. Students use e-banking mainly for online bill payments and choose their bank on the basis of trust factor. However, it is concluded that the respondents find e-banking services highly convenient for usage. Therefore, the concerned authorities have to frame policies, which ensure the maximum participation of educated teenagers into the e-banking and through that ensure cent percent digital financial inclusion of educated youth.

References

Carranza, R., Diaz, E., Sanchez-Camacho, C., & Martin-Consuegra, D. (2021). E-banking adoption: An opportunity for customer value co-creation. *Frontiers in Psychology, 11*, 621248. https://doi.org/10.3389/fpsyg.2020.621248

Casalo, L. V., Flavián, C., & Guinalíu, M. (2007). The role of security, privacy, usability and reputation in the development of online banking. *Online Information Review, 31*(5), 583–603.

Dixit, N., & Saroj, K. (1970). Acceptance of e-banking among adult customers: An empirical investigation in India. *The Journal of Internet Banking and Commerce, 15*(2), 1–17.

Giordani, G., Floros, C., & Judge, G. (2009). Internet banking services and fees: The case of Greece. *International Journal of Electronic Finance, 3*(2), 177–198.

Haque, A. K. M., Ismail, A. Z., & Daraz, A. H. (2009). Issues of e-banking transaction: An empirical investigation on Malaysian customer's perception. *Journal of Applied Sciences, 9*(10), 1870–1879.

Laforet, S., & Li, X. (2005). Consumers' attitudes towards online and mobile banking in China. *International Journal of Bank Marketing, 23*(5), 362–380.

Liao, Z., & Cheung, M. T. (2002). Internet-based e-banking and consumer attitudes: An empirical study. *Information & Management, 39*(4), 283–295.

Nyangosi, R., Arora, J. S., & Singh, S. (2009). The evolution of e-banking: A study of Indian and Kenyan technology awareness. *International Journal of Electronic Finance, 3*(2), 149–165.

Poon, W. C. (2007). Users' adoption of e-banking services: The Malaysian perspective. *Journal of Business & Industrial Marketing, 23*(1), 59–69.

Sathye, M. (1999). Adoption of internet banking by Australian consumers: An empirical investigation. *International Journal of Bank Marketing, 17*(7), 324–334.

Sohail, M. S., & Shanmugham, B. (2003). E-banking and customer preferences in Malaysia: An empirical investigation. *Information Sciences, 150*(3–4), 207–217.

The Economic Times. (2023). Retrieved from https://economictimes.indiatimes.com/definition/bank.

Enrooting Artificial Intelligence Advantageously in Marketing

Ahmad M. A. Zamil, Ahmad Yousef Areiqat, Mohammed Nadem Dabaghia, and Jamal M. M. Joudeh

1 Introduction

Over the past few decades, sales-oriented marketing concepts and processes have undergone various stages of evolution, change, and reshaping. New marketing ideas, such as customer-oriented, can prioritise customer satisfaction and earn profit. It can be noted that the old concept did not consider customer satisfaction a priority for most businesses back then.

Due to the technological advancements that have taken place contemporarily, changes in traditional marketing concepts have taken place. Customers' reviews on a specific product can make a noticeable impact. The customer can share his experience using many platforms, such as social media, the manufacturer's website, or even a third-party provider's website, such as Amazon or eBay.

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Even though AI technology has been used in marketing for decades, several variables contribute to the recent increase in interest and feasibility. Some of these would include increased computing capabilities to process AI algorithms at scale and at lower costs than ever, big data and data management advancements, and a large pool of incredibly talented professionals eager to advance the industry. The increasing buzz around AI has resulted in $27 billion in venture capital funding for AI businesses, three times more in 2017 than in 2016 (Venture Scanner, 2018). As AI technology becomes more accessible, the potential for different marketing capabilities is emerging in various ways.

The number of companies implementing robust AI systems is still tiny. Still, many companies of all sizes are employing smaller scale solutions requiring less effort to set up and manage. Due to this tremendous change in today's business environment, many businesses are adopting an electronic approach to conducting their processes, aiming for more accessible and efficient business pathways. Thus, artificial intelligence can become a crucial change in the strategies of firms planning to survive and thrive in today's competitive marketplace. As AI is associated with creative knowledge, it might take much work to connect the subject of AI with many marketing strategies. It is even harder to imagine a field that AI cannot impact. AI has changed the marketing landscape globally.

2 Literature Review

In their research study, Jarek and Mazurek (2019) presented a framework for understanding the impact of AI, specifically the impact of AI on marketing practices and customer behaviour. According to them, AI's short- and medium-term influence may be minimal, and it will be more effective if AI is enhanced instead of replacing human workers. Conick (2017) discussed the impact of AI on business, covering everything from creativity to marketplace implementation to potential business model changes. He discussed the two primary elements that have contributed to AI becoming a core technology for advanced automation. He also discussed the "AI Divide", also known as "the dark side of AI". Overgoor et al. (2019) conducted a qualitative study in which they questioned marketing experts of several companies to figure out the factors that influence the incorporation of AI with marketing. Their studies revealed the advantages of merging AI with marketing, despite having significant technological compatibility-related issues. Wierenga (2010) described how the Cross-Industry Standard Process for Data Mining (CRISP-DM) structure could be used to generate AI solutions for marketing challenges. He proved this concept with a fascinating case study on automatic image scoring for digital marketing. In their research, Paschen et al. (2019) looked at various elements influencing customer purchase decisions.

By analysing and grasping the elements that affect their clients, brands may set up a strategy and a personalised marketing message. Ma and Sun (2020) discussed many forms of forecasting and AI tools that can be used for prediction. Their study

evaluated some current AI technologies for analysis and forecasting profitability. According to Mariani et al. (2022), AI, combined with other technologies such as machine learning, big data, and data analytics, would produce more correct findings than any different forecasting technique. They provided details on AI's drawbacks, such as excessive cost and threat of cybercrime to AI-powered forecasts. In his study, Wirth (2018) merges academic and practitioner perspectives to evaluate the concerns and future trends that will affect the function of marketing research. Artificial intelligence (AI) is the intelligence shown by machines, robots, and computers instead of human intelligence. Artificial intelligence is represented by intelligent agent machines analysing the environment to achieve their aim. According to Stone et al. (2020), artificial intelligence refers to machines (computers) that mimic the objective and subjective functions of humans. AI has advanced tremendously recently, and scientists have worked extensively to expand AI technologies. The effort resulted in critical breakthroughs such as machine learning applications and big data analytics in various industries and applications. The term artificial intelligence contrives images of automated robots working for humans.

AI refers to any computer that must think and act like a person, resulting in continual learning and problem-solving. These are the characteristics that distinguish AI. People can find a repetitious task boring or unpleasant at times. People, on the other hand, will always have to do a job that is more varied than this one. An artificially intelligent system is constantly performing repetitive tasks for humans. In artificial intelligence, data ingestion is a critical part. Artificially intelligent systems can deal with all kinds of data. The artificial intelligence system generally collects data and processes it based on the requirements. Organisations like Google and Amazon manage a massive amount of data that humans cannot understand. In addition, an artificially intelligent system stores data from many sources about numerous groups and devices. All of these are displayed concurrently or simultaneously on the system. Artificial intelligent systems are meant to perceive and respond to their environments. They observe the environment and respond accordingly, considering the complications that may arise in the future. AI can forecast the repair time of a machine using past data. It can warn users of impending action. Many technologies can perform routine jobs but cannot make decisions independently. They are unable to think outside of the box.

On the other hand, machine grasp is a subset of AI that tries to enable machines to learn a task without needing pre-existing data. Machines are supplied with various issues and examples to learn how to perform specific tasks. Machines learn and adjust their technique to automatically perform the functions as they work through these issues and standards. An image recognition device, for example, may be given millions of images to examine. After countless iterations, the machine learns to recognise patterns, forms, faces, and other objects.

Artificial intelligence is the ability to transfer human intelligence to technologies to do simple and sophisticated tasks. The goal of artificial intelligence is for it to learn, analyse, and perform tasks. As technology advances, earlier definitions of artificial intelligence become irrelevant. Artificial intelligence is based on three key

fundamentals. The three fundamental principles are machine learning, deep learning, and neural networks. These concepts are leading to more data mining and natural language processing and driving software development. While AI and machine learning may appear to be relative terms, AI is widely thought of as a broader term, with machine learning and the other two AI principles being regarded as extensions of it.

2.1 Artificial Intelligence Defined

The intelligence displayed by machines is a widely recognised definition of Shahid and Li (2019). "Artificial Intellect is designed to have computers accomplish things that, when done by people, are considered as having indicated intelligence", Gentsch (2018) noted. While accurate, this definition merely kicks the bucket down the road because it presupposes widespread agreement on intelligence. While learning, planning, and problem-solving are most strongly connected with intelligence (Sinha et al., 2020), it can also include comprehension, self-awareness, emotional knowledge, reasoning, creativity, logic, and critical thinking (Huang & Rust, 2021a, 2021b). Some may claim that we are decades away from attaining AI based on this widely recognised concept of AI, depending on how intelligence is defined or perceived. Others may assume that performing a simple regression analysis (which involves learning through minimising a loss function) is enough to achieve artificial intelligence. Companies have been able to claim that they offer AI-powered products and services (a strategy nicknamed "AI washing") (van Esch & Stewart Black, 2021), even though most AI researchers would be hesitant to characterise them as such. Simple regression analyses are used in some parts of Salesforce's "Einstein AI", for example. While it can be described as "intelligence displayed by machines", this vague definition does not help precisely identify what constitutes AI in general and what does not. It must be noted that this loose definition can lead to misconceptions, misuse, and confusion.

3 The Threats of Embedding Artificial Intelligence

The capability of modern AI algorithms to detect hidden patterns in data and autonomously develop higher degree structures from original information, with little or no human interference, is their main strength. A deep learning perceptron, for example, can autonomously identify previously unidentified interactions between predictors, a convolutional network can independently determine and recognise abstract concepts, and a recurrent neural network can discover basic patterns the researcher is unaware of. Experts have used this capability to solve predicted tasks that were too complicated or contained too many variables for a human mind to

specify fully. AI algorithms do more than calibrate the parameters of a human-specified model; they also develop the model autonomously.

Therein lies their natural strength, which presents a unique set of obstacles which will be examined later on.

1. Too Robotic

   Emotional intelligence, the capability of machines to understand human emotions, is a rapidly developing field in AI. Image recognition (e.g. recognising happiness in a face or detecting falsehoods in facial expressions), voice analysis (e.g. seeing an unhappy client calling a call centre), and text analysis are all forms of emotional intelligence (e.g. detecting dissatisfaction in an online review, Olson & Levy, 2018). Given customers' aversion to interacting with AI (Kwong et al., 2016), AI systems' ability to perceive and mimic emotions will become increasingly essential to ease this aversion.

   However, there is a conceptual distinction between detecting and experiencing emotions. Even the most advanced computer program cannot comprehend, let alone feel, joy. AI may be trained to find and recognise geometric patterns in photographs that are statistically associated with the image category "smile", which we, humans, have arbitrarily designated. In some ways, AI algorithms are psychopaths; they can be taught to perceive and even mimic emotions, but we are still a long way from the day when they can feel them. The same can be said about awareness or comprehension.

   An AI algorithm may learn on its own that the terms "seat" and "sofa" have statistical relationships and be able to exploit these correlations to auto-generate phrases that make sense to a human but have no comprehension of what these words or sentences mean. Similarly, an autonomous car can be programmed to avoid pedestrians at all costs, but it will do so without regard for life's intrinsic value. Hitting a pedestrian is nothing more than a numerical penalty to avoid for an AI system, and such a punishment, if incurred, would produce no pain, remorse, or guilt. Although AI algorithms are emotionless and mindless and lack understanding, one of the challenges they face in practice is that they lack common sense, which is both obvious and simple to overlook. In other words, they do not follow an unspoken system of laws that any human being would automatically accept, and they have no comprehension of the world in which they live. Any aim or constraints that are not mentioned, even the most obvious, are meaningless and irrelevant.
2. Bias in Artificial Intelligence

   Since people develop AI algorithms, those who either purposefully or mistakenly add bias to the algorithm can bring bias into the algorithm. AI algorithms will generate biased results if they are developed with a preference or if the data in the guidance sets they are given to gain from is skewed. This reality could have unexpected repercussions, similar to what we have seen with discriminating hiring algorithms and Microsoft's racist Twitter chatbot. Companies must design and train AI systems responsibly as they build them (Dias & Torkamani, 2019).
3. Lack of Human Touch

While artificial intelligence will create more employment opportunities, many people expect a net gain in jobs or, at the very least, the same number of jobs to be made to replace those lost due to AI technology; there will be tasks that people do now that robots will take over. This will necessitate adjustments to training and skill programs to prepare employability and assist present employees in transitioning to new professions that will utilise their unique human qualities (Pradeep et al., 2018).

4. Increase in the Danger of Hacking

Artificial intelligence accelerates what can be achieved, and in many situations, it outpaces our capacity to follow along as humans. With automation, criminal behaviours like phishing, virus transmission to software, and taking support of AI systems because they interpret the world may be challenging for people to detect until a genuine problem arises (Mari, 2019).

4 The Overlap Between Marketing and Artificial Intelligence

The research involved a literature study deciding the scope of research on adopting AI to improve customer experiences. The adoption obstacles of automated customer experience management were detailed by De Bruyn et al. (2020). Natural language processing and AI-driven virtual assistants increased customer experience (Thiraviyam, 2018). AI and machine learning algorithms help efficient data processing, allowing people to make the best judgment possible (Mustak et al., 2021).

AI must be used to assess client habits, sales, preferences, opinions, and other aspects (Pusztahelyi, 2020). Artificial intelligence user interface (AIUI) helped customer relationship management (CRM) tasks (Saura et al., 2021). Traditional retail stores are becoming innovative retail stores as a result of AI and IoT. Innovative retail businesses improve the consumer experience, shopping convenience, and supply chain efficiency (Eriksson et al., 2020).

Such technologies can help retailers develop marketing strategies and planning activities by assisting with categorisation, segmentation, and branding. Aside from that, AI may help marketers define an organisational direction (Huang & Rust, 2021a, 2021b). Text mining and machine learning algorithms can identify valuable consumer categories in banking, finance, retail, and distribution (Gkikas & Theodoridis, 2019a, 2019b). Customers can be narrowed down using data optimisation methods, machine learning, and causal forests (Gkikas & Theodoridis, 2019a, 2019b).

An analytics tool can determine whether a product design is suitable for client needs and, as a result, a better customer experience (Kumar et al., 2019). Topic modelling enhances the system's ability to innovate and build services (Saura et al., 2021). During product search, choice values applied to product qualities assist marketers in better understanding the product recommender system and aligning

marketing techniques for effective product management (Huang & Rust, 2021a, 2021b). Deep learning can help marketers discover new destinations by customising the topic of attraction suggestions (Mikalef et al., 2021). Artificial intelligence can change solutions to satisfy customer requirements (Mogaji et al., 2020).

Media planning, scheduling, advertising campaign management, and search engine optimisation are all examples of promotion management. Promotional strategies are shifting from the physical to the digital domain. Due to the global digital revolution, digital marketing and social media tactics have gained traction. Customers define the scope, location, and timing in today's technological era.

AI enables message modification and personalisation based on the customer's profile and interests (Huang & Rust, 2021a, 2021b). Marketing-based content analytics can help users improve the value and efficacy of messages. Emotional intelligence-based systems can track customer preferences in real time. Netnography on social media material provides marketers with new ways to tailor their marketing campaigns to their customers' preferences (King, 2019).

