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Hasan Dincer
Serhat Yüksel *Editors*

Management Strategies to Survive in a Competitive Environment

How to Improve Company Performance

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Editors

Management Strategies to Survive in a Competitive Environment

How to Improve Company Performance

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Developing Strategies for Hospitals from Patient and Personnel Perspective with DEMATEL

Erman Kedikli, Emre Yılmaz, Yeter Demir Uslu, and Pakize Yiğit

Abstract In this study, it is examined that how to improve hospital performance was examined. In this context, because of the literature review, 12 different Balanced Scorecards Performance Indicators are selected, which may be effective for developing strategies. DEMATEL method used for determining more important indicators. According to the results, rate of patient complaints, staff satisfaction rate, patient's satisfaction percentage are the most important indicators. However, the rate of patient complaints and staff satisfaction rate rank the first and the second, while the cause degree of them are effect and cause, respectively. Thus, managers need to pay more consideration and developing strategies to increase staff satisfaction, so it will be possible to reduce the percentage of patient complaints, second important criteria. Consequently, increasing to staff satisfaction rate can help the improving total performance.

1 Introduction

Strategic management is a set of activities and decisions determined by business management with the participation of all management levels to determine the long-term activities of businesses. The first stage of this is strategic planning (Arslan, 2010). Strategy development and strategic planning have become required efforts to achieve medium- and long-term goals for almost any institution. Within the scope of strategic management while, "internal factors" can develop under the control of institutions, "external factors" are shaped under the influence of the future "environmental conditions." The environmental conditions are constantly changing, and it

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will naturally not be the same as those for the current environment. Based on this fact, institutions and need to have information about risks and how the future will be shaped (Cesmeci, 2012).

Managers provide information about the internal and external environments that used in the strategy formulation with situational analysis in order to develop strategic alternatives and select strategies for the organization. Internal environment analysis identifies the strengths and weaknesses by determining whether they are the source of short- or long-term competitive advantages or disadvantages. External environment analysis identifies important general and opportunities and threats, including a comprehensive service area competitor analysis (Swayne, Duncan, & Ginter, 2006).

The main purpose of healthcare organizations is to develop strategies and methods that will provide the best service to society in the most efficient and effective way and thus to reach the goals and objectives. This is only possible if healthcare organizations have a long-term vision in order to keep up with the very rapid changes of today, and the necessary strategies are determined and implemented with this long-term perspective (Soylu & Ileri, 2014). In this perspective, organizations need to effectively manage change in dynamic environmental conditions. One of the biggest challenges faced by healthcare organizations is identifying and planning the most likely changes to occur (Koumpouros, 2013). Healthcare organizations can use different tools to analyze the current situation. Especially, achieving the standards determined in measuring the performance of the institution can be tested with different arguments. The idea of measuring performance is not only to identify the current performance of businesses, therewithal to make it possible to perform better and also to create resources for new strategies (Kairu, Wafula, Okaka, Odera, & Kayode Akerele, 2013; Okwo & Marire, 2012). Performance evaluation is a model used to compare the implementation of past strategies, the activities of organizations with executive skills, the rates of employees and the competitive rates. Additionally, this assessment model helps organizations to plan future strategies to achieve their ultimate goals, and set employees' performance goals (Yin, 2014). Additionally, measurement of nonfinancial performance, which is the source of financial performance, improved performance will be better. Therefore, organizations need comprehensive performance measurement systems that can provide evidence for alternative strategies and minimize weaknesses (Setiawannie & Rahmania, 2019).

Thus, erroneous managerial decisions in any industrial establishment result in the greatest decrease in production or monetary loss; but, in health management result in a decrease in the quality of human life and a deterioration in the health level of the society (Soylu & Ileri, 2014). In addition, the cost of errors in health institutions is mostly related to human life or quality of life, which cannot be compensated, and that many services with different features such as hotel management, outpatient clinic, operating room, X-ray, and laboratory are required together. Also, healthcare organizations, especially hospitals, are positioned as vulnerable and naturally the first place to deal with natural and man-made disasters, due to their unique missions, size, complexity, types of machinery and equipment used, and the types of patients and diseases they encounter (Ginter, Duncan, & Abdolrasulnia, 2007). In the perspective of these important criteria, performance measures are a very significant tool for achieving goals and planning new strategies for hospitals. Hospitals have programs that add value to patients, staff, and society, and support regional and national economic growth. Comprehensive performance evaluation of the hospital affects the successful implementation of these programs (Setiawannie & Rahmania, 2019). The main feature of an effective performance evaluation system is the accuracy of its results. Therefore, it is very important to identify and select appropriate methods and reasonable indicators for the purpose of performance evaluation (Li & Yu, 2013). So, the Balanced Scorecards (BSC) can be considered as one of the best alternative performance measurement tools for hospitals thanks to its features.

Strategy development phase can directly affect managers' decisions in connection with performance measures. In organizations using the BSC or any performance measurement tool, the managers need to be knowledgeable about the basic strategies of the organization. As, the manager's inability to understand the strategy makes the performance measurement tools useless (Banker, Chang, & Pizzini, 2004). The BCS can help to comply with legal regulations if designed in accordance with the characteristics of hospitals. In hospitals, the four perceptions of the BSC modified to concentrate on patients and to stimulate a patient-centeredness. Thereby, the BSC encourages the effectual clinical coordination, refine processes and outcome indicators, and advance leadership (Jones & Filip, 2000; Lin, Yu, & Zhang, 2014).

In this chapter, DEMATEL method was used to examine the cause-and-effect relationship between the key performance indicators of only two of the four perspectives (Customer, and Learning and Growth Perspectives) of the BSC. As, some of the most intangible assets that a business can have are relationships with customers and employees. Employee and customer (patient) loyalty are strongly related and achieving both is essential for success (Kairu et al., 2013). As a result of the literature review, 12 indicators were determined for this study. In this way, health facility managers can determine the priority and superiority criteria in decision-making mechanisms while developing strategies.

2 Performance Measurements for Hospitals

Performance is a concept that qualitatively and quantitatively indicates what an organization can achieve for the intended purpose of that business. In general, it is a model that determines what is obtained as a result of a purposeful or planned activity quantitatively or qualitatively (Tengilimoglu, Isik, & Akbolat, 2012).

Performance management consists of determining the degree of achieving goals and targets using pre-determined performance indicators, as well as revealing the success of the personnel, and evaluating the results obtained (Koseoglu, 2007). Specifically, hospital performance can be defined as achieving determined goals set in clinical or administrative context. So, targets do not only include operational or conventional administrative objectives, but they may also be related to hospital functions, which are; education and research, as well as diagnosis, treatment, care and rehabilitation (Tengilimoglu & Toygar, 2013).