5 Customers' Behaviour and Experience Impacted by Artificial Intelligence

Customer behaviour is significantly influenced by modern innovation, and AI is considered to be no exception. It is presented in three study topics: AI implementation, AI use, and post-implementation challenges. Due to several issues, customers have an unfavourable perception of AI, a barrier to implementation. Customers' perceptions that AI is unable to feel (Davenport et al., 2020) or that AI is significantly less able to discern what is distinctive about each client are the source of these unfavourable sentiments (Hermann, 2021a, 2021b). In addition, Basri (2020) stated that customers believe that AI systems are less sensitive. Customers are also less prone to use AI in significant areas (Verma et al., 2021) and for activities that are genuinely important to them (Cannella, 2018). As a result, a vital topic for future research, both in terms of research and practice, would be to look at how to reduce the effects of the above effectively. Positioning AI as a learning (artificial) organism or positioning the AI application as one that combines AI and human inputs may help partially mitigate the impact of the points above, according to initial brainstorming with colleagues and practitioners.

Also, other methods of minimising such impacts are worthy of study. Preliminary initiatives include convincing consumers that robots can perceive things from their perspective and (also) have some ability to feel emotion for the client if the customer is in distress (Park et al., 2021). Other approaches include humanising the AI, which may persuade customers that the AI has a higher level of empathy (this point needs to balance with concerns about the UVH). Sociologists are particularly interested in how robots with integrated AI can infiltrate society (Jain & Aggarwal, 2020), noting

that "difficulties develop when cultural preferences linked with human versus machine delivery of personal services are evaluated".

Aside from cultural influences, the study might help determine whether additional personality traits influence whether clients are prepared to have their hair done by robots or accept childcare/elderly care services supplied by robots (Jarek & Mazurek, 2019). Aside from physical well-being, some sociologists believe that robots may help with spiritual well-being (Conick, 2017), as demonstrated by robots (Ma & Sun, 2020) and Buddhist monk Xian'er (Wirth, 2018).

Understanding how robots with integrated AI might help consumers in a variety of ways, in addition to increasing their physical well-being, is a promising study field. In the application of artificial intelligence, customers may be primed for a low-level construal attitude when interacting with an AI application (Shahid & Li, 2019). According to research, AI could prime other perspectives, such as the preventative emphasis among clients for whom AI is modern technology. Related findings would have ramifications for how the AI application communicates with the consumer because communication has a higher impact when tailored to (a primed) mentality. When AI is incorporated into robots, the robots are expected to play an essential part in consumers' lives, such as frontline service providers, companions, nannies, or pet substitutes (Gentsch, 2018). In addition to the UVH-related issues previously discussed, specific study findings imply that interactions with AI-enabled robots cause discomfort and compensatory behaviours (Olson & Levy, 2018). It is necessary to establish when customers have unfavourable feelings about AI-enabled robots and if they may change over time.

Finally, suppose customers' ideal preferences differ from their prior actions. In that case, AI may make it more arduous for them to identify and advance toward their preferred options by only providing them with opportunities that represent their previous behaviours. One illustration of this problem is the extensive "retargeting" of digital adverts. The best way to instruct AI to manage this issue is post-implementation. The ramifications of AI implementation also point to several interesting research subjects. Customers, in particular, may experience a loss of independence if AI can accurately forecast their choices. Customers should see products more positively in principle because AI supports data-driven, micro-targeting marketing offerings (Dias & Torkamani, 2019). After all, it decreases their search costs.

However, it has the potential to erode consumers' perceived autonomy, affecting their assessments and decisions (Mari, 2019). Customers may pick a nonpreferred option to reassert their independence if they realise that an AI system can anticipate their preferred opportunities (Thiraviyam, 2018). These concerns elicit a wide range of research issues. Which elements, for example, influence whether customers appreciate perceived autonomy in AI-assisted decision-making? Individual differences in characteristics, such as culture and whether consumers see AI as a servant or a collaborator, may be helpful to investigate. Because of the differences in linkages to customers' identities, perceived autonomy may be less significant for utilitarian product decisions than hedonic ones.

Furthermore, there is a widespread concern that forming ties with robots with integrated AI would result in a loss of human connectivity. The popular press, according to Pusztahelyi (2020), raises fears that robots with embedded AI may become more popular as companions (over humans). Harmony (by Realbotix) is a competent candidate, as it can assume several personas and display some emotion. However, such robots might harm society by increasing social isolation, lowering marriage rates, and decreasing birth rates.

5.1 Positive Impact on Customer's Experience and Potential Opportunities

1. Interactive Customer Service
   Artificial intelligence (AI) apps can discover typical consumer complaints and even provide insight into what is causing them. Using this data to create AI chatbots at specific client touchpoints can assist a company in personalising real-time customer interactions while being initiative-taking. Chatbots are meant to keep one step ahead of the user, providing a flawless experience and preventing any potential problems before they arise. They can be put in high-traffic locations to answer frequent queries, provide research ideas and guidance, or assist with order placement. This will significantly impact how people perceive and interact with a business (Dharani et al., 2020).
2. Increase Sales and Leads Potentiality
   When customers are purchasing goods, making the transaction as seamless as possible is essential, and AI-powered chatbots can help. Preprogrammed questions can be used to check leads before they are passed on to a salesperson. Chatbots may also initiate discussions with consumers based on their browsing history to expedite the transaction and even upsell after the sale (Akinsola et al., 2022).
3. Personalisation
   Companies frequently devote days to designing and scheduling weekly emails to various client groups. The challenge is that you can only send personalised emails to some consumers on your list, even if you use the correct email segments. This is where artificial intelligence enters the picture. By assessing subjects of interest and finding trends to propose relevant information, AI enables highly tailored emails to be sent. Many customers believe that it is critical for companies to automatically alter information based on context, so minor improvements like these may cause a substantial difference (Hermann, 2021a, 2021b).
4. Minimise the Burden on Employees
   Unlike humans, AI technology does not require sleep or breaks. AI can quickly gain new abilities and work persistently to maintain a high level of performance and production. Of course, this is not a case for replacing people;

instead, it demonstrates how artificial intelligence may assist in guaranteeing that staff are never overworked or burnt out, which allows employees to concentrate on jobs that demand a human touch and essential people skills (Verma et al., 2021).

6 Conclusion

This study attempted to clarify and study the adoption of artificial intelligence in the marketing field. A wealthy literature review states different opinions on AI and definitions provided by various AI and marketing experts. The threats and potential opportunities of adopting such technology are thoroughly explained while discussing the clear connection between the two fields we are witnessing nowadays, as well as AI's noticeable impact on customers' behaviours and experiences and how they adapt to AI in their day-to-day lives. The author believes that at every stage of the buyer's journey, AI has the potential to improve the consumer experience. It is the capacity to assist businesses in learning who their consumers are, what they favour and dislike, and how they purchase that opens up unlimited possibilities for improving the company's customer experience. The adoption of AI is just beginning; AI will inevitably be embedded deeply in almost every aspect of living, not only marketing; that is why experts in the technological field need to find the balance in this overwhelming technology because it can be tempting for us to accomplish our daily activities quickly, but with a potential cost of losing the human touch and minimising the human interaction, which could lead to a further and more considerable distancing between individuals.

References

Akinsola, J. E. T., Adeagbo, M. A., Oladapo, K. A., Akinsehinde, S. A., & Onipede, F. O. (2022). Artificial intelligence emergence in disruptive technology. In *Computational intelligence and data sciences* (pp. 63–90). CRC Press.

Basri, W. (2020). Examining the impact of artificial intelligence (AI)-assisted social media marketing on the performance of small and medium enterprises: Toward effective business management in the Saudi Arabian context. *International Journal of Computational Intelligence Systems, 13*(1), 142.

Cannella, J. (2018). *Artificial intelligence in marketing*. Honors Thesis for Barrett, The Honors College at Arizona State University.

Conick, H. (2017). The past, present and future of AI in marketing. *Marketing News, 51*(1), 26–35.

Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science, 48*(1), 24–42.

De Bruyn, A., Viswanathan, V., Beh, Y. S., Brock, J. K. U., & von Wangenheim, F. (2020). Artificial intelligence and marketing: Pitfalls and opportunities. *Journal of Interactive Marketing, 51*, 91–105.

Dharani, M., Jyostna, J. V. S. L., Sucharitha, E., Likitha, R., & Manne, S. (2020). Interactive transport enquiry with AI Chatbot. In *2020 4th international conference on intelligent computing and control systems (ICICCS)* (pp. 1271–1276). IEEE.

Dias, R., & Torkamani, A. (2019). Artificial intelligence in clinical and genomic diagnostics. *Genome Medicine, 11*(1), 1–12.

Eriksson, T., Bigi, A., & Bonera, M. (2020). Think with me, or think for me? On the future role of artificial intelligence in marketing strategy formulation. *The TQM Journal., 32*, 795.

Feng, C. M., Park, A., Pitt, L., Kietzmann, J., & Northey, G. (2021). Artificial intelligence in marketing: A bibliographic perspective. *Australasian Marketing Journal, 29*(3), 252–263.

Gentsch, P. (2018). *AI in marketing, sales and service: How marketers without a data science degree can use AI, big data and bots*. Springer.

Gkikas, D. C., & Theodoridis, P. K. (2019a). Artificial intelligence (AI) impacts digital marketing research. In *Strategic, innovative marketing and tourism* (pp. 1251–1259). Springer.

Gkikas, D. C., & Theodoridis, P. K. (2019b). The future of technology and marketing: A multidisciplinary perspective. *Journal of the Academy of Marketing Science, 48*(1), 1–8.

Hermann, E. (2021a). Artificial intelligence and mass personalisation of communication content—An ethical and literacy perspective. *New Media & Society, 24*(5), 14614448211022702.

Hermann, E. (2021b). Leveraging artificial intelligence in marketing for social good—An ethical perspective. *Journal of Business Ethics, 179*, 43–61.

Huang, M. H., & Rust, R. T. (2021a). A framework for collaborative artificial intelligence in marketing. *Journal of Retailing, 98*, 209–223.

Huang, M. H., & Rust, R. T. (2021b). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science, 49*(1), 30–50.

Jain, P., & Aggarwal, K. (2020). Transforming marketing with artificial intelligence. *International Research Journal of Engineering and Technology, 7*(7), 3964–3976.

Jarek, K., & Mazurek, G. (2019). Marketing and artificial intelligence. *Central European Business Review, 8*(2), 46.

King, K. (2019). *Using artificial intelligence in marketing: How to harness AI and maintain the competitive edge*. Kogan Page Publishers.

Kumar, V., Rajan, B., Venkatesan, R., & Lecinski, J. (2019). Understanding the role of artificial intelligence in personalised engagement marketing. *California Management Review, 61*(4), 135–155.

Kwong, C. K., Jiang, H., & Luo, X. G. (2016). AI-based methodology of integrating effective design, engineering, and marketing to define new product design specifications. *Engineering Applications of Artificial Intelligence, 47*, 49–60.

Ma, L., & Sun, B. (2020). Machine learning and AI in marketing–connecting computing power to human insights. *International Journal of Research in Marketing, 37*(3), 481–504.

Mari, A. (2019). The rise of machine learning in marketing: Goal, process, and benefit of AI-driven marketing.

Mariani, M. M., Perez-Vega, R., & Wirtz, J. (2022). AI in marketing, consumer research and psychology: A systematic literature review and research agenda. *Psychology & Marketing, 39*(4), 755–776.

McLean, S., Read, G. J., Thompson, J., Baber, C., Stanton, N. A., & Salmon, P. M. (2021). The risks associated with artificial general intelligence: A systematic review. *Journal of Experimental & Theoretical Artificial Intelligence, 35*, 649–663.

Mikalef, P., Conboy, K., & Krogstie, J. (2021). Artificial intelligence as an enabler of B2B marketing: A dynamic capabilities micro-foundations approach. *Industrial Marketing Management, 98*, 80–92.

Mogaji, E., Soetan, T. O., & Kieu, T. A. (2020). The implications of artificial intelligence on the digital marketing of financial services to vulnerable customers. *Australasian Marketing Journal, 29*(3).

Mustak, M., Salminen, J., Plé, L., & Wirtz, J. (2021). Artificial intelligence in marketing: Topic modelling, scientometric analysis, and research agenda. *Journal of Business Research, 124*, 389–404.

Olson, C., & Levy, J. (2018). Transforming marketing with artificial intelligence. *Applied Marketing Analytics, 3*(4), 291–297.

Overgoor, G., Chica, M., Rand, W., & Weishampel, A. (2019). Letting the computers take over: Using AI to solve marketing problems. *California Management Review, 61*(4), 156–185.

Park, S. S., Tung, C. D., & Lee, H. (2021). The adoption of AI service robots: A comparison between credence and experience service settings. *Psychology & Marketing, 38*(4), 691–703.

Paschen, J., Kietzmann, J., & Kietzmann, T. C. (2019). Artificial intelligence (AI) and its implications for market knowledge in B2B marketing. *Journal of Business & Industrial Marketing., 34*, 1410.

Pei, J., Deng, L., Song, S., Zhao, M., Zhang, Y., Shuang, W., Wang, G., Zou, Z., Zhenzhi, W., He, W., Chen, F., Deng, N., Si, W., Wang, Y., Yujie, W., Yang, Z., Ma, C., Li, G., Han, W., Li, H., Huaqiang, W., Zhao, R., Xie, Y., & Shi, L. (2019). Towards artificial general intelligence with hybrid Tianjic chip architecture. *Nature, 572*(7767), 106–111.

Pradeep, A. K., Appel, A., & Sthanunathan, S. (2018). *AI for marketing and product innovation: Powerful new tools for predicting trends, connecting with customers, and closing sales*. Wiley.

Pusztahelyi, R. (2020). Emotional AI and its challenges in the viewpoint of online marketing. *Curentul Juridic, 81*(2), 13–31.

Saura, J. R., Ribeiro-Soriano, D., & Palacios-Marqués, D. (2021). Setting B2B digital marketing in artificial intelligence-based CRMs: A review and directions for future research. *Industrial Marketing Management, 98*, 161–178.

Shahid, M. Z., & Li, G. (2019). Impact of artificial intelligence in marketing: A perspective of marketing professionals of Pakistan. *Global Journal of Management And Business Research, 19*, 27–33.

Sinha, M., Healey, J., & Sengupta, T. (2020). Designing with AI for digital marketing. In *Adjunct publication of the 28th ACM conference on user modeling, adaptation and personalization* (pp. 65-70).

Stone, M., Aravopoulou, E., Ekinci, Y., Evans, G., Hobbs, M., Labib, A., Laughlin, P., Machtynger, J., & Machtynger, L. (2020). Artificial intelligence (AI) in strategic marketing decision-making: A research agenda. *The Bottom Line, 33*(2), 183–200.

Tanveer, M., Khan, N., & Ahmad, A. R. (2021, April). AI support marketing: Understanding the customer journey towards the business development. In *2021 1st international conference on artificial intelligence and data analytics (CAIDA)* (pp. 144–150). IEEE.

Thiraviyam, T. (2018). Artificial intelligence marketing. ?Need to fill this. International Journal of Recent Research Aspects, 5, 449–452.

van Esch, P., & Stewart Black, J. (2021). Artificial intelligence (AI): Revolutionising digital marketing. *Australasian Marketing Journal, 29*(3), 199–203.

Venture Scanner. (2018). Retrieved from https://www.venturescanner.com/artificial-intelligence/.

Verma, S., Sharma, R., Deb, S., & Maitra, D. (2021). Artificial intelligence in marketing: Systematic review and future research direction. *International Journal of Information Management Data Insights, 1*(1), 100002.

Wierenga, B. (2010). Marketing and artificial intelligence: Great opportunities, reluctant partners. In *Marketing intelligent systems using soft computing* (pp. 1–8). Springer.

Wirth, N. (2018). Hello marketing, what can artificial intelligence help you with? *International Journal of Market Research, 60*(5), 435–438.