In the literature for assessing the hospital performance, there are many different tools. One of them and has been widely used in the health sector especially in recent years is the BSC. The BSC was developed in 1992 by Kaplan and Norton for performance measurement and strategic management which include nonfinancial indicators. Nonfinancial indicators are, in fact, important intermediaries for financial performance. Financial and nonfinancial performance measurements can be combined with the BSC performance measurement methodology, which links all aspects of performance to the company's strategies (Kairu et al., 2013).

It is very important to developing a true strategy map in order to obtain health information about the performance of employees, departments, and organization with the BSC method and to perform self-evaluation. In order to develop the strategy, the most important basic activities of the organization should be taken into consideration. For example, while developing a strategy for producing services or products, it is of great importance in terms of reaching the whole by producing a strategy on issues such as management, public relations, personnel, and patient royalty and finding and maintaining balance in the performance measurement process in organizations (Murby & Gould, 2005).

The BSC makes it easy to compare across departments and guides the prioritization of resources. The BSC is composed of four perceptions: financial, internal process, learning and growth, and customer (Koumpouros, 2013; Rababah, 2014; Teklehaimanot, Teklehaimanot, Tedella, & Abdella, 2016; Yin, 2014). To measure and report health system performance the BSC is often used. Thanks to having four perspectives this method makes available a balanced assessment of performance and leads strategic decisions at the health facilities (El-Jardali, Saleh, Ataya, & Jamal, 2011; Yin, 2014). The BSC allows the managers to develop true and most suitable strategies and promote the sensibility to patient focus. In this method, the financial indicators involve profitability, growth, and risk. The internal businesses indicators concentrate on creating value and how can be improve those processes. The customer indicators focused on market share and customer satisfaction in order to assess performance from the customer side. And finally, learning and growth are related to organizational change, growth, staff satisfaction, etc., which are focusing to make easy to sustainable improvement (Banker et al., 2004; Mehralian, Nazari, Nooriparto, & Rasekh, 2017).

3 Developing Strategies in Hospitals

Organizations must face some of the cost types. These are estimated economic cost, financial cost, and nonfinancial cost also can be call opportunity (Manzi et al., 2008). In order for organizations to compete in the long term and ensure sustainability, the most important cost type is actually the nonfinancial costs. If the opportunities are evaluated under constantly changing environmental conditions, these elements can be realized successfully. The most important way to achieve this is undoubtedly to analyze the situation and determine the position of the business itself. Moreover, in the light of this information, it will be possible to develop the best strategies.

Performance measurements can be expressed as a tool that helps determine the progress of the organization in line with its predetermined strategic goals and objectives, the strengths and weaknesses of the institution, and the future priorities of the institution (Yenice, 2006).

In the health sector, especially when hospitals are considered, there is no standard measurement method for quality improvement and performance measurement (Esatoglu, 2007). Hospital performance can be defined as achieving clinically or administratively determined goals. The quality and performance level of the service provided in hospitals is important for controlling costs and ensuring sustainability (Tengilimoglu & Toygar, 2013). So, there are many performance measurement systems for hospitals. But the most effective are designed to make cause–effect relations between managers' endeavor and generate evidence for strategies. The BSC can be defined as the best and most used tool in this context. Therefore, the BSC explain the relationship between the performance of hospitals as a strategy map. This is a strategy map that is correlated to financial and nonfinancial fulfillment (Banker et al., 2004; Kaplan & Norton, 1996; Young & O'Byrne, 2001). So, the strategy can be thought of as being central to the BSC. The advantages of the BSC can be listed as follows (Kaplan & Norton, 1996):

- Provides clarity on strategy and helps to reach consensus.
- Strategy communication is provided in the organization.
- Aligns department and personal goals with the strategy.
- Associate strategic goals with long-term goals and annual budgets.
- Helps to identify strategic initiatives.
- Periodically and systematically conducts strategic reviews.
- Provides feedback to learn and develop new strategies.

The hospital performance indicators demonstrate the performance in different fields. These indicators disclose to performance, current, and situations. With this evidence, developing strategies easier by managers. Customer attitudes are essentially significant as there is competition between hospitals in the fact of patients' loyalty, reduction of medical costs, and increasing profitability (especially for private hospitals). Thus, it is obligatory to get better by selecting customer perspective as the pinnacle (Gholamzadeh Nikjoo, Jabbari Beyrami, Jannati, & Asghari Jaafarabadi, 2013; Kaplan, 2001). Additionally, the missions and visions of government and nonprofit organizations differ from those of nongovernmental organizations. Therefore, financial success is not the main goal in such organizations. Therefore, it is difficult to create and implement a balanced scorecard perspective from a financial perspective. For this reason, it is necessary to choose the customer perspective first. In fact, nonprofits should consider setting their BSC's core strategies to cover all indicators from the BSC's perspective (Aujirapongpan, Meesook, Theinsathid, & Maneechot, 2020; Kaplan, 2001; Martello, Watson, & Fischer, 2008). For developing strategy for organizations, the DEMATEL can help managers in decision-making process. Especially with combine the BSC and DEMATEL for developing strategy represents the relationship between perspectives and indicators (Golcuk & Baykasoglu, 2015; Leksono, Suparno, & Vanany, 2019).

4 Literature Review

In this study, hospital performance indicators were categorized into four groups like finance, internal process, learning and growth, and customer which are categorized according to the BSC. This classification was made in the same way in previous studies (Nasiripour, Kazemi, & Izadi, 2012; Raeisi, Yarmohammadian, Bakhsh, & Gangi, 2012; Rahimi, Kavosi, Shojaei, & Kharazmi, 2016). Each hospital should set its goals separately. Targets should be adjusted according to past performance. They should be accessible. Goals clearly show what a company wants to achieve and the desired outcome of a measure of performance (Niven, 2007). The number of indicators in the BSC is not considered to be the key norm, but it is also crucial to carefully select important and vital indicators. So, different indicators are included in the same classification in each study. An example of this is shown in Table 1.

The results of the literature review demonstrate that the BSC has been used extensively to measure performance and developing strategy for health systems, especially hospitals. Although the performance indicators in health-related studies differ, it is seen that they have a lot in common. The reason for these differences is the variety of health systems, ownership of hospitals (public, private, etc.), working in a private area, etc. elements can be listed.