Significance of Financial Attitude, Financial Education on Financial Well-Being

Suku Samuel and John Kumar

1 Introduction

Chris Budd, in his book title "The Financial Wellbeing Book: Creating Financial Peace of Mind," stated one of the biggest contributors to general well-being in concern about money. "Financial wellbeing is defined as a state when a person is well prepared to meet the current and the future needs of life." Attainment of a state of well-being is when a person feels confident about the future and is equipped to meet any contingency needs in the future. Based on the projects of the United Nations Population Fund (UNFPA) report, India is set to gain the benefits of having the longest demographic dividend. The report further highlights that a major section of the global community is from the age section belonging to 20–59 years. The country is positioning itself to take advantage of the demographic dividend for national development and economic progress. The regulators of the country and the financial institutions are in the race to introduce new age and innovative products to fulfill the current financial needs and save for retirement.

Financial security depends not only on current income, savings, and expenses but also on the preparation for future income, expenses, and savings. The understanding of financial framework, products, and instruments is crucial to plan and prepare for financial emergencies and future incomes. Lack of integrated financial awareness and education among working community is a major reason for this. Multiple studies and surveys including that by the National Centre for Financial Education have concurred with this conclusion. Financial literacy and awareness are seen to have a

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positive impact on economic growth. It enables the working class to take better decisions and equips for better financial planning.

In the survey titled "Employee Financial Wellbeing Survey of 2021" by PwC, it was concluded that 62% of the workforce stated an increase in financial stress due to the pandemic. In a similar study by virtual consultants of wealth management service provider, Scripbox, the major contributing aspect to stress levels among the respondents, financial health was seen to be the second contributing factor after physical health. Financial stress is seen to impact physical health, workplace productivity, personal life, and above all psychological condition. For an employee, the financial well-being plays a crucial appearance in their satisfaction, happiness, and conduct at work. Personnel are expected to transition jobs more time and again if they face financial concerns. It also impacts their state of engagement and motivation.

2 Literature Review

Considerable theories on employee motivation and capacity have been reviewed for this study. Some of the theories and assumption are as follows:

2.1 Maslow's Hierarchy of Needs Theory

Maslow's hierarchy of needs theory explains encouragement planted on five primary requirements of a personal of "psychological, safety, social, self-esteem, and self-actualization" (Maslow, 1958). According to the theory, a person follows a hierarchical progression by moving from lower need levels to advanced levels. Financial well-being comes under the bottom levels of psychological and safety. The desire for a lone person to accomplish the higher level of need is dependent on the financial competence to provide for the individual as well as the needs of the family. Hence, financial security would be directly proportionate to the income level and management of finance to meet the brief time and distant future needs.

2.2 Life Cycle Theory

The life cycle theory considered by F. Modigliani and Richard Brumberg states that the consumption of an individual depends on current income and expected earnings. As an extension to theory, Modigliani established the relationship between individual's position on consumption and savings. An entry-level worker with low income is likely to have a low consumption with minimal savings. With the increase in income, the consumption and savings rate are likely to increase. The career

progression of the worker calls for a need for financial literacy to improve the financial responsibility and attitude and lower the stress for the employees.

2.3 Herzberg's Two-Factor Theory

The theory of two factors suggested by Frederick Herzberg explains that two types of factors can be used to regulate the levels of satisfaction and dissatisfaction of an employee. The factors are hygiene and motivation factor. Hygiene factors are the essential facets of work that bolster to inhibit dissatisfaction. It includes job security, compensation, work conditions, and social acceptance. The second set of factors identified as motivator factors helps to maximize the performance of the employee. These are factors that motivate the workers to work harder. It includes rewards, celebrating accomplishments, and work engagements. Thus, financial awareness and literacy have a direct impression on the satisfaction of the employee.

The measure of financial well-being can be explained using a multidimensional construct, which is complex in nature. The research of academicians has identified subjective and objective indicators. The earlier studies established levels of income, debt level, amount of assets, and extent of savings as the objective factors. Recent studies have established subjective measures to be of importance in assessing individuals' well-being.

Empirical studies have proved that the practice of positive finance attitude has a greater satisfaction of financial situation (Kim et al., 2003). Low levels of debt, active savings, advance devising, and preparation towards retirement are received as healthy financial conditions. Financial stress can be the outcome of failure to manage finance, leading to a surge in the financial stress. Behaviour patterns of tolerating financial risk, spending and saving for times of need has direct consequences on overall financial health (Aboagye & Jung, 2018). Financial behaviour is influenced by a combination of factors of financial literacy, attitudes toward finances, childhood consumer experiences, and the outcomes of agents of primary and secondary socialization. (Falahati et al., 2012). Financial literacy thought to be notably impacted by elements such as peer association, family context and individual attitudes towards saving and spending behaviours (Alekam, 2018). Many of the existing studies suggests that key determinants of financial literacy revolve around the demographic factors, economic level, social status, and psychological factors. (Janor et al., 2016), (Klapper & Lusardi, 2020). In the context of financial wellness initiatives of employers were see to lead to lowers level of financial stress coupled with satisfactory financial behaviours (Parcia & Estimo, 2017). Most research have converged on the conclusion that attitudinal traits of individuals impact and influence the financial well-being. Among the studies carried out on financial well-being, it has been established that financial satisfaction and financial knowledge help in minimizing the financial stress. Positive mindset at work and higher levels of productivity are seen in individuals with lower levels of financial stress. Garman's empirical study established the conclusive affiliation between financial education

and financial stress. Demography of the workers has an impact on financial well-being. Age, gender, education, marital status, and number of dependents are some of the crucial factors that have been identified through the studies. The effectives of the financial well-being interventions was seen to be impacted by these demographic factors.

3 Research Methodology

A quantitative methodology was singled up to perform the study. An instrument of survey was designed to rendezvous the response online from the workforce at Bangalore, Karnataka, through the Google Forms survey circulated on social media and messaging platform. Filter controls were incorporated to ensure that respondents of the age group of 21–60 years conjugated in the audit. Bangalore was elected as the principal city for the exploration due to its cosmopolitan nature and hosting a huge number of multinational companies. With respondents from diverse socioeconomic sections, it is easier to generalize the findings to other cities of India.

An overall 347 samples were collected. After processing the data, 25 samples were eliminated due to incomplete and missing information. The remaining 327 data points were subjected to analysis. Majority of the survey respondents were in the age group of 30–40 years (32.9%) and were males (71.4%). 60.7% of the respondents possessed a postgraduation as the educational qualification, and an equal percentage (60.7%) were married. 41.1% of the respondents had a recurring income less than Rs. 50,000. IBM SPSS software package was reasoned for the scrutiny of the collected data.

The hypotheses framed for the study are mentioned below:

Hypothesis 1 Financial literacy of an individual has a conclusive influence on the person's financial well-being.

Hypothesis 2 Financial attitude of an individual has a conclusive influence on the person's financial wellness.

Hypothesis 3 Financial stress of an individual has an adverse impact on the well-being of the person's financials.

Hypothesis 4 Demographic factors impact the accord intervening financial awareness, financial attitude, stress of financials, and well-being financially.

Table 1 Result for factor analysis

	Statement	β
Financial well-being	I am content at my financial position personally	0.681
	I can pay monthly bills and financial obligations on time (utility bills, credit cards, loan EMI, etc.)	0.774
	I have retained an urgency or contingency fund to suffice my expenses during contingencies	0.677
	I am satisfied about my retirement savings	0.873
	I have alternate source of income apart from salary	0.788
Financial literacy	I am able to effectively track monetary transactions (incomes, expenses, etc.)	0.623
	I seek assistance before taking crucial financial decisions (investment, loan application, retirement planning, etc.)	0.734
	I am aware of the features of various financial instruments (FD, MF, insurance, PPF, etc.)	0.865
	I have a good knowledge about financial concepts and terminologies (inflation, interest rate, etc.)	0.686
	I stay informed about current affairs, government policies, regulations, market conditions, etc. and change my financial strategies accordingly	0.720
Financial stress	I have trouble meeting my financial needs on time (rent payments, bill payments, EMIs, etc.)	0.679
	I am not prepared to meet unplanned or unexpected requirements for money	0.665
	My financial condition has impacted my sleep and health	0.786
	I have challenges to set apart for my future needs and retirement	0.733
	My work life is impacted because of my financial condition	0.769
Financial attitude	I keep a track of my daily expenses	0.662
	I purchase daily essentials using cash instead of credit card	0.725
	I review options of payment before making a purchase (cash, credit card, instalments, etc.)	0.716
	I discuss financial matters with my family members	0.827
	I review my finances before making purchase decisions	0.643

Table 2 Statistics of effectiveness and reliability

Constructs	Cronbach α	CR	MSV	AVE
Financial well-being	0.923	0.949	0.378	0.545
Financial stress	0.932	0.916	0.173	0.524
Financial literacy	0.907	0.913	0.247	0.657
Financial attitude	0.921	0.908	0.213	0.507

4 Findings

An estimation of the peak likelihood was done to examine the structural model with application of AMOS. The study contradicted multivariate normality and had an unsatisfactory sample size to handle the method of distribution-free appraisal.

Table 3 Hypothesis testing

Pathname	Sample effect
Financial literacy → Financial well-being	0.176
Financial attitude → Financial well-being	0.096
Financial stress → Financial well-being	0.158

Confirmatory factor analysis (CFA) was applied directly as the study had sufficient evidence to support the empirical and theoretical validation. Factor analysis of exploratory nature was not used to discern the arrangement of dossier as the instrument of the research favored from existing studies and literature. Coefficient of Cronbach's alpha (α) confirmed the authenticity of the constructs of the study. The estimate values (β) on display in Table 1 are greater than 0.5 for all the variables.

To reaffirm the estimations, other measures were applied to the study to confirm validity and reliability. The other estimates applied in the study were composite reliability (CR), average variance extracted (AVE), and maximum shared variance (MSV). The value of coefficient of Cronbach alpha for all the selected constructs of the study was greater than 0.7. This is conclusive of the finding that the constructs are of excellent composite reliability. Composite reliability was calculated to gauge the measurement model's properties. AVE measure was used to assess the construct's convergent validity. Table 2 shows the value of AVE to be validated, thus concluding all the constructs to be supporting the convergent validity.

Structural modelling was applied to test the hypotheses devised for the study (Table 3).

The model was tested for fit using the measures of CFI, RMSEA, and SRMR. In the study, the three direct paths were tested. The outcome of the test showed complete paths as significant. Financial literacy was seen to positively influence financial attitude (β 0.239, $p < 0.01$) and financial well-being (β 0.176, $p < 0.01$). Financial attitude was skeptically impacting the value of stress due to finances (β value 0.158, p value less than 0.05), thus firmly impacting financial well-being (β 5 0.096, $p < 0.01$). Trauma of financials was seen to resentfully impact financial well-being (β value is 0.329, $p < 0.010$). From the above causatum, we are accepting hypotheses H1, H2, and H3.

5 Conclusion

From the study, it can be concluded that financial well-being and awareness programs and events need to be incorporated into mainline education systems and well-being programs hosted by employers. The survey is conclusive for the requirement of imparting financial awareness to students and new employees. The educational qualification has no relevance in the financial awareness and knowledge of an employee. Increasing the financial literacy and awareness among employees has proved to be a way out for improving the financial stress, thereby enhancing a person's overall well-being.

Competitive employment opportunities and inability to create multiple sources of income have created a need for financial well-being in the country. The demography of the participant is seen to play a crucial role and impacts the financial well-being. Further exploratory studies can be taken to examine the specific factors that impact financial well-being.

6 Future Studies

The study can be replicated to other geographical whereabouts based on the cosmopolitan and demographic spread of the location. The scope of the inquiry can be extrapolated to establish the consanguinity between the degrees of education, literacy, and familiarity of the extent of preparedness to mitigate the financial needs of the individual.

References

Aboagye, J., & Jung, J. Y. (2018). Debt holding, financial behavior, and financial satisfaction. *Journal of Financial Counseling and Planning, 29*(2), 208–218.

Esmail Alekam, J. M. (2018). The effect of family, peer, behavior, saving and spending behavior on financial literacy among young generations. *International Journal of Organizational Leadership, 7*, 309–323.

Falahati, L., Sabri, M. F., & Paim, L. H. (2012). Assessment a model of financial satisfaction predictors: Examining the mediate effect of financial attitude and financial strain. *World Applied Sciences Journal, 20*(2), 190–197.

Janor, H., Yakob, R., Hashim, N. A., Zanariah, Z., & Wel, C. A. C. (2016). Financial literacy and investment decisions in Malaysia and the United Kingdom: A comparative analysis. *Geografia, 12*(2).

Klapper, L., & Lusardi, A. (2020). Financial literacy and financial resilience: Evidence from around the world. *Financial Management, 49*(3), 589–614.

Kim, J., Garman, E. T., & Sorhaindo, B. (2003). Relationships among credit counseling clients' financial wellbeing, financial behaviors, financial stressor events, and health. Journal of Financial Counseling and planning, 14(2).

Maslow, A. H. (1958). A Dynamic Theory of Human Motivation. In C. L. Stacey & M. DeMartino (Eds.), Understanding human motivation (pp. 26–47). Howard Allen Publishers. https://doi.org/10.1037/11305-004

Parcia, R. O., & Estimo, E. T. (2017). Employees' financial literacy, behavior, stress and wellness. *Journal of Human Resource Management, 5*(5), 78–89.

Academic Leadership Roles: Influence on Work-Based Learning

Saad Darwish

1 Introduction

University presidents, vice presidents, deans of faculty, and department heads are examples of academic and administrative leaders. Various titles for the same job depend on the country's higher education system. University's most senior administrator might be referred to as the rector or president and is often backed by vice presidents in their roles. Because of this, it is critical to consider these distinctions while examining academic administration officials' responsibilities. Thus, there must be some precise analysis of job descriptions to grasp exactly their various roles.

One may consider the shift in the university's culture from one of the academics to one of the professionals and the consequent need for general management activities to be performed by professional managers. They conclude that the fusion of business and academia produces a new hybrid area that necessitates new management models in HEIs.

We need to emphasize the significance of academic credibility, which means that academics are more likely to believe and accept leaders with a demonstrated academic track record who are familiar with the academic system, despite many academic types of research. Leaders in higher education, and because of the complexity of the academic system, must have a combination of leadership skills that make them capable of dealing with the challenges. Scholars also need to pay more attention to academic leaders who are not hierarchical but play an informal role in leading academia.

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2 Research Universities

Generally, professors' duties have included research, instruction, and administration. Professors in Western universities generally have the freedom to perform their duties, which include research, instruction, and administration. Specifically, academic freedom grants the freedom to engage in all knowledge-producing activities, such as choosing research topics, deciding classroom instruction, presenting research outcomes to colleagues, and publishing findings. These responsibilities are seen as competitive, and a faculty with high publication output puts less effort into teaching. In recent decades, academics have had to contend with a more significant number of competing tasks. The growing size of research teams is also a factor in the rise in leadership expectations. The increased demands on professors mean that they must increasingly assume managerial and leadership roles. Aside from their responsibilities as exceptional researchers, they must also establish a management and leadership style. As a result, in today's higher education scene, leadership might be viewed as an equally important responsibility as research and teaching. Academics in charge of research teams and projects face additional difficulties due to this evolution. Educators just starting their careers are often unprepared to take on leadership roles because of their fresh experience.

In the eyes of professors, leadership entailed serving as a model, a mentor, a protector, an investigator, and an ambassador. Professors also reported a disconnect between their priorities and the expectations of their institutions. They are role models, mentors, managers, and strategists for their departments and research teams, all of which contribute to the success of their departments and the advancement of their fields of study (Fraser, n.d.). For that reason, they significantly impact team performance, motivation, and growth. It has long been known that transformational leaders inspire their followers and provide individual attention, intellectual stimulation, and an academic role model, all of which contribute to higher productivity levels. As a result, universities must do everything they can to prepare academics for leadership roles and to develop current leaders further so that they may be more effective.