In this study, 12 performance indicators of customer and learning and growth perspectives were selected. For learning and growth perspective; staff satisfaction rate, staff turnover, training expenditures per capita, key jobs contains substitute, the amount of the electronic medical record, number of days of sick leave of total employees, and employee absenteeism rate; for customer perspective; the facilities for families and visitors, patient satisfaction percentage, rate of patient complaints, other stakeholders' satisfaction, and social satisfaction were selected. Seven indicators measures learning and growth; the others measures customer dimensions. A different number of performance indicators have been determined in the literature for these perspectives. Most authors agree with 7–9 indicators. For example, El-Jardali et al. (2011) were selected 4 (just for learning and growth perspective), Nasiripour et al. (2012) 9, Grigoroudis et al. (2012) 12, Rahimi et al. (2016) 7, Setiawannie and Rahmania (2019) 7, Leksono et al. (2019) 9, and Aujirapongpan et al. (2020) 9.

Table 1 Performance indicators of BSC which is used in different studies

	Indicators	
References	Customer perspective	Learning and growth perspective
El-Jardali et al. (2011)		Staff satisfaction rate Staff turnover rate Employee absenteeism Rate of employee sick leave
Nasiripour et al. (2012)	Patient satisfaction Rate of patient complaints Mean waiting time in the emergency department	Training expenditures per capita Sickness absence rate Employee satisfaction Percutaneous injuries Training expenditures Information technology efficiency
Grigoroudis, Orfanoudaki, and Zopounidis (2012)	Patient satisfaction index Number of patient complaints Average waiting time Hospital beds per 1000 people Percentage of cases transferred to other hospitals Percentage of readmissions Average duration of hospitalization	Number of projects with other organizations Percentage of budget used for purchase of new technology Resource allocation to information technology/capital Percentage of employees trained Percentage of medical staff participating in conferences
Rahimi et al. (2016)	Patients' satisfaction percentage Rate of patients' complaints The facilities for families and visitors	Staff satisfaction rate Staff turnover Training expenditures per capita Employee absenteeism rate
Setiawannie and Rahmania (2019)	Customer satisfaction Follow up on customer complaints	Employee satisfaction Employee productivity Implement continuation of hospital accreditation Increased use of technology Empowerment of human resources
Leksono et al. (2019)	Customer satisfaction Patient loyalty Stakeholder satisfaction Quality of service delivery	Capacity and professionalism Innovation training and education Research and development Health and safety Organization behavior
Aujirapongpan et al. (2020)	Rate of patient complaints Patient satisfaction percentage Inpatient satisfaction percentage Outpatient satisfaction percentage Outpatient waiting time	Staff satisfaction rate Staff turnover Number of studies

5 An Evaluation for Hospital Performance Measurement by the Balanced Scorecards

Firstly, selected indicators based on the literature review will be explained under this section. After that, the significance of these factors will be identified by DEMATEL approach.

5.1 Selected Indicators

Similar studies in the literature are analyzed to understand the significant issues of performance indicators for hospitals. Therefore, 12 indicators are identified to measure the performance of learning and growth and customer dimensions past studies: staff satisfaction rate (C_1), staff turnover (C_2), training expenditures per capita (C_3), key jobs contains substitute (C_4), the amount of the electronic medical record (C_5), number of days of sick leave of total employees (C_6), employee absenteeism rate (C_7), the facilities for families and visitors (C_8), patient satisfaction percentage (C_9), rate of patient complaints (C_{10}), other stakeholders satisfaction (C_{11}), and social satisfaction (C_{12}). The first seven criteria measures learning and growth; the others measures customer perspectives.

5.2 Methodology

There can be many main and sub-criteria that have interrelationships between them and can influence the result. There are many alternatives or decision points that should be evaluated taking into account these criteria. None of the criteria alone is for reaching the result. In other words, it is not enough at the point of choosing the best among the alternatives. Therefore, all evaluation criteria should be considered at the same time in order to solve the problem at hand. DEMATEL method visualizes the problem for decision makers in such complex problems and helps to understand the problem better (Aydin & Uludag, 2020; Qiu, Dinçer, Yüksel, & Ubay, 2020; Zhang et al., 2020).

DEMATEL is a comprehensive method for building and analyzing a structural model involving causal relationships between complex factors (Wu, 2008; Wu & Lee, 2007). Apart from the other multicriteria decision-making techniques, DEMATEL assumes that there is a casual relationship between criteria. DEMATEL is based on graph theory and solves problems with directed graphs, known as digraphs. They visualize factors into cause group and effect group and represent a communication network (Wu & Lee, 2007; Zhou, Zhou, Yüksel, Dinçer, & Uluer, 2020).

Through the DEMATEL method, the value of "four degrees" of each factor, including "R," "C," "$R + C$," and "$R - C$," can be calculated to identify the criteria (Tseng, 2009; Tzeng, Chiang, & Li, 2007; Zhang, Sun, & Xue, 2019). Here, "R" indicates the degree of influence exerted on other factors, and "C" represents the degree of influence received from other factors. "$R + C$" denotes the degree of relation with other factors, and "$R - C$" means the influence strength, which can be divided into dispatchers or receivers (Du, Dinçer, Ersin, & Yüksel, 2020; Wang, Ha, Kalkavan, Yüksel, & Dinçer, 2020; Zhang et al., 2019).

5.3 Analysis Results

Firstly, a questionnaire was developed based on the twelve criteria. Then, it was answered by 3 decision makers at least 15-year experience who had a managerial position in hospitals. The decision makers make evaluations by considering 5 different scales that are none (N), low (L), medium (M), high (H), and very high (VH). The computation of DEMATEL was calculated upon these three experts' opinions. Then, DEMATEL method was used to determine relationships among indicators, separate to effective and important factors for developing strategy. Firstly, the integrated matrix is created by taking the average values of 3 expert opinions. Details of the integrated matrix are included in Table 2.

Next, in this step the values in the direct effect matrix are normalized using the smallest value in the rows and columns of this matrix, and a normalized direct relation matrix is formed. Details of the normalized direct relation matrix are summarized in Table 3.

After, the total relationship matrix (T) is formed by using Eq. $T = N(I - N) - 1$. In this equation, I symbolizes the identity matrix (Table 4).