3 Conclusive Remarks

It is critical to discuss whether or not leadership ability is something that can be learned. All of these factors play a significant role in shaping a person. In addition to academic or nonacademic training and practice, other factors influence leadership behavior in the workplace. The development of leadership skills should begin in elementary school and continue throughout college and the workforce. Leadership skills in higher education require developing specialized knowledge and integrating general education courses. Many university faculty members who hold leadership positions may have received little to no education or training regarding their educational and teaching duties. Many of them hold professional or academic

positions, and their advancement is tied to the quality of their research. There should not be a distinction between leadership and educational development programs; instead, they should be integrated so that both can be effective. Higher education leadership development programs must be studied further to see if they positively impact academic standards. Evaluating leadership training programs' effectiveness is complex, but it is necessary. The opportunities for academic leadership are appropriate. They require this to fulfill their ambitions of becoming engaged scholars and to consider various personal, professional, and institutional criteria established by institutions to choose or not choose leaders, not forgetting to pay attention to the lessons learned from previous academic leaders who are engaged. Universities now operate in a world different from the one we lived in many years ago due to the proliferation of diverse challenges brought about by many variables in a continuously transforming and developing world. It is possible that the phenomenon of internationalization, as well as increased global competition and technological developments, is at the heart of these challenges faced by universities today. Dealing with these changes requires the universities to find radical solutions to various problems by redesigning and inventing their operations to meet the requirements of developing solutions. It continues to be qualified and accredited with a focus on providing effective teaching and learning to reduce time and costs by optimizing its resources, as well as overcoming the problems of redundancy and overlap in business delivery, as well as overcoming the problems of regulatory boundaries (Carlsson et al., 2014).

The decision-making process, whether in private or public universities: Academic leaders must be capable of mastering essential skills that will be of use to the university's foreseeable future, e.g., innovation management, future outlook, potential future scenarios, competitiveness and sustainability, and emerging fields of artificial intelligence. Technology has given university leaders a new level of responsibility. Many believe that they are unprepared or unqualified to identify and incorporate technology into their practice. It is critical to overcome any reservations or discomforts to prepare students for the future they deserve. Academic leaders focus the discussion on how technology fits into their classrooms to best meet their students' needs. We must be visible in using and discussing these tools for learning and teaching. The future has arrived, and we must embrace the opportunities it brings to reshape work-based learning. Academic leaders must lead professional development for teachers and classroom network support to integrate technology into every class's subject properly.

References

Carlsson, H., Ketti's, Å., & Söderholm, A. (2014). *Research Quality and the Role of the University Leadership Commissioned by the Association of Swedish Higher Education (SUHF)/Experts' Committee on Quality*. Retrieved from https://suhf.se/app/uploads/2019/07/Expertgruppen-kvalitet-2010-2011-Bilaga-4-Research-Quality-and-the-Role-of-the-University-Leadership.pdf.

Fraser, G. (n.d.). *Setting up a mentoring scheme*. Retrieved from https://heeoe.hee.nhs.uk/sites/default/files/docustore/rcpsych_-_setting_up_a_mentoring_scheme.pdf.

Content Validity on Teachers' Observation Behaviour Checklist for Biomorphic Art Implementation

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1 Introduction

1.1 Background of a Study

Quality education in Sustainable Development Goals is to ensure inclusive and equitable quality education, as well as opportunities for lifelong learning for all. Primary and secondary education were a part of target 4.1 in SDGs, which requires all type of organization, school, stakeholder, and also executive members in government to play important roles. In terms of school, teachers are the main source of learning to educate the youngster in a proper manner. This is why mentor and mentee programmes that have been introduced by the Ministry of Education are important in order to educate the community. Learning in a non-formal way is a part of learning process that can be seen in mentor and mentee programme. There are several

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programmes and initiatives that have been held to improve mentor and mentee programmes. However, a review of the empirical evidence, such as a lack of exploratory research designs, follow-up on statistical data, and use of non-validated assessment and instruments, emphasizes the need for more rigorous research design and the development of validated measurement tools, particularly in mentor and mentee programmes for primary and secondary schools in Malaysia. Measuring or assessing students' emotions and behaviour is methodologically difficult, especially for teachers (mentors) who did not have any basic training in psychology or guidance and counselling. To see the implications of using art and design through biomorphic concepts for the recovery process of students, an observational instrument that can measure certain domains through observation of behaviour and emotional expression can be developed.

According to Alam and Shakir (2019), Lawshe's method has been widely used by researchers to determine content validity in a range of areas. It has been used in a variety of areas of study and is recognized as one of the most widely accepted methods for assessing content validity. In this study, the Lawshe content validity method was used because it is a rigorous methodological approach for assessing the validity of each item as well as the whole questionnaire or checklist. Despite that, experts will analyse the item through content validity using Lawshe's methods. This is to ensure that the item in each domain is reliable and can be accepted where the content validity index or CVI and content validity ratio or CVR findings have been displayed. Although it is considered a traditional measurement, Lawshe's approach is still relevant as one of the statistical procedures used in quantitative studies to assess the validity of each item. There are various flaws in content validity studies that need to be addressed. The study is prone to expert bias since expert judgment is subjective. If the content domain is not adequately defined, this type of analysis may omit information that was excluded from the instrument. However, experts are being asked to submit alternate instrument parts that could assist in filling this gap. Experts should have the requisite content expertise and background of the study to undergo a critical review of the instrument (Almanasreh et al., 2019).

1.2 Objective

This study aims to design and validate an observation behaviour checklist for teachers (mentors) to be used after implementing biomorphic art in mentor and mentee programmes.

2 Literature Review

2.1 Psychological Support in Mentor and Mentee Programme Through Biomorphic Art

A mentoring programme is a two-way interaction between a teacher and a student that includes mentoring, assistance, and guidance. Mentors not only focus on the individual (mentee) and guide them, but they also show respect, appreciation, and support and help them develop other skills such as decision-making, problem-solving, and stress management. "The term implies a broader and longer interest in the lives of mentees", the mentoring process. Mentoring is viewed as one of several growth relationships, those relationships whose purpose and outcomes are to help one or both parties' self-development (Ludin & Roshaimi, 2022). Safura et al. (2016) explain that mentoring is a programme that has two basic components: mentors who engage as educators and leaders, and mentees who are students, learners, or followers in need of advice and supervision. Despite that, one of the mentor's roles is to teach students how to cope with technology and solve real-world challenges. It also aims to promote student volunteering and leadership development (Ali et al., 2018). The quality of the relationship between people who participated will determine the success of mentorship in mentor and mentee programmes (Singh & Omar, 2018). The mentor and mentee programme in this study refers to supplementary activities carried out in schools to assist students with a more effective teacher and student approach. Problems about psychological issues among these school-aged children are also inadequately recognized and known by teachers. As a result, teachers, particularly those who serve as mentors, are frequently disregarded when it comes to students who have issues with imbalanced emotional development.

Although every school is mandated to have a counsellor or guidance and counselling teacher, their involvement in student holistically is still limited. As a result, efforts should be made to develop an alternative approach through specific activities using art and design based on biomorphic concepts for the emotional recovery process for students, either at the primary school level or at the secondary school level; it is very important for teachers to have the opportunity in order to help their mentees to express emotions and provide mental health support, especially for students who have been referred to a psychiatrist with a psychological disorder. Biomorphic art is a part of an abstract art introduced by Alfred Bar (Nordin, 2020). Biomorphic is also known as organic or a biological shape or living creature, either flora or fauna, that has been used as a source of inspiration that can be employed in exploration phase by a psychologist during psychotherapy session (Nordin & Mohd, 2020). In this study, the concept of biomorphic is used as part of the application. One of the biomorphic concepts used is the selection of flora and fauna in span lines, colours, groups, and patterns. These efforts can help in some extent to create a secure learning environment for students, obtain the trust of students and their mentees, disclose difficulties, and be one of the platforms for students to vent their emotions and get temporary relief.

2.2 Domain and Item Development

In the first phase, a comprehensive literature review was conducted to investigate the teachers' observation behaviour checklist for implementing biomorphic abstract art in mentor and mentee programmes. The items were created in accordance with the findings of the literature review. Three domains were identified for this instrument, known as the aggressive behaviour domain, the passive behaviour domain, and the anxiety domain. In this study, children's behaviour SDQ-MAL (Strengths and Difficulties Questionnaire) from Idris et al. (2019) was used as an example of item pooling and development, whereas a few items in the aggressive and passive behaviour domain were created in this manner. Some items from the Depression Anxiety Stress Scale (DASS) (Lovibond) were also improvised and implemented in the anxiety domain scale. This study aimed to create a measurement tool that can be completed in a short time through teacher observation and does not require a lengthy time to be utilized. Thus, the items were designed based on the student expressions and behaviour that can be seen during the mentor and mentee programme. The second phase is the evaluation of the domain and item. The descriptive and analytical content validity evaluations were executed at this phase. Quantitative content validity measures the degree of agreement among experts on the content relevance of an instrument (Noviani et al., 2022).

3 Methods

3.1 Methodology Description

In this study, the content validity index (CVI) and content validity ratio (CVR) were established to investigate quantitative content validity. Furthermore, qualitative content validity has been used in this study through expert comments and opinions on the domain and items to ensure that all the items are adequate. In order to establish qualitative content validity, experts' broad judgments on whether or not the instrument items accurately represent the instrument can be used (Nasir et al., 2022). The instrument, which consisted of 21 items, was presented to nine experts for the researchers to evaluate the items CVI and CVR. Four academic experts with PhDs and more than 5 years of professional experience in psychology, educational psychology, and counselling participated in this study, and five lay experts participated in this study, each with a master's degree in educational psychology, counselling, and more than 5 years of professional experience.

3.2 *Content Validity Index (CVI) and Content Validity Ratio (CVR)*

CVI was evaluated using the Lynn method, and each item was rated by experts on a 4-point Likert scale. For example, the following levels of relevancy were assigned as (1) not relevant; (2) slightly relevant; (3) rather relevant; and (4) highly relevant. The CVI score for the whole instrument was obtained by taking the average of all item CVI numbers. Content validity was considered adequate if the CVI score was 0.78 or above (Yusoff, 2019). Tables 1 and 2 show the number of expert and CVI and acceptable CVR values. CVI can be categorized into two categories: CVI for the item (I-CVI) and CVI for scale (S-CVI). There are two methods for calculating S-CVI: the average of the I-CVI scores for all items on the scale (S-CVI/Ave) and the proportion of items on the scale that achieve a relevance scale of 3 or 4 by all experts (S-CVI/UA). In order to calculate the S-CVI/UA for six experts, at least 0.83 CVI

Table 1 CVI values for aggressive, passive, and anxiety behaviour domain

Aggressive behaviour domain				
Items	Relevant (rating 3–4)	Not relevant (rating 1–2)	I-CVIs*	Interpretation
1	7	2	0.77	Eliminate
2	8	1	0.88	Appropriate
3	9	0	1	Appropriate
4	8	1	0.88	Appropriate
5	8	1	0.88	Appropriate
6	8	1	0.88	Appropriate
7	8	1	0.88	Appropriate
The average proportion of items evaluated across all nine experts is 0.88				
Passive behaviour domain				
8	9	0	1	Appropriate
9	8	1	0.88	Appropriate
10	8	1	0.88	Appropriate
11	8	1	0.88	Appropriate
12	8	1	0.88	Appropriate
13	9	0	1	Appropriate
14	9	0	1	Appropriate
The average proportion of items evaluated across all nine experts is 0.93				
Anxiety behaviour domain				
15	9	0	1	Appropriate
16	9	0	1	Appropriate
17	7	2	0.77	Eliminate
18	9	0	1	Appropriate
19	9	0	1	Appropriate
20	8	1	0.88	Appropriate
21	8	1	0.88	Appropriate
The average proportion of items evaluated across all nine experts is 0.91				

Table 2 CVR values for aggressive, passive, and anxiety behaviour domain

Aggressive behaviour domain			
Items	Ne*	CVR**	Interpretation
1	8	0.77	Eliminated
2	9	1	Remained
3	9	1	Remained
4	9	1	Remained
5	9	1	Remained
6	9	1	Remained
7	9	1	Remained
Passive behaviour domain			
8	9	1	Remained
9	9	1	Remained
10	9	1	Remained
11	8	0.77	Eliminated
12	9	1	Remained
13	9	1	Remained
14	9	1	Remained
Anxiety behaviour domain			
15	9	1	Remained
16	9	1	Remained
17	8	0.77	Eliminated
18	9	1	Remained
19	9	1	Remained
20	9	1	Remained
21	9	1	Remained

values were recommended by Polit and Beck in their writing (Yusoff, 2019). Meanwhile in Lynn CVI table, for six to eight experts, at least 0.83 CVI values were recommended, and for nine experts at least 0.78 CVI values were recommended (Yusoff, 2019):

$$\text{CVI or\%agreement} = \frac{(\text{Average of I} - \text{CVI across all item})}{(\text{Total item})}$$

$$\text{CVI or\%agreement} = \frac{(\text{Number of experts agreeing on items rated as 3 or 4})}{(\text{Total number of experts})}$$

The overall CVR score for the instrument was computed by taking the average of all the CVR values of the items. The experts were also requested to write comments for each item and to recommend any revisions or additional information. The qualitative content validity of the texts was examined. Item requirements were also reported on a 3-point Likert grading scale: (1) not required; (2) useful but not necessary; and (3) crucial. The conclusion of content validity was reached after

averaging the responses from all experts to evaluate the degrees of relevance for each question (Alam & Shakir, 2019). Positive figures indicate that the question was considered necessary by more than half of the experts (Kennedy et al., 2019). Content validity ratio according to Lawshe table: for five experts, the minimum value is 0.99; for six experts, the minimum value is 0.99; for seven experts, the minimum value is 0.99; for eight experts, the minimum value is 0.75; for nine experts, the minimum value is 0.78; and for ten experts, the minimum value is 0.62. Questions with CVR less than the numeric value determined by the Lawshe table should be removed from the survey (Salimian, 2021). The CVR was analysed for each item in the instrument as follows:

$$\mathrm{CVR} = \frac{\left(\mathrm{N}_e 2\left(\frac{N}{2}\right)\right)}{\left(\frac{N}{2}\right)}$$

Ne: number of experts indicating a measurement item is essential.
N: total number of experts that answer to that item.

4 Result and Discussion

4.1 Result and Discussion Overview

This study illustrates and analyses numerical indicators of a new instrument's content validity throughout the design and checklist of a teacher-centred observation instrument. It should be emphasized that validation is a complex procedure, with the first phase concentrating on content validity and the subsequent study focusing on reliability analysis. Twelve experts were invited to participate in this content validity study. Only nine experts completed and returned the relevance rating scale. To reflect content validity, a minimum S-CVI of 0.8 is recommended (Jamin et al., 2022). The CVI and CVR for the entire instrument were 0.91 and 0.96; however, item CVI varied from 0.77 to 1, whereas the item CVR also ranged from 0.77 to 1. Items with low CVI and CVR (0.77) will be eliminated. Eighteen items in this instrument received adequate validity, and three items were eliminated.