Table 2 Integrated matrix

Criteria	$C1$	$C2$	$C3$	$C4$	$C5$	$C6$	$C7$	$C8$	$C9$	$C10$	$C11$	$C12$
$C1$	0.00	3.33	2.00	3.00	1.67	2.33	3.33	1.00	3.67	3.67	3.00	2.67
$C2$	2.67	0.00	2.67	2.67	1.67	3.00	3.00	1.00	3.00	3.00	2.33	2.33
$C3$	2.67	2.00	0.00	2.00	1.67	2.33	2.00	0.33	2.00	1.67	1.67	1.67
$C4$	1.33	1.00	1.67	0.00	1.00	1.33	1.67	0.33	2.33	2.33	1.33	1.67
$C5$	1.00	1.00	1.00	1.00	0.00	1.00	0.67	0.00	2.67	2.00	2.33	1.00
$C6$	2.67	2.67	3.00	2.00	1.33	0.00	2.33	0.67	1.67	1.67	1.00	1.00
$C7$	2.33	2.00	1.33	1.33	1.33	1.67	0.00	1.33	3.00	3.33	2.00	2.00
$C8$	1.33	0.33	0.33	0.00	0.00	0.00	0.00	0.00	3.67	3.00	0.67	2.33
$C9$	2.00	2.00	0.67	0.67	0.00	0.00	1.00	3.00	0.00	4.00	2.33	3.00
$C10$	3.33	3.00	2.33	2.00	1.33	0.33	0.67	3.00	4.00	0.00	1.67	2.67
$C11$	1.67	1.67	1.00	2.00	2.33	1.00	0.67	1.67	1.67	1.67	0.00	1.67
$C12$	2.00	1.67	1.00	1.00	0.33	0.67	1.33	3.00	3.00	3.00	2.00	0.00

Table 3 Normalized direct relation matrix

Criteria	*C*1	*C*2	*C*3	*C*4	*C*5	*C*6	*C*7	*C*8	*C*9	*C*10	*C*11	*C*12
*C*1	0.00	0.11	0.07	0.10	0.06	0.08	0.11	0.03	0.12	0.12	0.10	0.09
*C*2	0.09	0.00	0.09	0.09	0.06	0.10	0.10	0.03	0.10	0.10	0.08	0.08
*C*3	0.09	0.07	0.00	0.07	0.06	0.08	0.07	0.01	0.07	0.06	0.06	0.06
*C*4	0.04	0.03	0.06	0.00	0.03	0.04	0.06	0.01	0.08	0.08	0.04	0.06
*C*5	0.03	0.03	0.03	0.03	0.00	0.03	0.02	0.00	0.09	0.07	0.08	0.03
*C*6	0.09	0.09	0.10	0.07	0.04	0.00	0.08	0.02	0.06	0.06	0.03	0.03
*C*7	0.08	0.07	0.04	0.04	0.04	0.06	0.00	0.04	0.10	0.11	0.07	0.07
*C*8	0.04	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.12	0.10	0.02	0.08
*C*9	0.07	0.07	0.02	0.02	0.00	0.00	0.03	0.10	0.00	0.13	0.08	0.10
*C*10	0.11	0.10	0.08	0.07	0.04	0.01	0.02	0.10	0.13	0.00	0.06	0.09
*C*11	0.06	0.06	0.03	0.07	0.08	0.03	0.02	0.06	0.06	0.06	0.00	0.06
*C*12	0.07	0.06	0.03	0.03	0.01	0.02	0.04	0.10	0.10	0.10	0.07	0.00

Table 4 Total relation matrix

Criteria	*C*1	*C*2	*C*3	*C*4	*C*5	*C*6	*C*7	*C*8	*C*9	*C*10	*C*11	*C*12
*C*1	0.22	0.30	0.22	0.26	0.17	0.20	0.26	0.20	0.39	0.38	0.28	0.29
*C*2	0.28	0.18	0.23	0.24	0.16	0.21	0.24	0.18	0.35	0.34	0.25	0.27
*C*3	0.23	0.20	0.11	0.18	0.14	0.16	0.18	0.12	0.26	0.24	0.19	0.20
*C*4	0.16	0.14	0.14	0.09	0.10	0.11	0.14	0.10	0.23	0.22	0.15	0.17
*C*5	0.13	0.13	0.11	0.11	0.06	0.09	0.09	0.08	0.21	0.19	0.17	0.13
*C*6	0.24	0.22	0.21	0.18	0.13	0.09	0.19	0.13	0.25	0.24	0.17	0.18
*C*7	0.23	0.21	0.16	0.17	0.13	0.14	0.11	0.17	0.30	0.31	0.21	0.22
*C*8	0.13	0.10	0.07	0.07	0.04	0.04	0.06	0.08	0.23	0.21	0.10	0.17
*C*9	0.20	0.19	0.12	0.13	0.07	0.08	0.13	0.21	0.19	0.30	0.20	0.24
*C*10	0.28	0.25	0.20	0.20	0.13	0.11	0.15	0.23	0.35	0.23	0.21	0.26
*C*11	0.17	0.16	0.12	0.16	0.14	0.10	0.11	0.14	0.21	0.21	0.11	0.17
*C*12	0.20	0.18	0.13	0.14	0.08	0.10	0.14	0.21	0.28	0.27	0.19	0.14

The values of “R,” “C,” “$R + C$,” and “$R - C$” were calculated as shown in Table 5. “$R - C$” measures the impact on other factors. Days of sick leave to total employees’ ratio (C_6), staff satisfaction rate (C_1), staff turnover (C_2), employee absenteeism rate (C_7), training expenditures per capita (C_3), the amount of the electronic medical record (C_5), were cause group in order. Also, six criteria have negative “$R - C$” values. Key jobs contain substitute ($C4$), The facilities for families and visitors (C_8), Patients satisfaction percentage ($C9$), Rate of patient complaints (C_{10}), Other stakeholders’ satisfaction (C_{11}), and Social satisfaction (C_{12}) were in the effect group. “$R + C$” means the importance of each criteria in the overall analysis structure. The prominence of the 12 criteria rank from the largest to the smallest as follows: Rate of patient complaints (C_{10}), Staff satisfaction rate (C_1), Patients satisfaction percentage (C_9), Staff turnover (C_2), Social satisfaction (C_{12}), Employee absenteeism rate (C_7), Training expenditures per capita (C_3), Other stakeholders satisfaction (C_{11}), Key jobs contains substitute (C_4), Number of days of sick leave to

Table 5 Cause and effect values of DEMATEL

Criteria	R (effect degree)	C (affected degree)	$R + C$ (prominence)	R - C (casual degree)
Staff satisfaction rate (C_1)	4.17	3.49	7.66	0.68
Staff turnover (C_2)	3.93	3.28	7.21	0.65
Training expenditures per capita (C_3)	3.21	2.82	6.03	0.39
Key jobs contain substitute (C_4)	2.77	2.91	5.68	−0.15
The amount of the electronic medical record (C_5)	2.50	2.35	4.85	0.15
Number of days of sick leave to total employees' ratio (C_6)	3.24	2.43	5.67	0.81
Employee absenteeism rate (C_7)	3.37	2.79	6.15	0.58
The facilities for families and visitors (C_8)	2.31	2.85	5.16	−0.54
Patients satisfaction percentage (C_9)	3.04	4.25	7.30	−1.21
Rate of patient complaints (C_{10})	3.61	4.15	7.76	−0.55
Other stakeholders satisfaction (C_{11})	2.81	3.22	6.03	−0.41
Social satisfaction ($C12$)	3.05	3.45	6.50	−0.40

total employees ratio (C_6), The facilities for families and visitors (C_8), and The amount of the electronic medical record (C_5).

6 Conclusion and Discussion

Determining the performance indicators of hospital offers managers the opportunity to identify vital points with lower cost and time. So, for hospitals improvement areas could be recognized. With using the BSC managers evaluate and compare the performance of health facilities (Rahimi et al., 2016). The BSC indicators of perspectives should donate the cause-and-effect relationship in the realization of the hospital's strategies (Kaplan, 2001). Evaluating and comparing provide evidence to developing strategies for hospitals managers. All the BSC perspectives must be interrelated and integrate all strategies to achieve the success.

In the term of the value of "$R + C$" for each criterion, rate of patient complaints (C_{10}), staff satisfaction rate (C_1), and patient's satisfaction percentage (C_9) are the most important indicators. In contrast, number of days of sick leave to total employees' ratio (C_6), the facilities for families and visitors (C_8), and the amount of the electronic medical record (C_5) are lowest important indicators. But rate of patient complaints (C_{10}) and staff satisfaction rate (C_1) rank the first and the second, while the cause degree of them are effect and cause, respectively. Also, in study results learning and growth perspective indicators, out of key jobs contains substitute (C_4), effects the customer perspective indicators. According to Rahimi, Bahmaei, Shojaei, Kavosi, and Khavasi (2018) state that learning and growth perspective affects the other perspectives powerfully. So, this perspective determined as the main cause factor. Also, in other studies the indicator state as; influence on staff approach to patients, clinical job, and patients' results (Cai, Cai, Deng, Cai, & Yu, 2016; Listyowardojo, Nap, & Johnson, 2012). But in other studies, for instance; in Jiang, Shi, Lin, and Liu (2020) study, patient satisfaction, patient complaint, and patient medical expenses indicators were determined as the most importance indicators. Whereas, in other study patient satisfaction has the lowest affect (Si, You, Liu, & Huang, 2017). Thus, managers need to pay more consideration and developing strategies to increase staff satisfaction, so it will be possible to reduce the percentage of patient complaints, second important criteria. Consequently, increasing to staff satisfaction rate can help the improving total performance.

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New Approach to A Disruptive Business Model with Dynamic Capability Under the Blockchain Technology

Arafat Salih Aydiner

Abstract This chapter aims to develop a holistic view of the blockchain business model framework with the role of dynamic capability. The study conceptualizes a dynamic capability framework with blockchain properties and business model understanding. The traditional approach to a business model with new technological improvements is the lack of defining the necessary business values that are captured and created from the digital environment. Specifically, blockchain technology generates additional properties that can even disrupt digital business processes. Therefore, it is necessary to build a new business model framework other than digitalization for blockchain technology to disclose disruptive values for guidance on business strategy. The study explains the detailed properties of the blockchain and classical business model and its logic. Later, a dynamic capability framework is combined with these views to establish a new business model for blockchain. This framework is the beginning for businesses that invest in blockchain to understand holistically how to extract the disruptive values out of blockchain technology and applications. Therefore, the study contributes to the businesses that invest in blockchain technology to realize the new benefits by changing traditional processes and distinctive capability which they will gain with the blockchain technology.

1 Introduction

The business environment and the way of making business have been evolving with the advancement of new technologies. The ideology of centralization of power keeps the classical structure of management in position with these new platforms. On the other hand, these new platforms and technologies enforce organizations to change their behavior on business models toward a more decentralized way. Clashes

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between tradition and contemporary approach disrupt business ecosystems without considering any market and sector. Brick and mortar retail companies are adopting their model partially to digital business models. Start-up companies build their model based solely on digital perspectives. Infrastructure companies create a digital marketing environment while constructing different structures and buildings. At the same time, internal and external relations of the companies are transforming from traditional to the digitalized environment. So, digitalization keeps pushing every segment of the business model to transform somehow into the new age of doing business to create and capture values with new approaches.

Traditional business models aim to produce and distribute better products/services efficiently with the help of closed-innovation, brand management, and minimum cost structure (Viswanadham, 2018). Even though the defense of the traditional way of doing things is prevalent, disruptive technologies adduce changing all structures of business ecosystems. Still, the aim is to create value for customers and create a profit for companies, however, agility, distribution, and openness arise as the new characterization for businesses. These characters are initiated with vast profound new information systems (IS) platforms. Companies that cannot achieve to establish platforms and change their business model will not be able to gain sustainable competitive advantage (VanAlstyne, Parker, & Choudary, 2016). Blockchain is one of the most promising IS platforms, which offers revolutionary changes socially and economically for the business ecosystem among new IS platforms (Filipova, 2018).

Blockchain is a technology that is famous for its cryptocurrency applications and services. Cryptocurrency product Bitcoin is more popular than the technology, which is a blockchain application like many others. The financial industry seems to focus more on the cryptocurrency part and attract more attention from the public. However, Blockchain technology is more than a financial application and service. It is the technology that creates an underlying platform for different businesses. The nature of this technology has the promise to disturb some structures of organizations. Thus, Blockchain defenders claim to revolutionize business models with decentralization, speed, security, and auditable properties (Risius & Spohrer, 2017). Davos, Group of the 20s are some of the most influential policy-making platforms in the world considers Blockchain as a game-changer and has been debating the underlying effect for the businesses and relations with governments because of these claimed disruptive properties of the technology. In addition, the World Economic Forum has surveyed that 10% of global GDP would be stored in blockchain technologies by 2027 (Carson, Romanelli, Walsh, & Zhumaev, 2018). Millions of dollars are being spent by giant technology companies to initiate Blockchain for their technological platforms like the Internet of Things (IoT), Industry 4.0, artificial intelligence, and others (Carson et al., 2018). Start-ups are implementing and developing applications and platforms with blockchain technologies for extensive business ecosystems. However, there are not many well-known applications and implementations rather than cryptocurrencies so far, which form hype around the technology. Although there are ongoing implementations of the technology, uncertainty of developed systems creates a lack of understanding of how blockchain defines and disrupts business models to generate and capture business value (Risius & Spohrer, 2017).

The promise to change the traditional business model with blockchain technology implementation and applications are scarce and limited. Hence, our study compares the traditional business models and proposes a model with blockchain technology to address whether the technology is applicable to all sectors generally. Thereby, the study addresses the research question: What would be the necessary model with blockchain technology to maintain the foundation of businesses to create and capture values without making mystical promises? To answer this question, the study offers a new framework to have a holistic blockchain business model.

The remainder of this study is organized as follows. Next, the theoretical background of blockchain technology and its underlying concept are provided. Then, the literature review of the business model is discussed. Afterward, a new suggested framework is introduced concerning the research question. Finally, a discussion and conclusion are argued along with the managerial implications and future research suggestions.