The first domain is aggressive behaviour described as behaviour that is meant to inflict harm to others or oneself, whether with a specific goal or objective in mind or not. Ratings of child behaviour given by different informants in different contexts frequently show only minor correlations. As a result, studies on significant variable- and person-oriented relationships can support the data's reliability (Bender & Losel, 2021). Aggressive behaviour is also characterized as behaviour that deviates from social norms. In this area, "aggressive" behaviour is defined as behaviour that is intended to harm oneself or others, more particularly during the teaching and learning process or mentor and mentee programme. Feelings of anger are one of the elements that produce aggressive behaviour. An individual who cannot control

his anger will show aggressive and direct behaviour, so it needs to be controlled (Mustafa et al., 2019). In this domain, "anger" refers to the condition of a student who is unable to control his angry feelings and is easily offended when reprimanded. Items 1, 2, 3, 4, 5, 6, and 7 in this instrument are specifically designed to measure aggressive behaviour. In terms of CVI and CVR values, the results suggest that six out of seven items were relevant and suitable, while one item needed to be eliminated.

The second domain is passive behaviour; this domain refers to a person who does not want to express themselves, who does not want to interact, or who suppresses their feelings. Individuals that engage in this behaviour are dishonest and regularly enable others to intrude in their personal affairs (Alam & Shakir, 2019). In this domain, passive behaviour refers to students who are more silent, who are secretive, who are often used or bullied by other peers, who feel inferior, and who engage less in any discussion that occurs during teaching and learning. Being very silent is another sign of passive conduct. This might be related to the student's shyness, depression, or gender-based problems. This excessively silent kid may also cause the instructor to ignore his or her presence in the classroom. Kids who are too silent in this item allude to students who refuse to communicate with the instructor or listen to other friends and refuse to interact even after the teaching and learning process has begun. In this instrument, items, 8, 9, 10, 11, 12, 13, and 14 are specifically designed to measure passive behaviour. In this study, result of CVI values suggests that all seven items were relevant and suitable, but for CVR values, the results suggest that one item needs to be eliminated.

Worry or anxiety is a vexing experience in a person's life. Anxiety will cause individuals to live in worry, fear, tension, and stress, and children are not immune. Anxiety manifests itself in emotional and behavioural changes when a person feels it. Anxiety impairs academic performance, family relationships, and social functioning significantly (Khanna & Carper, 2021). Third domain depicts how a person feels stressed, afraid, unhappy, and threatened. Anxiety is a condition in which a person has reoccurring incidents or sentiments toward anything of a negative character. Excessive and intense anxiety is a symptom of anxiety. To assess children's emotions and anxiety behaviour, an observational scale can be used or activity can be taken as an intervention (Baughman et al., 2020). Anxiety in this domain refers to excessive behaviour displayed by students that interferes with the learning process during the mentor and mentee programme. In this instrument, items 15, 16, 17, 18, 19, 20, and 21 are specifically designed to measure passive behaviour. In terms of CVI and CVR values, the results suggest that six out of seven items were relevant and suitable, while one item needed to be eliminated.

4.2 Results and Discussion for CVI Values

This study shows CVI values for the aggressive behaviour domain, the passive behaviour domain, and the anxiety behaviour domain. The number of items

considered relevant by all the experts is 1, the total number of items for each domain is 7, the scale validity index (S-CVI/average: sum of I-CVI score/number of items) is 0.91, and the S-CVI/average (based on proportional relevance) is 0.91 for the whole instrument. The interpretation of I-CVIs is that if the I-CVI is higher than 0.78, the item will be appropriate. However, in this study, if the item is less than 0.77, it will be eliminated. CVI value for the aggressive domain (S-CVI/average: sum of I-CVI score/number of items) is 0.88. In terms of CVI values for passive behaviour, the results suggest that all seven items were relevant and suitable. Table 1, row passive behaviour, shows that the total number of items deemed relevant by all experts is 3 and that the S-CVI/average, sum of I-CVI scores/number of items, is 0.91. This item has significant content and faces validity. The number of items considered relevant by all experts in the anxiety behaviour domain is 4, and the S-CVI average (the sum of the I-CVI score and the number of items) is 0.91. In this study, S-CVI/average were calculated by incorporating relevance scores from a panel of nine experts across three distinct domains, specifically, aggressive behavior (0.88), passive behavior (0.93), and anxiety behavior (0.91). This calculation adheres to the principle of proportional relevance.

4.3 Results and Discussion for CVR Values

This study shows the CVR values for aggressive behaviour domain, passive behaviour domain, and anxiety behaviour domain. In the domain of aggressive behavior, the reasercher conducted an evaluation with a designated number of experts who evaluated the item essential, **CVR = (Ne-N/2)/(N/2) with 9 persons as ($N = 9$), an item with CVR >0.78 remained in the instrument. Table 2, for aggressive behaviour domain, indicates that all experts agreed on the relevance of six questions. The retained questions had low CVR, implying that they were unnecessary. Furthermore, because a qualitative expert analysis revealed that these items were unsuitable for aggressive components, these particular items are required to be eliminated. Table 2, for passive behaviour domain, shows the number of experts who evaluated the item essential, **CVR = (Ne-N/2)/(N/2) with 9 persons as ($N = 9$), and the item with CVR >0.78 remained in the instrument. Lawshe CVR indicated unanimous consensus among experts that six questions were essential. The CVR for the retained questions was low, suggesting that they were not necessary. As a matter of fact, considering qualitative expert evaluation showed that these items were unsuitable for passive behaviour components, and these questions will be eliminated. As for anxiety behaviour domain, the result shows the number of experts who evaluated the item essential, **CVR = (Ne-N/2)/(N/2) with 9 persons as ($N = 9$), and the item with CVR >0.78 remained in the instrument. For this domain, all experts agreed that six questions were essential. The retained questions had inadequate CVR, suggesting that they were unsuitable. In addition, because qualitative expert review indicated that these items were unsuitable for anxiety components, these questions will be eliminated.

5 Conclusion and Future Research

5.1 Conclusion

Instrument validity is a methodical technique that must be followed to produce clear and reliable research results. The quality of a study is determined by the accuracy of the data in accordance with the researcher's objectives and research questions. As a result, to produce research findings with a high validity value, the validity of the instrument being constructed should apply accurate and rigorous techniques. This study's strength resides in its comprehensive analysis of validity. Feedback from a variety of experts, along with a high CVI and CVR, leads to greater efficiency that this checklist accurately and reliably measures students' emotions and behaviour, allowing the teacher who becomes their mentor to give effective emotional support. This instrument can be used by all the teachers, schools, district education office, state education department, and the Ministry of Education in Malaysia, especially during mentor and mentee programme as a part of process and intervention regarding mental health issues in school.

5.2 Future Research

Other forms of validity tests, such as correlation test, internal consistency coefficient alpha, and others, can be used to further investigate this study. Researchers can also investigate the impact of this instrument based on demographic and geographical aspects of a school.

5.3 Authors' Contribution

Mohammad Hazim and Azlina contributed to the development of concept, theoretical, and study design. Nurhafizah, Mohamad Fahridzakki, and Nik Sasliza performed the data analysis, while Mohammad Hazim drafted the manuscript and made the critical revisions in the study. Authors had discussed the literature, results, and implications and approved the final version of the manuscript for submission.

References

Alam, H. R., & Shakir, M. (2019). Causes of the passive attitude in children at early grade level. *International Journal of Social Sciences and Economic Review, 1*(1), 16–21.

Ali, M., Surif, J., Zaid, N. M., Talib, C. A., Abdullah, A. H., & Ibrahim, N. H. (2018). The effectiveness of a mentor-mentee program on Malaysian School Students' interest in STEM. In

EEE international conference on teaching, assessment, and learning for engineering proceeding (TALE) (pp. 855–860).

Almanasreh, E., Moles, R., Chen, T., & F. (2019). Evaluation of methods used for estimating content validity. *Research in Social and Administrative Pharmacy, 15*(2), 214–221.

Baughman, N., Prescott, S. L., & Rooney, R. (2020). The prevention of anxiety and depression in early childhood. *Frontiers in Psychology, 11*, 1–8.

Bender, D., & Losel, F. (2021). Adrenocortical activity and aggressive behaviour in children: A longitudinal study on risk and protective effects. *Frontiers in Psychology, 12*, 1–12.

Idris, I. B., Barlow, J., Dolan, A., & Surat, S. (2019). The reliability and validity of the Malay parents-report version of the strengths and difficulties questionnaire. *Malaysian Journal of Medical Science, 26*(1), 125–137.

Jamin, N. H., Surat, S., & Mohammad, W. M. R. W. (2022). Teachers' knowledge in HOTS (TKHOTS) instrument: Content validity index. *International Journal of Academic Research in Progressive Education and Development, 11*(1), 1107–1118.

Kennedy, L. G., Kichler, E. J., Seabrook, J. A., Matthews, J. I., & Dworatzek, P. D. N. (2019). Validity and reliability of a food skills questionnaire. *Journal of Nutrition Education and Behavior, 51*(7), 857–864.

Khanna, M. S., & Carper, M. (2021). Digital mental health interventions for child and adolescent anxiety. *Cognitive and Behavioural Practise*, 2–9.

Ludin, S. M., & Roshaimi, F. E. (2022). Knowledge and attitude of nursing students towards mentoring program in Kulliyyah of nursing, IIUM. *International Journal of Care Scholars, 5*(2), 27–34.

Mustafa, N. A. A., Kamaluddin, M. R., Murad, F. A., Ratakhrishnan, B., Akhir, N. M., & Nasir, N. C. M. (2019). Pengaruh faktor psikososial terhadap tingkah laku agresif dalam kalangan pelajar pra universiti sekitar kuala lumpur. *Malaysian Journal of Youth Studies, 20*, 32–49.

Nasir, N. A. M., Singh, P., Narayanan, G., Habali, A. H. M., & Rasid, N. S. (2022). Development of mathematical thinking test: Content validity process. *ESTEEM Journal of Social Science and Humanities, 6*(2), 18–29.

Nordin, M. A., & Mohd, A. A. B. (2020). Children psychological support through the application of biomorphic concept: An intervention in educational psychology. *International Journal of Academic Research in Progressive Education and Development, 9*(4), 106–122.

Nordin, M. H. A. (2020). Exploration of biomorphic concept for emotions expression in educational psychology. *International Journal of Academic Research in Business and Social Science, 10*(6), 909–915.

Noviani, W., Chong, M. C., & Tang, L. (2022). Psychometric testing of instrument the nurse professional competence (NPC) in Indonesia. *Malaysian Journal of Medicine and Health Science, 18*, 31–37.

Safura, A. B., Hazlin, F. R., Nurzakira, A. Z., Ahmad, F. M. S., & Mohammad, A. M. K. (2016). Peranan program mentoring dalam pembentukan sahsiah pelajar. In *Proceeding of the 3rd international conference on management and Muamalah* (vol. 1, pp. 356–365).

Salimian, F. (2021). Measuring the return on investment of training modules of electrical protection and uninterruptible power supply (UPS) using the corrective and AHP approaches. *Hindawi. Mathematical Problems in Engineering, 2021*, 2635761.

Singh, J. K. U., & Omar, A. (2018). A study of mentoring practices for novice TEDL teachers: A Malaysian perspective. *International Journal of Education, Psychology and Counseling, 3*(21), 81–93.

Yusoff, M. S. B. (2019). ABC of content validation and content validity index calculation. *Education in Medicine Journal, 11*(2), 49–54.

Human Resource Management Practices Toward Job Satisfaction and Employee Intention to Leave Academic Institutions

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1 Introduction

The issue of turnover must be taken seriously since it has detrimental effects on organisational performance as well as human resource management, including talented, skilled and experienced employees (Naiemah et al., 2021). Researchers and practitioners have acknowledged the significance of human resource management (HRM) strategies and their efficacy for organisational achievements among university academics in light of the sector's rapid evolution (Noor et al., 2022). Investigations from past studies suggest that the efficacy of HRM practices should be assessed from the perspective of the employee in terms of behavioural and psychological consequences (Mondejar & Asio, 2022; Najam et al., 2020). According to recent literature (Ali & Anwar, 2021; Noor et al., 2022), the impact of HRM practices on employee attitudes, such as work satisfaction and turnover intention, is a subject of growing interest. Since people's attitudes, behaviours, and resource consumption directly influence social and environmental practises, HRM and Sustainable Development Goals (SDGs) are interconnected by the human aspect (Chams & García-Blandón, 2019). In fact, the relationship between HRM and SDGs is illustrated by three key explanations: first, a responsibility-oriented approach based on an open system model that takes into account the well-being of

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employees, community prosperity and quality of work-life balance, and second, corporate goals that are efficiency and innovation oriented (Ehnert, 2009; Fallah Shayan et al., 2022). The ability of sustainable HRM to promote sustainable performance in the workforce and to optimise resource management is increased when the human aspect is nurtured, which contributes to a better understanding of sustainable HRM (Mohiuddin et al., 2022; Stone, 2000). In this perspective, managing the application of human resources—more particularly, the managerial control of people talents and skills—is seen as the primary task of sustainable HRM. Therefore, sustainable HRM can improve sustainable initiatives and sustainability development by retaining the employees, promoting green skills and fostering proactive attitudes toward social and environmental challenges (Chams & García-Blandón, 2019).

Employees typically leave an organisation because of poor human resource management (HRM) procedures that are unable to handle the issues in question (Halid et al., 2020). Recent literature highlighted that low compensation, lack of recognition, limited professional advancement, unreliable leadership, inadequate management techniques, unsatisfying occupations and dysfunctional work cultures are the top causes of employee departures (Mondejar & Asio, 2022; Najam et al., 2020; Noor et al., 2022). A comprehensive grasp of the connection between HRM practices and the desire to stay will assist organisations in making the most appropriate choices in the interest of accomplishing their organisational goals. All these aspects are directly related to HRM practices. Moreover, the availability of external opportunities (Ramlawati et al., 2021), working environment (Devadhasan et al., 2021) and job satisfaction (Ali & Anwar, 2021) are also some of the reasons why employees of the organisation want to leave their current positions. To understand how HRM practices can affect employee satisfaction and decrease their desire to leave, the current study examined the suggested theoretical model.

2 Literature Review

2.1 Theoretical Foundation

Social exchange theory (SET), which is one of the most significant theoretical foundations for comprehending attitude and behaviour in the workplace (Hasan et al., 2021), offers a plausible explanation of the relationship between employee perceptions of HRM practices, job satisfaction (Noor et al., 2022) and intention to leave (Halid et al., 2020). According to the SET, social and economic interactions are a necessary component of the connection between employers and their employees (Devadhasan et al., 2021). SET states that employees are obligated to show favourable attitudes, efforts and performance in return for the institution's fair treatment (Kakar et al., 2021). In return, the organisation's investment in its workers' training and development lays the path for increased performance, good attitudes and satisfaction of employees (Najam et al., 2020). Recruitment, selection and

training are HRM procedures designed to improve employee performance in contrast to pay and wages that are based on performance (Najam et al., 2020). As a result, using these high-performance HRM techniques helps employees develop positive attitudes and behaviours. The duration of an employment relationship is governed by how satisfied each party is with the social and financial interactions (Kakar et al., 2021). Therefore, this study adopts the SET to examine the postulated hypothesis relationship.