2 Literature Review

2.1 Theoretical Background of Blockchain

Blockchain technology is always explained by cryptocurrency applications even though the technology exists way before cryptocurrencies became popular (Filipova, 2018). Instead of focusing on financial applications, this study nails down the facts, properties, and values of the technology itself.

The main characteristics of Blockchain are cryptographically captured, stored, distributed, transparent, and immutable digital a kind of database or ledger that is shared through a public and private networks (Carson et al., 2018; Risius & Spohrer, 2017). Conte de Leon, Stalick, Jillepalli, Haney, and Sheldon (2017) claim that these characteristics are desired and emergent properties of the blockchain. Conte de Leon et al. (2017) add that the characteristics of Blockchain are to be ordered, incremental, sound, and digital. Blockchain combines software engineering, game theory, and cryptography science fields. The game theory part is related to the mathematical models of conflict and cooperation between decision makers. The cryptography part of the blockchain is focused on securing the whole chain and the system (Mougayar, 2016). Blockchain behaves like a database as well. Distributed database behavior places the data into a container (blocks). Everyone knows that the data is yours but cannot see inside the container in the ecosystem (Mougayar, 2016). However, unlike database systems, Blockchain does not allow to store the data into a centralized mechanism. The immutability of blockchain prevents to delete, rewrite, and revise the data. In essence, blockchain cannot be merely claimed as a database (Furlonger & Uzureau, 2019). The explained identifiers of blockchain technology disrupt the way of doing business by changing the business value perception.

Technical Background of the system: Each computer is considered a node in a network. This network type is defined as peer-to-peer networking structure (Oh & Shong, 2017). Each node holds cryptographically chained of blocs consist of data that prevents failure (Carson et al., 2018). Blocks include components that are a set of messages or multiple transactions of data with a hash function, the previous blocks' hash values which are called timestamp, and a nonce which is a random number that verifies hash values (Conte de Leon et al., 2017; Nofer, Gomber, Hinz, & Schiereck, 2017). Hash values assure the integrity of the data in the blocks and the chains. When data is changed from a block, related hash values are also regenerated. The majority of the nodes in the chain should agree on the validity of the data and block, then a block and data can be added. Without a consensus between the nodes, a block cannot be updated or created, and the transaction cannot be completed. Blocks hold the historical background of transactions as well. The data is stored at specific points in time and kept track of these transitions. Thus, blockchain is considered as an immutable state machine (Mougayar, 2016). The state machine characteristics of blockchain facilitate two different types of which are called public and private networks. The public type of Blockchain is open to everyone and no access limitation. However, private ones are only limited to a certain ecosystem for which the blockchain network is built on.

The critical and important part of blockchain technology is the protocols. There are a variety of protocols with a set of conditions is being implemented for different industrial sectors and purposes. The important part of these protocols is algorithms that establish robust tools and middleware technologies (Mougayar, 2016). These algorithms construct trust services that can be categorized based on proof types. These proof types are proof in a consensus, proof as a service, and proof in a service (Mougayar, 2016). The most known protocol is proof of work (PoW) that is an algorithm mostly used for cryptocurrencies in which stands on proof of state consensus protocol. More than one miner work on the problems to create a block with PoW algorithm. It requires a high volume of energy resources, but it assures consistency and protection against any forgery without trusted intermediation (Risius & Spohrer, 2017; Zamani & Giaglis, 2018). PoW assures that all the transactions are copied identically to all networks. Especially in a public blockchain, everyone can join the environment, and able to vote to evaluate each transaction with PoW consensus protocol if the given problem is solved. All transactions are transparent but the enablers are anonymous (Filipova, 2018; Nofer et al., 2017). However, the critical part of PoW is gradually growing cost and time per block, transaction (Conte de Leon et al., 2017). There is a proposed alternative consensus protocol which is called proof of stake is less costly and uses less computer power than PoW. Each stake is either rewarded or punished depending on their transactional achievement or failure (Kang et al., 2018; Puthal & Mohanty, 2019). Another way of having a consensus is the proof of value (PoV) algorithm. This type of consensus determines the perceived value of the contribution of each node. Also, the system evaluates each contribution and its reputation in the ecosystem, then ascribes the influence accordingly. Proof of authority and proof of existing protocols are also

Table 1 Proof in a service and proof as a service categories

Proof as a service	
Proof of asset	Proof of ownership
Proof of identity	Proof of physical address
Proof of authenticity	Proof of provenance
Proof of individuality	Proof of receipt
Proof in a service	
Wedding registry	Counterparty transactions
Land registry	Accounting audits
Supply chains	Voting
Assets registrations	Deed transfer

Source: Mougayar (2016)

included in proof in a consensus type. Additional proposed protocols exist and are called Proof as a service and proof in service types which are depicted in Table 1.

2.2 *Smart Contract*

Blockchain technology promises to digitize the tangible assets with its capability of trust and distributed ledger technology with other promising applications that affect business models. A smart contract is a very well-known blockchain application that opens a new venue for the contractual agreements for all sorts of businesses that might change the traditional business models. Even though the smart contract idea introduced by Nick Szabo a long time ago (Giancaspro, 2017; Mougayar, 2016), it became popular recently with the implementation of Blockchain principles. The advantage of using a smart contract is to create a peer-to-peer agreement where every participant is agreed on the content of the digital contract and fulfills their obligations accordingly (Carson et al., 2018; Macrinici, Cartofeanu, & Gao, 2018).

The smart contract provides clear opportunities to reshape the business values stream by increasing efficiency, reducing transaction, and legal cost (Giancaspro, 2017). Moreover, triggering the automation of blockchain when the contract's content is met simplifies the business processes by reducing the infrastructure cost. Also, transparency and anonymity of the Smart contract build trust among all blockchain participants for that environment (Carson et al., 2018; Giancaspro, 2017). These functional elements of blockchain applications and their properties change traditional business processes by constructing new business value linkages. Eliminating traditional business creates an innovative business model. Therefore, this study proposes to implement the necessary holistic view of the business model to gain maximum benefits out of blockchain technology in an organization.

2.3 Business Model Innovation and Blockchain

New customer expectations, requirements, technologies, and regulations are forcing to establish a new form of business model. Also, not every element of the existing models fits with different technologies as well as blockchain properties. The model approach creates an understanding of overall business strategy with the guidance of related components that affect the way of doing business in a variety of sectors. Identifying operation issues and solving them is one of the characteristics of business model thinking. There are different models for different purposes, however, the common elements of which define business logic are the way values are created and captured for customers (Heikkilä, Bouwman, Heikkilä, Solaimani, & Janssen, 2016). Business models are conceptual perspectives that define the framework to capture the values and show how these values can be transformed into a profit (Ugray, Paper, & Johnson, 2019). It is a system-level approach to explain business operations. There are conventional methods to define business models for companies. However, digital technologies are transforming business models into an innovative type of approaches. Obviously, traditional business models will be disrupted by blockchain technology as well as value streams that are captured and created (Morkunas, Paschen, & Boon, 2019).

The well-known traditional business model is CANVAS was introduced by Osterwalder and Pigneur that contains nine principles with the concept of simple, relevant, and understandable ways of defining the functionalities of companies (Urban, Klemm, Ploetner, & Hornung, 2018; Wrigley & Straker, 2016). The firm level of the business concept is considered and asked the question of "what of doing business" while establishing the model with factors (Keane, Cormican, & Sheahan, 2018). The nine elements are; customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structures, which analyses capabilities for efficiency and value for stakeholders (Aagaard, 2019; Morkunas et al., 2019). The missing part of this model is not capturing the data and the trust as a part of the value for a model (Aagaard, 2019).

Business model literature does not have a set of common components that describes how the models should be. Therefore, the St. Gallen Business model navigator develops the questions to define a business model. The model asks, "who is the customer?", "what is offered to target customer?", "How to build and disseminate the value proposition?", and "why the business model is financially viable" to apprehend the value of a business (Aagaard, 2019; Böhm et al., 2017; Gassmann, Frankenberger, & Csik, 2013). The other suggested models, the value design model is composed of value drivers, nodes, exchanges, and extracts that interacts interchangeably with one another. The ecosystem is the main driver of the value design model to create a holistic view between building blocks to identify the values (Aagaard, 2019). Business DNA (design, needs, aspirations) model works within three blocks of values that interact with elements of given systems. Interaction occurs by answering "How?", "What?", and "Why?" questions to define each element in DNA blocks. D blocks consist of key partners, resources, and activities. N block contains channels, customer relationships, and segments. A block deals with a value proposition, revenue, and cost (Sun, Yan, Lu, Bie, & Thomas, 2012). When these models define the elements of blocks, they always see the value through some additional intermediaries to explain the business model. However, blockchain promises to eliminate an intermediary from the business structures. These commonly used business models seem that they are not capable enough to define blockchain used business properties and values because of their static approaches.

The physical boundaries are expanding, and data is broader than ever. Created platforms are interacting with external entities as well. The relationships of the systems are like a symbiotic type of dependence between internal and external of the companies which creates an ecosystem. Lean and agile types of structures with these new technological grounds create new opportunities to capture and create new distributed and decentralized values for businesses (Krco, van Kranenburg, Loncar, Ziouvelou, & McGroarty, 2019). Therefore, the whole system and the contributors of that ecosystem need to be considered to innovate a value-driven dynamic model. A linear and traditional type of business model is evolving to a more dynamic network type of structure because of new technological advancement with hypoconnectivity. Building dynamic capabilities help to create contingency plans to integrate business strategies with dynamic business models that consider digitalization. New business model innovation implements sensing, seizing, and transforming capabilities to establish digital models. Digital business models with these dynamic capabilities will be constructing a new approach to business strategy, design, and also creates understandable business models that captures the competitive advantage (Warner & Wäger, 2019).

Sensing capability provides to capture external ecosystem opportunities to find out the value creation for the digital business models (Warner & Wäger, 2019). Sensing the value for external and internal ecosystem would provide more dynamic models to operate businesses. Seizing capability is to grab the opportunity by allowing disintermediation, decentralization, and agility (Chong, Lim, Hua, Zheng, & Tan, 2019; Warner & Wäger, 2019). The result of this disintermediation, decentralization, and agility with customers, partners, and operations help to seize the value for businesses. Transforming capability is to share created and captured values among the ecosystem in which designed for digital dynamic businesses (Chong et al., 2019; Warner & Wäger, 2019). Thus, this capability supports active engagement among participants to innovate inside the value co-creation and fits the blockchain environment.

3 Blockchain Business Model with Dynamic Capabilities

The nature of blockchain technology has the power to transform traditional business models. Changing the classical structure with blockchain draws a new concept of business model innovation. There are case studies that layout current business models and expected blockchain business models in different sectors (Chong et al., 2019; Mettler & Hsg, 2016; Oh & Shong, 2017), however, they do not share any framework which looks at the model holistically.

In this study, dynamic capabilities and blockchain characteristics are combined and proposed a holistic framework for the blockchain business model. At the same time, some of the elements would be injected from traditional and digital business models to create a hybrid structure for the blockchain business model.

The blockchain business model has been created with three main trust layers. Trust is the main component of the business model for which blockchain technology promises to establish building blocks for business benefits. The built trust changes and disrupts the classical model structures among the elements that create efficiency and values. Therefore, a created trust among infrastructure, participant, and output generates layers that have different created and captured values compared to the traditional models.

The first one is the infrastructure layer which consists of blockchain technological foundations. Infrastructure creates a trust layer with the foundational technology that is used to build blockchain itself. This layer provides transactional values for businesses because of the nature of the blockchain secure establishment. The core technological capability of blockchain generates value-related transactions with different platforms. These platforms can transform tangible assets into digital assets with different application opportunities. Also, public and private network values create different platforms, like smart contracts and cryptocurrency types of applications. The blockchain platforms give different architectural opportunities to build hybrid applications that may have a Web or not (Mougayar, 2016). Ability to have different platforms generate flexible business architectural designs to adopt a variety of sectors. The immutability of blockchain technology technically prevents having an exact copy, which creates trustworthiness for the system (Conte de Leon et al., 2017). Trust for blockchain is a core value that is paved in every step of the infrastructure that creates the network integrity. The consensus system is the backbone of blockchain to validate transactions. Secure network interchange gives dynamic roles to the job (Tapscott & Tapscott, 2016). Also, a decentralized scheme of cryptographic algorithms for consensus properties of blockchain allocates the trust to a decentralized network. The principle of distribution for blockchain establishes no single point of control for the system so that no one can disable the system alone. Empowering the contributors with a distributed power prevents manipulation which exuberate assurance inside the infrastructure trust layer. Security is embedded in every part of the processes in the layers. Every participant should join to blockchain environment by accepting proof of concepts that defines security measures how to be a part of the network. Different types of security measures—like a public key or private key infrastructures, hashing algorithms, protecting the privacy, and keeping transparency at the same time—provide transaction values to be captured within the infrastructure trust layer (Mougayar, 2016; Tapscott & Tapscott, 2016).