2.2 Human Resource Management Practice (HRMP)

HRMPs are a group of policies or processes that organisations can use to control how they handle their most valuable resources, including employees, in order to attain and maintain an unrivalled competitive edge and provide superior outcomes (Mondejar & Asio, 2022). HRM initiatives that consider hiring and selection, rewards, performance appraisal, training and development are known as HRM practices (Aguinis, 2009). In contrast to compensation and salaries that are based on performance, HRMPs, including recruitment, selection and training, are created to enhance employee performance (Najam et al., 2020). In particular, high salaries appear to increase employee engagement and organisational commitment (Halid et al., 2020). Job autonomy and participation in decision-making are seen as crucial in boosting chances for participation and causing discretionary strength (Najam et al., 2020). As a result, using these high-performance HRMP helps employees develop positive attitudes and behaviours. An employee's intention to leave their employer is influenced by both their attitude toward HRMP and their behaviour (Samad & Saufi, 2017). Thus, successful organisational implementation of HRMP may foster a positive attitude among organisational employees, increasing job satisfaction and decreasing employee intention to leave (Vizano et al., 2021). Thus, the following hypotheses are formulated:

H_1 *HRMP is negatively related to employees' intention to leave.*

H_3 *HRMP is positively related to JBS.*

2.3 Job Satisfaction (JBS)

JBS refers to how much people like or dislike their present job (Naiemah et al., 2021; Spector, 1997). It is a psychological or emotional response to the nature of employment (Tangthong & Agahi, 2018). It is also defined as a general attitude that includes employees' attitudes toward their workplace, remuneration and promotional opportunities (Najam et al., 2020). It is a combination of feelings related to tasks carried out at the workplace. JBS has several different aspects, but in general, it includes contentment with the work itself, pay, recognition, ambiance at work and prospects

for progress (Ramlawati et al., 2021). Employees who are not satisfied at work are more likely to consider leaving. As a result, this kind of employee will search for other work to replace their existing position. Employees with low JBS are more inclined to leave their workplace, regardless of the industry. Similarly, when an employee is satisfied with their work, they are more willing to provide their best effort, which in turn reduces turnover intention (Mondejar & Asio, 2022). Empirical studies demonstrated a significant relationship between JBS and turnover intention (Ali & Anwar, 2021; Serin et al., 2022). Further, Najam et al. (2020) showed that HRMP exerted a significant effect on JBS, while Vizano et al. (2021) found that JBS positively mediated the relationship between HRM practices and turnover intention. Thus, the following hypotheses are formulated:

H_2 *JBS is negatively related to intention to leave.*

H_6 *JBS mediates the relationship between HRMP and intention to leave.*

2.4 Moderating Effect of Job Opportunity (JOP)

The labour market overall has an impact on how people perceive and anticipate alternative employment opportunities. The perceived accessibility of external jobs within the organisation is referred to as JOP (Price & Mueller, 1981). Employee satisfaction and perceived available employment alternatives are connected to the intention to stay with the organisation (Ramlawati et al., 2021). When employees become aware of numerous alternative employment opportunities and accept offers from other organisations, they evaluate the advantages and disadvantages of their current position against the alternative position. Employees' job satisfaction will rise when they perceive low alternative employment opportunities, whereas it will diminish when they discover large alternative job options. Thus, this study suggests that JOP will moderate the relationship between JBS and the employee's intention to leave.

H_4 *JOP is positively related to intention to leave.*

H_5 *JOP will moderate the relationship between JBS and intention to leave.*

2.5 Intention to Leave

The biggest issue for corporate executives today is staff retention, which is driven by a scarcity of skilled personnel and excessive employee turnover (Sepahvand & Khodashahri, 2021). An employee's intent to leave their current job with the organisation immediately is referred to as turnover intention (Serin et al., 2022). According to the theory of planned behaviour (Ajzen, 1991), the desire to depart is the most significant predictor of actual departing behaviour. An external factor, such

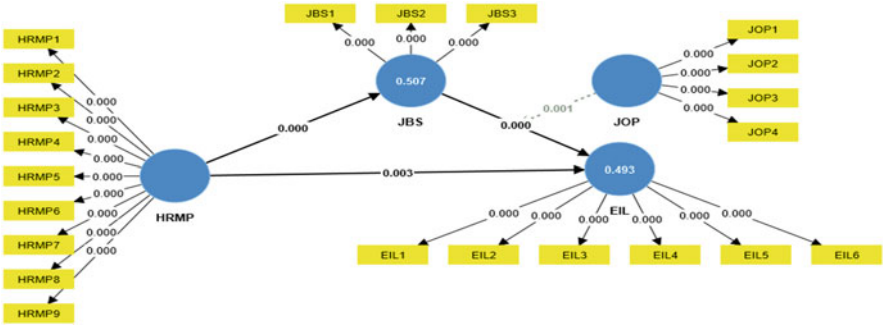

Fig. 1 Research model

as JOP, has the potential to be particularly important in understanding how HRM interacts with employees' attitudes and behaviours (Kakar et al., 2018). The reality is that employees have more employment possibilities when JBO is greater, which enhances their likelihood of quitting their jobs. Figure 1 illustrates the postulated hypothesis relationship from the current investigation.

3 Research Methodology

G-Power 3.1 was used to determine the sample size for this investigation, with a power of 0.95 and an effect size of 0.15. The model needed 119 samples, with three predictors. According to Chin (2010), PLS-SEM required a minimum threshold of 200 samples. Data was collected from the respondents using an online platform in Malaysian public universities. In order to avoid any potential issues driven by the small sample size, 466 academic members of public universities participated in this study.

HRM practice items were adapted from Alfes et al. (2013). JOP items were drawn from Peters et al. (1981). JBS items were taken from Saks (2006). Intention to leave items were obtained from.

In this study, two different approaches were utilised to lessen the effects of CMV (Podsakoff et al., 2012). The first method identified the independent and dependent variables for each item measurement. Second, the study investigated the full collinearity of all constructs to detect CMV, as suggested by Kock (2015). The VIFs for HRMP (2.289), JBS (2.287) and JBO (1.349) are all less than 3.3, showing the absence of bias from the single-sourced data (Podsakoff et al., 2012).

3.1 Data Analysis

The study used the PLS-SEM technique to test the model and assess the hypotheses. The PLS-SEM technique for evaluating hypotheses has been demonstrated to be effective in various studies (Hair et al., 2019). This technique's flexibility in data allocation makes it ideal for complex model analysis. It is also required to confirm the constructs' reliability, convergent validity and discriminant validity before starting the structural model (Henseler et al., 2017). Cronbach's alpha, Dillon-Goldstein's rho and composite reliability determined internal consistency reliability, and the average variance extracted (AVE) measured the convergent validity (Hair et al., 2019). To further evaluate discriminant validity, the heterotrait-monotrait ratio (HTMT), the Fornell-Larcker criterion and cross-loading were also performed. To test the hypothesis, the path coefficients were combined with coefficients (beta), confidence interval bias, t-value, p-value, r^2 and effect size (Hair et al., 2019).

3.2 Reliability and Validity

All CA, DG rho and CR values were higher than 0.70 (Hair et al., 2019), as shown in Table 1. All indicators are therefore regarded as reliable. Additionally, all of the items' AVE values were higher than 0.50, demonstrating a suitable and sufficient level of convergent validity (Hair et al., 2019). The VIF for each construct, with all values being less than 3, demonstrated that there was no difficulty with multi-collinearity between the constructs used in this study (Hair et al., 2019). Therefore, these research constructs met the criteria for validity and reliability (Table 1).

Furthermore, all HTMT ratio results are below 0.900, supporting the adequate discriminant validity. All of the Fornell-Larcker indicators meet the criteria for discriminant validity, according to Table 2. It is advised that all cross-loading values for the constructs achieve a minimum threshold value of 0.708 (Hair et al., 2019) in accordance with Table 3, which displays the discriminant validity of cross-loading. Thus, the results show that the constructs in the study showed discriminant validity.

Table 1 Reliability analysis

Variable	CA	DG rho	CR	AVE	VIF
Human resource management practice	0.904	0.915	0.908	0.731	2.389
Job satisfaction	0.937	0.927	0.915	0.856	2.287
Job opportunity	0.927	0.948	0.920	0.863	1.349
Employee intention to leave	0.943	0.933	0.936	0.820	

Note: *CA* Cronbach's alpha; *DG rho* Dillon-Goldstein's rho; *CR* composite reliability; *AVE* average variance extracted; *VIF* variance inflation factors
Source: Author's data analysis

Table 2 Discriminant validities

	EIL	HRMP	JBS	JOP	JOP × JBS
HTMT ratio					
EIL					
HRMP	0.566				
JBS	0.584	0.729			
JOP	0.567	0.422	0.39		
JOP × JBS	0.368	0.55	0.548	0.037	
Fornell-Larcker criterion					
EIL	0.959				
HRMP	−0.555	0.911			
JBS	−0.572	0.712	0.978		
JOP	0.559	−0.415	−0.383	0.981	
JOP × JBS	−0.365	0.543	0.542	−0.037	

Table 3 Outer loading and cross-loadings

	EIL	HRMP	JBS	JOP	JOP × JBS
EIL1	0.97	−0.527	−0.547	0.545	−0.345
EIL2	0.97	−0.526	−0.539	0.529	−0.336
EIL3	0.964	−0.545	−0.555	0.543	−0.351
EIL4	0.957	−0.536	−0.559	0.535	−0.361
EIL5	0.956	−0.545	−0.565	0.536	−0.367
EIL6	0.936	−0.511	−0.527	0.528	−0.337
HRMP1	−0.5	0.911	0.656	−0.384	0.512
HRMP2	−0.51	0.918	0.647	−0.391	0.503
HRMP3	−0.509	0.92	0.655	−0.364	0.504
HRMP4	−0.497	0.915	0.643	−0.361	0.491
HRMP5	−0.493	0.908	0.624	−0.365	0.502
HRMP6	−0.497	0.915	0.643	−0.381	0.474
HRMP7	−0.5	0.904	0.668	−0.368	0.485
HRMP8	−0.51	0.918	0.652	−0.389	0.484
HRMP9	−0.531	0.893	0.65	−0.396	0.496
JBS1	−0.56	0.694	0.974	−0.365	0.52
JBS2	−0.555	0.7	0.982	−0.382	0.535
JBS3	−0.563	0.694	0.978	−0.376	0.536
JOP1	0.568	−0.419	−0.39	0.986	−0.031
JOP2	0.545	−0.398	−0.362	0.972	−0.037
JOP3	0.539	−0.396	−0.367	0.984	−0.029
JOP4	0.542	−0.413	−0.384	0.983	−0.047

4 Path Analysis

The influence of HRMP, JBS and JBO on employee intention to leave (EIL) is explained by the r^2 value (0.493), which signifies that 49.3% of the variance in EIL can be explained by HRMP, JBS and JBO. Further, the r^2 value (50.7%) for job satisfaction is explained by HRMP.

The path analysis for HRMP ($\beta = -0.136$ and $p < 0.05$) and JBS ($\beta = -0.242$ and $p < 0.05$) showed a negative and significant effect on EIL, supporting hypotheses H1 and H2. Additionally, the association between HRMP and JBS ($\beta = 0.712$ and $p < 0.05$) indicated a positive and significant impact on JBS, confirming hypothesis H3. JOP exerted a positive and significant impact on EIL, with a medium effect size of 23.9%, according to the path value between JOP and EIL ($\beta = 0.405$ and $p < 0.05$), supporting H4.

The moderation analysis showed that the connection between JBS and EIL ($\beta = -0.15$ and $p < 0.05$) was strongly moderated by JOP, confirming H5. Likewise, the mediation analysis also demonstrated that JBS strongly mediated the association between HRMP and EIL ($\beta = -0.172$ and $p < 0.05$), supporting H6. All the study results are also confirmed by the confidence interval bias corrected at 95% (see Table 4).

5 Discussions, Implications and Limitations

The study analysis revealed that HRM practices were positively related to JBS and negatively related to EIL. The study outcome matched the results posted by Noor et al. (2022), who confirmed that HRM practices were positively related to JBS, and Ali and Anwar (2021), who found that HRM practices were significantly related to EIL. Further, the study outcome also indicated that JBS had a positive and significant mediation between HRM practices and EIL, which is compatible with the result documented by Vizano et al. (2021). Finally, the study confirmed that JOP exerted a significant moderating effect on the association between JBS and EIL, which aligned with the result proposed by Sepahvand and Khodashahri (2021).

The theoretical implication of this study is that the relationship between HRM practices, JBS and EIL is demonstrated, providing support for SET. The study's outcomes are in line with the fundamentals of SET, which claim that workers who positively regard HRM practices would reciprocate by demonstrating positive attitudes and behaviours that are appreciated by the organisation. By highlighting the considerable connection between HRM practices, JBS, JOP and EIL, this study contributes to the corpus of literature. Two of the study's great contributions include the investigation of JBS as a mediator and JOP as a moderator. This investigation goes beyond previous studies by examining the interactions between HRM practices, EIL, JBS and JOP, which is vital when taking into account the contextual factors for individuals to explore employment options before leaving their current

Table 4 Hypothesis testing

Hyp.	Relationship	Beta	T	Sig	BCI LL	BCI UL	r^2	f^2	Decision
H1	HRMP > EIL	−0.136	2.721	0.003	−0.218	−0.052	0.493	0.015	Supported
H2	JBS > EIL	−0.242	4.571	0.000	−0.329	−0.157		0.05	Supported
H4	JOP > EIL	0.405	10.077	0.000	0.341	0.471		0.239	Supported
H3	HRMP > JBS	0.712	25.859	0.000	0.662	0.752	0.507	0.28	Supported
Moderation effect									
H5	JOP × JBS > EIL	−0.15	3.169	0.001	−0.224	−0.069		0.025	Supported
Mediation effect									
H6	HRMP > JBS > EIL	−0.172	4.365	0.000	−0.238	−0.11			Supported

Note: *HRMP* human resource management practice; *JBS* job satisfaction; *JOB* job opportunity; *EIL* employee intention to leave

position. Since the availability and accessibility of outside employment opportunities affect the decision to quit a job as well as HRM practices, this study significantly contributes to the SET.

There are also some incredibly crucial managerial and practical considerations in this study that may have some significant implications for decision-makers, particularly university authorities and human resource departments. The study confirmed that employees' positive attitudes about HRM practices enhance job satisfaction and reduce turnover intention. Thus, strategies for boosting employee satisfaction must include actions that have a beneficial impact on both the employee and the organisation. One of the strongest arguments for an employee to stay with the organisation is the remuneration and perks. However, remuneration alone is insufficient to encourage employees to remain with the organisation. Therefore, a competitive compensation system and training opportunities would persuade academic staff to observe HRM practices positively. Management must also make employees aware of the organisation's expectations and give them the necessary tools to achieve their goals. Additionally, by adopting and implementing ethical, reasonable and coherent sustainable HRM practices into reality, management should foster attitudes of fairness, objectivity and impartiality. Thus, it is highly recommended for HR to satisfy their employees by paying a satisfying salary, providing excellent supervision and career development, and delivering a comfortable workplace.

This study has some weaknesses despite the substantial theoretical and management implications. One limitation of the study's cross-sectional design is that it makes it more challenging to generalise. Furthermore, the study's limited ability to be generalised is hampered by its specific emphasis on one country. Moreover, since respondents only operate in the high education sector, future studies should indeed take a broader perspective that includes other fields.

References

Aguinis, H. (2009). *Performance management*. Pearson/Prentice Hall.

Ajzen, I. (1991). The theory of planned behavior. *Orgnizational Behavior and Human Decision Processes, 50*, 179–211.

Alfes, K., Truss, C., Soane, E. C., Rees, C., & Gatenby, M. (2013). The relationship between line manager behavior, perceived HRM practices, and individual performance: Examining the mediating role of engagement. *Human Resource Management, 52*(6), 839–859. https://doi.org/10.1002/hrm.21512

Ali, J. B., & Anwar, G. (2021). Employee turnover intention and job satisfaction. *International Journal of Advanced Engineering, Management and Science, 7*(6), 1–9. https://doi.org/10.22161/ijaems.76.3

Chams, N., & García-Blandón, J. (2019). On the importance of sustainable human resource management for the adoption of sustainable development goals. *Resources, Conservation and Recycling, 141*, 109–122. https://doi.org/10.1016/j.resconrec.2018.10.006

Chin, W. W. (2010). How to write up and report PLS analyses. In *Handbook of partial least squares*. Springer.

Devadhasan, B. D., Meyer, N., Vetrivel, S. C., & Magda, R. (2021). The mediating role of person-job fit between work-life balance (WLB) practices and academic turnover intentions in India's higher educational institutions. *Sustainability, 13*, 10497. https://doi.org/10.3390/su131910497

Ehnert, I. (2009). Sustainability and human resource management: Reasoning and applications on corporate websites. *European Journal of International Management, 3*(4), 419–438. https://doi.org/10.1504/.EJIM.2009.028848

Fallah Shayan, N., Mohabbati-Kalejahi, N., Alavi, S., & Zahed, M. A. (2022). Sustainable development goals (SDGs) as a framework for corporate social responsibility (CSR). *Sustainability, 14*(1222), 1–17. https://doi.org/10.3390/su14031222

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review, 31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Halid, H., Kee, D. M. H., & Rahim, N. F. A. (2020). Perceived human resource management practices and intention to stay in private higher education institutions in Malaysia: The role of organizational citizenship behaviour. *Global Business Review*, 1–18. https://doi.org/10.1177/0972150920950906.

Hasan, T., Jawaad, M., & Butt, I. (2021). The influence of person–job fit, work–life balance, and work conditions on organizational commitment: Investigating the mediation of job satisfaction in the private sector of the emerging market. *Sustainability, 13*(6622), 1–20. https://doi.org/10.3390/su13126622

Henseler, J., Hubona, G., & Ray, P. A. (2017). *Partial least squares path modeling: Basic concepts, methodological issues and applications*. Springer International Publishing.

Kakar, A. S., Mansor, N. A., & Saufi, R. A. (2021). Does organizational reputation matter in Pakistan's higher education institutions? The mediating role of person-organization fit and person-vocation fit between organizational reputation and turnover intention. *International Review on Public and Nonprofit Marketing, 18*, 151–169. https://doi.org/10.1007/s12208-020-00266-z

Kakar, A. S., Saufi, R. A., & Singh, H. (2018). Understanding linkage between human resource management practices and intention to leave: A moderated-mediation conceptual model. In *Conference Paper*. https://doi.org/10.1145/3277139.3277166.

Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration, 11*, 1–10. https://doi.org/10.4018/ijec.2015100101

Mohiuddin, M., Hosseini, E., Faradonbeh, S. B., & Sabokro, M. (2022). Achieving human resource management sustainability in universities. *International Journal of Environmental Research and Public Health, 19*(928), 1–19. https://doi.org/10.3390/ijerph19020928

Mondejar, H. C. U., & Asio, J. M. R. (2022). Human resource management practices and job satisfaction: Basis for development of a teacher retention framework. *International Journal of Multidisciplinary: Applied Business and Education Research, 3*(9), 1630–1641. https://doi.org/10.11594/ijmaber.03.09.04

Naiemah, S. U., Beng, T. L., Isa, E. V. M., & Radzi, W. N. W. M. (2021). The impacts of job satisfaction, organizational commitment and job stress on turnover intention: A case in the Malaysian manufacturing. *Proceedings of Green Design and Manufacture*, 1–8. https://doi.org/10.1063/5.0050072.

Najam, U., Ishaque, S., Irshad, S., Salik, Q., Khakwani, M. S., & Liaquat, M. (2020). A link between human resource management practices and customer satisfaction: A moderated mediation model. *SAGE Open*, 1–16. https://doi.org/10.1177/215824402096878.

Noor, K. M., Razali, W. M. F. A., & Mutalib, M. A. (2022). Human resource management practices and job satisfaction of academics in Malaysian higher education institutions. *International Journal of Mechanical Engineering, 7*(4), 1–14.

Peters, L. H., Jackofsky, E. F., & Salter, J. R. (1981). Predicting turnover: A comparison of part-time and full-time employees. *Journal of Occupational Behaviour, 2*(2), 89–98. https://doi.org/10.1002/job.4030020204

Podsakoff, P. M., Mackenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review Psychology, 63*(1), 539–569. https://doi.org/10.1146/annurev-psych-120710-100452

Price, J. L., & Mueller, C. W. (1981). Causal model of turnover for nurses. *Academy of Management, 24*(3), 543–565. https://doi.org/10.2307/255574

Ramlawati, R., Trisnawati, E., Yasin, N. A., & Kurniawaty, K. (2021). External alternatives, job stress on job satisfaction and employee turnover intention. *Management Science Letters, 11*, 511–518. https://doi.org/10.5267/j.msl.2020.9.016

Saks, A. M. (2006). Antecedents and consequences of employee engagement. *Journal of Managerial Psychology, 21*(7), 1–20. https://doi.org/10.1108/02683940610690169

Samad, A., & Saufi, R. A. (2017). A comparative review of turnover models and recent trends in turnover literature. *Journal of Management and Marketing Review, 2*(4), 27–35. www.gatrenterprise.com/GATRJournals/index.html.

Sepahvand, R., & Khodashahri, R. B. (2021). Strategic human resource management practices and employee retention: A study of the moderating role of job engagement. *Iranian Journal of Management Studies (IJMS), 14*(2), 437–468.

Serin, H., Qasim, Z. R., & Mansoor, M. M. (2022). Impact of job satisfaction on turnover intention among academic personnel of private higher education sector in Iraq: A case of Tishk International University. *International Journal of Research in Business & Social Science, 11*(2), 402–413. https://doi.org/10.20525/ijrbs.v11i2.1641

Spector, P. E. (1997). *Job satisfaction: Application, assessment, causes, and consequences (3)*. Sage.

Stone, L. J. (2000). When case studies are not enough: The influence of corporate culture and employee attitudes on the success of cleaner production initiatives. *Journal of Cleaner Production, 8*(5), 353–359. https://doi.org/10.1016/S0959-6526(00)00037-8

Tangthong, S., & Agahi, H. (2018). The effects of human resource management practices on employee service quality in Thailand's chained-brand hotels. *IOSR Journal of Business and Management, 20*(3), 56–71. www.iosrjournals.org

Vizano, N. A., Sutawidjaya, A. H., & Endri, E. (2021). The effect of compensation and career on turnover intention: Evidence from Indonesia. *Journal of Asian Finance, Economics and Business, 8*(1), 471–478. https://doi.org/10.13106/jafeb.2021.vol8.no1.471

Business Intelligence Adoption Model During the Digital Transformation Era: An Empirical Investigation in the Jordanian Insurance Companies

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1 Introduction

Decision-making seems to be a crucial corporate function (Awan et al., 2021). Globalization, rapid economic development, technological advancements, new rules, and emergence of new markets have modified the decision-making processes of businesses (Niu et al., 2021). Therefore, the combination of best business practices with cutting-edge technology, such as specialized software tools, can enhance management decision-making. Business intelligence (BI) is considered a potential tool for business decision-making, and both academics and industry experts are becoming increasingly interested in this technology. BI permits businesses to make smart business decisions (Velu, 2021). BI systems focus on facilitating the access of interactive data, data processing, and enabling analysts and company directors for doing suitable analysis. The development and implementation of business intelligence have facilitated the conversion of information techniques to optimize corporate decisions and operations. Business intelligence systems can help organizations overcome information asymmetry, which is one of the greatest issues they face due to a lack of information management tools and methods (Al-Okaily & Al-Okaily, 2022). However, the idea of using business analytics to inform managerial decisions is not new, but the methodologies and technology behind this field have rapidly progressed over the past several years.

Business intelligence is required to establish a strong business identity and implement a successful technological plan. Thus, this enhances firm decisions and gives it a significant advantage in the changing marketplace. Data are a primary

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focus and are seen as the future's force because they can be handled rapidly and then used effectively to support uncertain conditions and decisions that can have a significant impact on company performance (Chen & Wang, 2010).

One of the most crucial technologies, tools, and techniques for helping firms gain a competitive edge through better understanding their business data, boosting operations and product development, and fostering stronger customer interactions is business intelligence and analytics (Hasan & Sudaryana, 2022). BI is a holistic approach to data management that supports management decisions (Basile et al., 2022). Top executives prioritize BI in information technology. Using BI systems, managers may learn, monitor, and coordinate the operations and processes of their organizations in order to reach both tactical and strategic decisions (Mohamad et al., 2022). Today's insurance and banking institutions use BI systems because they have a wealth of financial and operational data (Niu et al., 2021).

Velu (2021) promotes the utilization of BI applications to assist organizational decision-making. As per Niu et al. (2021), business intelligence can retain a variety of kinds of information and transform them into useful knowledge that a company can utilize to make well-informed decisions and enhance productivity and efficiency. BI offers reliable analysis, better customer service, higher revenues, better knowledge processing, and lower costs and decision times (Velu, 2021).

BIA plays a larger role in insurance companies by empowering experts and directors to conduct more informed, accurate, and relevant decisions that will increase the companies' profits and productivity and assist in meeting the many environmental and regulatory requirements (Mohamad et al., 2022; Niu et al., 2021). BI is one of the most common technologies that a company uses to create and maintain a competitive advantage. Business intelligence and data analyses can assist in developing and resolving insurance issues as well as achieving the greatest decision-making outcomes. Managers are unable to identify the relationship between various factors in business data because of the volume's rapid growth. Additionally, managers must do more research to draw conclusions about clients' needs and desires as well as behavioral patterns (Mohamad et al., 2022). Therefore, business intelligence supports managers in identifying distinct client classifications, designing products or services that are aligned with customer requirements, increasing sales, and expanding the customer segment.

The collected information from BI enhances the organization's decision-making, resulting in improved performance (Velu, 2021). Additionally, decision-making using this information in a way that facilitates business operations and innovation (Surya et al., 2021; Jaklič et al., 2018) is important. BI has not been examined sufficiently. Although business intelligence addresses particular business and managerial decision-making difficulties, Tavera Romero et al. (2021) argue that BI literature and theoretical frameworks are insufficient and inconclusive. In addition, factors influencing the adoption of BI and its impact on the decision-making process have not been adequately studied, particularly in developing nations like Jordan.

Business intelligence research is expanding; however, it has not considerably increased. Understanding business intelligence adoption factors is crucial to using business intelligence tools and applications effectively. BI may have been

understudied (Nithya & Kiruthika, 2021). The literature does not adequately support inconsistent findings and other factors that affect business intelligence and analytics use. Despite this, the insurance sector continues to rely significantly on business intelligence and analytics, particularly because of the accessibility of enormous consumer datasets that can aid in decision-making. In an effort to support the insurance industry's goal for a more successful adoption of business intelligence, the aim of this research is to examine the factors that impact the adoption of business intelligence in the insurance sector and their effect on decision-making performance.

This study uses TOE theory to better understand how Jordanian insurance sector users may adopt business intelligence technologies. TOE framework is an important innovation adoption framework for organizations. Technological, organizational, and environmental factors that may affect business intelligence adoption by users will be addressed. These variables may affect decision-making. Understanding how these factors affect users' adoption of BI in decision-making will increase BI adoption and decision-making performance, especially in developing countries where BI and other related technologies may be ignored.

The rest of the chapter is organized as follows: A overview of the business intelligence literature is presented in Sect. 2, followed by the conceptual model (the expanded TOE model) and study hypotheses. The research technique is outlined in Sect. 3. The fourth section contains the discussion and conclusion.

2 Literature Review and Theoretical Framework

Figure 1 shows a research model and hypotheses about business intelligence adoption based on Tornatzky and Fleischer's (1990) TOE framework and related literature. The model includes technology factors (complexity, compatibility, and relative advantage), organizational factors (organizational readiness, top management support), and environmental factors (industry competition, regulatory body). These crucial factors may influence the adoption of business intelligence systems and the decision-making performance. Figure 1 depicts the study's model.

2.1 Technological Context

2.1.1 Complexity

According to Rogers (1995), an innovation's complexity is measured by how difficult it is to use and understand. Similarly, Yoon et al. (2017) reported that the key reason for purchasing BI products is their ease of use. However, BI tools are likely to rise, as this is a future necessity (Nithya & Kiruthika, 2021). Usability surpasses functionality in BI adoption. Consequently, BI tools have to be user-friendly and intuitive, supported by IT and learning. Organizations have become

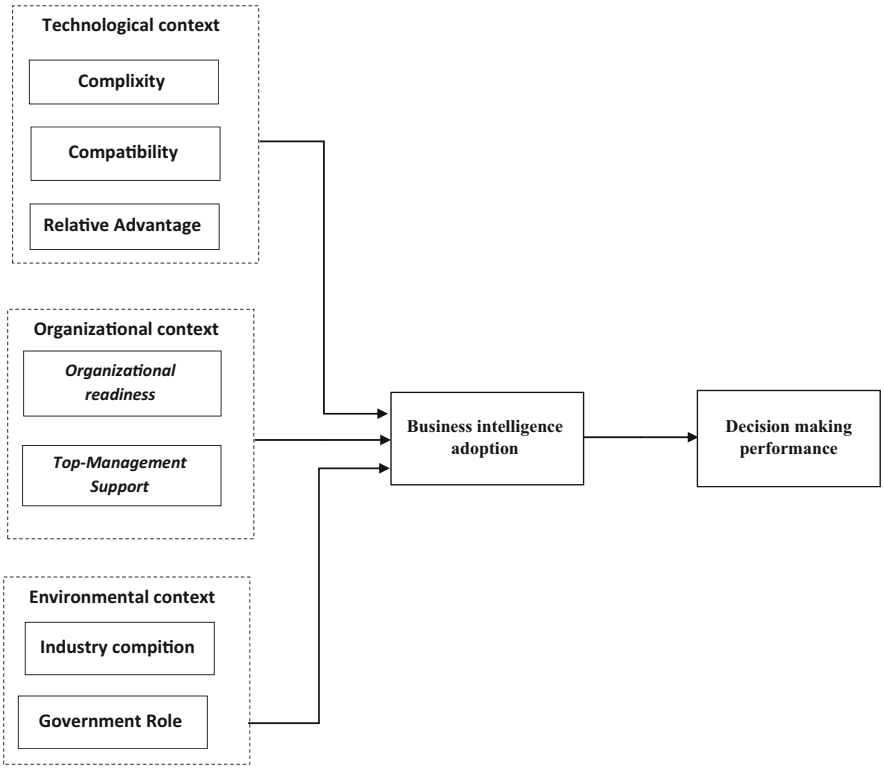

Fig. 1 Proposed model

less likely to use a technology that is difficult to comprehend and integrate into their procedures. Several studies have proven that the complexity of BI systems might hinder their general adoption (Yeoh et al., 2008). Several research have shown that the complexity of certain technologies presents a negligible barrier to their adoption (Malladi, 2013, Thiesse et al., 2011). Different work, however, has demonstrated that innovation complexity is a key adoption factor (Côrte-Real et al., 2014; Lai et al., 2014). Given these findings, we propose the following hypothesis:

H1 Complexity has a negative impact on adopting business intelligence.

2.1.2 Compatibility

Compatibility is seen as a crucial factor in innovation adoption (Jaklič et al., 2018), and it could be described as the degree to which the innovation matches with present values and past behaviors as well as reflects the requirements of potential prospective adopters (Owusu et al., 2017). It was revealed that technical innovations that complement the processes of the user expand more quickly (Lai et al., 2014);

hence, compatibility is an effective predictor of IS innovation adoption. Numerous studies have demonstrated a positive association between compatibility and IS innovation adoption in a wide range of businesses (Owusu et al., 2017; Jaradat et al., 2022). However, other research did not prove this variable as a predictor or determinant of IT/IS adoption in organizations (Malladi, 2013; Narwane et al., 2019; Thiesse et al., 2011). In accordance with this, the following theory is presented:

H2 Compatibility is positively related to the adoption of business intelligence.

2.1.3 Relative Advantage

What we mean by "relative advantage" is the degree to which a BI is considered as superior to the previous system (Rogers, 1995). Relative advantage can be measured in a variety of ways, from social recognition and financial reward to time and money saved and improved capacity for deciding. It has been found that a product or idea's adoption rate is linked to how many people see value in it (Ifinedo, 2011). Among the most commonly stated predictors in studies of IS adoption, the perceived benefits of BI systems to organizations have been widely reported in the literature, making this innovation a viable candidate for widespread adoption by businesses (Rogers et al., 2014; Narwane et al., 2019; Gibson et al., 2004; Oliveira et al., 2014). Therefore, we hypothesize based on these:

H3 The relative advantage is positively related to BI system adoption.

2.2 Organizational Context

2.2.1 Organizational Readiness

Financial, technological, and other resources are all part of what Hameed et al. (2012) define "organizational readiness." As a result, it has an impact on whether or not to adopt a new technology. It also takes into consideration the information technological knowledge of the adopting business (Grandon & Mykytyn Jr, 2004; LaValle et al., 2011). Research by Iacovou et al. (1995) suggests that the availability of both financial and technological resources within an organization is the primary factor in determining whether or not it will adopt a new technology, which is called the organizational readiness. In contrast to financial readiness, which refers to an organization's capacity to invest in emerging technologies, technological readiness emphasizes a company's level of technological skill and sophistication. Several research have found a correlation between innovation readiness and acceptability (Mehrtens et al., 2001; Tsai et al., 2010). However, a number of studies have found that organizational readiness is not crucial (Ifinedo, 2011; Grandon & Mykytyn Jr, 2004; Quaddus & Hofmeyer, 2007). The following situation is therefore proposed:

H4 Organizational readiness has a positive impact on the adoption of BIS.

2.2.2 Top Management Support

Support from top management is a crucial critical success factor for business intelligence (Rana et al., 2021). Top-level management should set clear priorities when it comes to implementing BI/BA tools (LaValle et al., 2011). Individual's receptiveness to new ideas predicts how likely they are to do anything new and creative (Cruz-Jesus et al., 2019). The top management promotes open communication and welcomes new ideas from their employees. Senior management support enhances the application of business intelligence by supervising change initiatives, acquiring vital assets, and enhancing division communication (Watson & Wixom, 2007). Support from managers has an impact on how well an IT innovation is received (Hameed et al., 2012; Tsai et al., 2010).

Management support has a big effect on IT adoption because it makes sure that there are enough resources to use the new technology (Lutfi et al., 2022; Tsai et al., 2010). So, here is what we suggest:

H5 Top management support is positively related to the adoption of business intelligence.

2.3 Environmental Context

2.3.1 Industry Competition

It is thought that competitive pressure is a key part of this TOE dimension, given how competitive the business world is right now and how many new technologies and companies are coming out (Wang & Wang, 2016). The pressure imposed by competitors in the same industry is what is meant by the term "competitive pressure" (Tornatzky & Fleischer, 1990). Researchers found that the adoption of BIS is significantly impacted by competitive pressure (Gangwar, 2018; Boonsiritomachai et al., 2016). Researchers discovered that competitive pressure has a substantial impact on the adoption of business intelligence systems (Gangwar, 2018; Boonsiritomachai et al., 2016). In a similar route, Ramanathan et al. (2017) and Hwang et al. (2004) stated that firms deploy innovative technologies to keep their advantage and that competitive pressure is a strong predictor of innovation adoption. It is realistic to anticipate that organizations will utilize BI due to the industry's increasing competition. Based on the facts offered before, we recommend the following:

H6 Competitive pressure is positively related to the adoption of business intelligence.

2.3.2 Regulatory Body

Compliance with the regulations that a business must follow can limit how and where business intelligence technologies can be implemented (Olbrich et al., 2012). The regulatory support is the help provided by a government body to encourage businesses to use IT innovation (Wahab et al., 2021). When government regulations and policies encourage firms to adopt business intelligence, and if technology standards and legislation are supportive of it, business intelligence adoption may expand (Hameed et al., 2012) ered by a government body to stimulate firms' application of IT innovation (Macredie & Mijinyawa 2011; Wahab et al., 2021). When government regulations and policies encourage firms to adopt business intelligence, and if technology standards and legislation are supportive of it, business intelligence adoption may expand (Hameed et al., 2012). Several companies have lately used BI systems to more effectively respond to and comply with regulatory reporting obligations, as reported by Sujitparapitaya et al. (2012). Government regulations that provide support and incentives for the use of business intelligence contribute to a favorable regulatory environment, which is a key component in the spread of innovation. And hence, we base our speculations on these:

H7 The use of business intelligence systems is positively related to a regulatory body.

2.3.3 Business Intelligence Adoption and Decision-Making Performance

Business intelligence (BI) is used to combine applications, technology, and processes from different industries to assist business users in addressing problems and opportunities and making wiser decisions. The reported that BI systems transform data and information into concise management knowledge that firms may use to enhance operational, tactical, and strategic decision-making and boost business performance. So according to Lutfi et al., business intelligence (BI) has an impact on actors' perception, generation, and exchange of information, as well as corporate decision-making. This study therefore proposes that BI enhances decision-making.

H8 BI is positively related to decision-making performance.

3 Research Methodology

3.1 Data Collection

After a thorough examination of the literature, an online survey will be used to accomplish the study's aim of determining how employees in Jordan's insurance industry are using business intelligence. Employees who have worked with business

intelligence are chosen for this study. SPSS 20 and SmartPLS 3.2.4 can be used for the analysis of the survey data. The conceptual model's hypotheses can be investigated using the structural equation modeling (SEM) methods.

4 Discussion and Conclusion

In developing countries, business intelligence applications are in their early stages compared to their widespread use in developed countries. This study aimed to investigate the adoption of business intelligence in Jordan's insurance sector. Several variables are added to the TOE framework created by Tornatzky and Fleischer (1990) in this work. As shown in Fig. 1, the technological, environmental, and organizational elements are contextually selected constructs from the TOE model, whereas business intelligence adoption and decision-making performance are new constructs included to extend the model.

References

Al-Okaily, M., & Al-Okaily, A. (2022). An empirical assessment of enterprise information systems success in a developing country: The Jordanian experience. *The TQM Journal., 34*, 1958.

Awan, U., Shamim, S., Khan, Z., Zia, N. U., Shariq, S. M., & Khan, M. N. (2021). Big data analytics capability and decision-making: The role of data-driven insight on circular economy performance. *Technological Forecasting and Social Change, 168*, 120766.

Basile, L. J., Carbonara, N., Pellegrino, R., & Panniello, U. (2022). Business intelligence in the healthcare industry: The utilization of a data-driven approach to support clinical decision making. *Technovation, 120*, 102482.

Boonsiritomachai, W., McGrath, G. M., & Burgess, S. (2016). Exploring business intelligence and its depth of maturity in Thai SMEs. *Cogent Business & Management, 3*(1), 1220663.

Chen, M. K., & Wang, S. C. (2010). The use of a hybrid fuzzy-Delphi-AHP approach to develop global business intelligence for information service firms. *Expert Systems with Applications, 37*(11), 7394–7407.

Côrte-Real, N., Ruivo, P., & Oliveira, T. (2014). The diffusion stages of business intelligence & analytics (BI&a): A systematic mapping study. *Procedia Technology, 16*, 172–179.

Cruz-Jesus, F., Pinheiro, A., & Oliveira, T. (2019). Understanding CRM adoption stages: Empirical analysis building on the TOE framework. *Computers in Industry, 109*, 1–13.

Gangwar, H. (2018). Understanding the determinants of big data adoption in India: An analysis of the manufacturing and services sectors. *Information Resources Management Journal (IRMJ), 31*(4), 1–22.

Gibson, M., Arnott, D., Jagielska, I., & Melbourne, A. (2004). Evaluating the intangible benefits of business intelligence: Review & research agenda. In *Proceedings of the 2004 IFIP international conference on decision support systems (DSS2004): Decision support in an uncertain and complex world, Prato, Italy* (pp. 295–305).

Grandon, E. E., & Mykytyn, P. P., Jr. (2004). Theory-based instrumentation to measure the intention to use electronic commerce in small and medium sized businesses. *Journal of Computer Information Systems, 44*(3), 44–57.

Hameed, M. A., Counsell, S., & Swift, S. (2012). A meta-analysis of relationships between organizational characteristics and IT innovation adoption in organizations. *Information & Management, 49*(5), 218–232.

Hasan, F. N., & Sudaryana, I. K. (2022). Penerapan Business Intelligence & Online Analytical Processing untuk Data-Data Penelitian dan Luarannya pada Perguruan Tinggi Menggunakan Pentaho. *Infotech: Journal of Technology Information, 8*(2), 85–92.

Hwang, H. G., Ku, C. Y., Yen, D. C., & Cheng, C. C. (2004). Critical factors influencing the adoption of data warehouse technology: A study of the banking industry in Taiwan. *Decision Support Systems, 37*(1), 1–21.

Iacovou, C. L., Benbasat, I., & Dexter, A. S. (1995). Electronic data interchange and small organizations: Adoption and impact of technology. *Management Information Systems Quarterly, 19*(4), 465–485. https://doi.org/10.2307/249629

Ifinedo, P. (2011). An empirical analysis of factors influencing internet/e-business technologies adoption by SMEs in Canada. *International Journal of Information Technology & Decision Making, 10*(04), 731–766.

Jaklič, J., Grublješič, T., & Popovič, A. (2018). The role of compatibility in predicting business intelligence and analytics use intentions. *International Journal of Information Management, 43*, 305–318.

Jaradat, Z., Al-Dmour, A., Alshurafat, H., Al-Hazaima, H., & Al Shbail, M. O. (2022). Factors influencing business intelligence adoption: Evidence from Jordan. *Journal of Decision Systems*, 1–21.

Lai, H. M., Lin, I. C., & Tseng, L. T. (2014). High-level managers' considerations for RFID adoption in hospitals: An empirical study in Taiwan. *Journal of Medical Systems, 38*(2), 1–17.

LaValle, S., Lesser, E., Shockley, R., Hopkins, M. S., & Kruschwitz, N. (2011). Big data, analytics and the path from insights to value. *MIT Sloan Management Review, 52*(2), 21–32.

Lutfi, A., Alsyouf, A., Almaiah, M. A., Alrawad, M., Abdo, A. A. K., Al-Khasawneh, A. L., Ibrahim, N., & Saad, M. (2022). Factors influencing the adoption of big data analytics in the digital transformation era: Case study of Jordanian SMEs. *Sustainability, 14*(3), 1802.

Macredie, D., & R., & Mijinyawa, K. (2011). A theory-grounded framework of open source software adoption in SMEs. *European Journal of Information Systems, 20*(2), 237–250.

Malladi, S. (2013). *Adoption of business intelligence & analytics in organizations–an empirical study of antecedents. Accounting information systems for decision making*. Springer.

Mehrtens, J., Cragg, P. B., & Mills, A. M. (2001). A model of internet adoption by SMEs. *Information & Management, 39*(3), 165–176.

Mohamad, A. K., Jayakrishnan, M., & Yusof, M. M. (2022). Thriving information system through business intelligence knowledge management excellence framework. *International Journal of Electrical & Computer Engineering, 12*(1), 506–514.

Narwane, V. S., Raut, R. D., Gardas, B. B., Kavre, M. S., & Narkhede, B. E. (2019). *Factors affecting the adoption of cloud of things: The case study of Indian small and medium enterprises*. Journal of Systems and Information Technology (Vol. 21, p. 397).

Nithya, N., & Kiruthika, R. (2021). Impact of business intelligence adoption on performance of banks: A conceptual framework. *Journal of Ambient Intelligence and Humanized Computing, 12*(2), 3139–3150.

Niu, Y., Ying, L., Yang, J., Bao, M., & Sivaparthipan, C. B. (2021). Organizational business intelligence and decision making using big data analytics. *Information Processing & Management, 58*(6), 102725.

Olbrich, S., Poppelbuß, J., & Niehaves, B. (2012, January). Critical contextual success factors for business intelligence: A Delphi study on their relevance, variability, and controllability. In *2012 45th Hawaii international conference on system sciences* (pp. 4148–4157). IEEE.

Oliveira, T., Thomas, M., & Espadanal, M. (2014). Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information & Management, 51*(5), 497–510.

Owusu, A., Ghanbari-Baghestan, A., & Kalantari, A. (2017). Investigating the factors affecting business intelligence systems adoption: A case study of private universities in Malaysia. *International Journal of Technology Diffusion (IJTD), 8*(2), 1–25.

Quaddus, M., & Hofmeyer, G. (2007). An investigation into the factors influencing the adoption of B2B trading exchanges in small businesses. *European Journal of Information Systems, 16*(3), 202–215.

Ramanathan, R., Philpott, E., Duan, Y., & Cao, G. (2017). Adoption of business analytics and impact on performance: A qualitative study in retail. *Production Planning & Control, 28*(11–12), 985–998.

Rana, N. P., Chatterjee, S., Dwivedi, Y. K., & Akter, S. (2021). Understanding dark side of artificial intelligence (AI) integrated business analytics: Assessing firm's operational inefficiency and competitiveness. *European Journal of Information Systems*, 1–24.

Rogers, E. M. (1995). Diffusion of Innovations: modifications of a model for telecommunications. *Die diffusion von innovationen in der telekommunikation*, 25–38.

Rogers, E. M., Singhal, A., & Quinlan, M. M. (2014). Diffusion of innovations. In *An integrated approach to communication theory and research* (pp. 432–448). Routledge.

Sujitparapitaya, S., Shirani, A., & Roldan, M. (2012). Business intelligence adoption in academic administration: An empirical investigation. *Issues in Information Systems, 13*(2), 112–122.

Surya, B., Menne, F., Sabhan, H., Suriani, S., Abubakar, H., & Idris, M. (2021). Economic growth, increasing productivity of SMEs, and open innovation. *Journal of Open Innovation: Technology, Market, and Complexity, 7*(1), 20.

Tavera Romero, C. A., Ortiz, J. H., Khalaf, O. I., & Ríos Prado, A. (2021). Business intelligence: Business evolution after industry 4.0. *Sustainability, 13*(18), 10026.

Thiesse, F., Staake, T., Schmitt, P., & Fleisch, E. (2011). The rise of the "next-generation bar code": An international RFID adoption study. *Supply Chain Management: An International Journal*.

Tornatzky, L., & Fleischer, M. (1990). *The process of technology innovation*. Lexington, MA.

Tsai, M. C., Lee, W., & Wu, H. C. (2010). Determinants of RFID adoption intention: Evidence from Taiwanese retail chains. *Information & Management, 47*(5–6), 255–261.

Velu, A. (2021). Influence of business intelligence and analytics on business value. *International Engineering Journal For Research & Development, 6*(1), 9–19.

Wahab, S. N., Hamzah, M. I., Sayuti, N. M., Lee, W. C., & Tan, S. Y. (2021). Big data analytics adoption: An empirical study in the Malaysian warehousing sector. *International Journal of Logistics Systems and Management, 40*(1), 121–144.

Wang, Y. M., & Wang, Y. C. (2016). Determinants of firms' knowledge management system implementation: An empirical study. *Computers in Human Behavior, 64*, 829–842.

Watson, H. J., & Wixom, B. H. (2007). The current state of business intelligence. *Computer, 40*(9), 96–99.

Yeoh, W., Koronios, A., & Gao, J. (2008). Managing the implementation of business intelligence systems: A critical success factors framework. *International Journal of Enterprise Information Systems (IJEIS), 4*(3), 79–94.

Yoon, T. E., Jeong, B. K., & Ghosh, B. (2017). User acceptance of business intelligence application: Motivation to learn, technology, social influence, and situational constraints. *International Journal of Business Information Systems, 26*(4), 432–450.