The blockchain infrastructure trust layer creates the transaction values that crafts a digital mindset for sensing capabilities (Warner & Wäger, 2019). Every property of the infrastructure trust layer generates special sensing capability for the business model to capture the values from the blockchain technology. Sensing capability triggers the network values that blockchain participants interact with each other for creating the values. While sensing the capability, transaction values seize the opportunities with the capability of blockchain infrastructure elements that are platform, immutability, decentralization, consensus, distribution, and security. Thus, new digital prospects are seized by having blockchain infrastructure trust layer properties with values for network and production.

After the dynamic capabilities are sensed and seized from the first layer as a transactional value, the second layer is the participant trust layer that is designed for business participants to establish a network value. In the traditional business model approaches, the "who?" question is asked to determine the customers, partners, customer segments, and so on. However, blockchain technology transforms these personal identification approaches to a collective identification approach that sees all participants are aligned at the same level to achieve the business goal. This way the shareholders or participants are empowered to decide in blockchain transactions more responsively, and inclusively with less manipulation (Tapscott & Tapscott, 2016). Moreover, channels, suppliers are also combined with direct relationships to complete the necessary business values. Peer-to-peer network value allows building public and private communication anonymously with the help of a secure consensus environment. Anonymous participants might be a different stakeholder, however, distributed transaction delivers the same data among peers to alter collaboration (Chong et al., 2019). Connected participants in the same network with a distributed ledger system operate in a collaborative environment (Conte de Leon et al., 2017). Every action inside the blockchain environment moves collaboratively to decide whether the transaction is suitable for the collective consensus rules that are defined in the infrastructure layer. Collaboration in the participant trust layer drives an enterprise-wide network structure value inside the business model (Solaimani, Bouwman, & Itälä, 2015). Thus, collaboration is the main channel for each peer in which appears to be a node for the entire network. Participation in blockchain provides security and control inside the environment. The participant trust layer enforces members to interfere depend on the defined consensus between the peers to check the validity of the transaction. Therefore, the blockchain business model raises the trust among members, and creates the business environment that each stakeholder shares direct business needs without any third party. Customer relationships are turned into a stakeholder participative network value that fulfills to aim direct business partnership without an intermediary that diminishes the hierarchical business relations (Morkunas et al., 2019). It is evident that blockchain technology produced values cannot be integrated with traditional business model dimensions.

Transformation capability is a reaction to the shifting business model with blockchain layers by exploiting infrastructure and participation layers for a more effective outcome (Wójcik, 2015). Successful transformation capability entails to sense and seize for relevant changes in order to adopt the technology (Braganza, Brooks, Nepelski, Ali, & Moro, 2017). Transaction and network values of each layer are being converted to the production stage with the transformation capability.

Transformation capability integrates blockchain technology with business processes with production values (Warner & Wäger, 2019). The transformation begins with sensing and seizing capability that captures the values from transaction and network to the output to create end product results of the blockchain technology. The capability of transforming from previous trust layers to the output trust layer derives the blockchain business model from the perspective of value proposition, revenue stream, and cost structure. This new perspective generates a distinctive set of values for blockchain output with trust in the operating environment (Wójcik, 2015).

The output trust layer contains new production, revenue stream, and cost structure values that form the blockchain business model last layer. Privacy is one of the leading values from blockchain technology implementation that transforms all of the capabilities that are embodied from other layers in the model. Privacy is an indispensable value to reach for every technological transformation. However, by nature, blockchain technology provides this value with cryptographically secured encryption from the beginning of infrastructure to a personal level (Mougayar, 2016). Protecting personal or transactional data is required by laws from which every authority puts in place. Blockchain technology automatically delivers privacy by keeping the personal information encrypted by distributing the data among peers. The transparent nature of blockchain makes visible every participant to overlook to the transactions which increase the confidence and trust (Giancaspro, 2017). While performing transparency value with distributed ledger by end-to-end processes, the anonymity of individuals is preserved at the same time with blockchain infrastructure trust layer that creates an output layer which is not considered in traditional business models as a proposition value (Burkhardt, Frey, Hiller, Neff, & Lasi, 2019; Faber & Jonker, 2019; Tapscott & Tapscott, 2016). Besides, public and private blockchain type of implementations also keeps the total privacy among participants even though the public one has generic purposes (Mougayar, 2016).

Speed is a challenging and controversial part of the value creation by blockchain technology. Performance and efficiency are the expected results of blockchain that triggers the speed. Direct communication in network values is expected to increase transaction speed with blockchain technology. Especially in the financial sector, blockchain technology can reduce the authorization waiting time among different portfolios between stakeholders (Morkunas et al., 2019). Some of the financial instruments' settlement takes time with traditional transactions. Nevertheless, removing the additional transactional burden from the network, blockchain technology has the opportunity to increase speed and efficiency from the unbanked and underbanked participants (Tapscott & Tapscott, 2016). Even though some studies are skeptical about blockchain technology transaction speed because of the technical constraints during the consensus (Chong et al., 2019; Nofer et al., 2017). The speed of blockchain technology is constantly improved which is considered a customer value creation for production values in the proposed blockchain business model.

Innovative business models attempt to reduce and manage the cost to unfold for new opportunities that create a unique value proposition (Wrigley & Straker, 2016). Therefore, unique value creation with a low-cost opportunity on blockchain technology provides a new market structure that disrupts the traditional businesses. First of all, distributed ledger technology allows eliminating more infrastructure investment to store the data in a central machine. Likewise, eliminating the third-party involvements among the buyer and seller removes the additional fees that the customer needs to pay for the services. Peer-to-peer participation that is built on coordinated distributed network value with transformative applications helps to reduce transaction cost, which creates and captures new business values (Lakhani & Iansity, 2017). Blockchain sits on the digital communication and infrastructure technologies which allows a reduction of the cost of new innovative products that are driven out of this multilevel architecture (Lakhani & Iansity, 2017). There are some dubious approaches from the literature that claims that recording of each data distributed in different machines may increase in cost. However, the disintermediation capability of blockchain infrastructure would eliminate constant transaction costs by allowing participants to directly connect with different blockchain platforms (Treiblmaier & Onder, 2019).

Strong dependency on blockchain technology poses a question of how to reduce the risk in business. The current practice of businesses collects and stores the data in their private storage. Even though there are policies and rules to handle the data, there is always a risk to lose your information at the hands of third parties and providers because of the data breach caused by intruders. Thus, the absence of intermediaries in blockchain and keeping the data in participants' or peers' platform increases the security and reduces the risk of losing data. Also, internal use of blockchain technology creates a low-risk solution for physical and digital assets, recording the transactions, and identity verification with a single-use application opportunity which helps to build more production values with advanced solutions in the blockchain business model (Lakhani & Iansity, 2017; Nofer et al., 2017). Blockchain transactions reconcile immediately with the other parties irrevocably which eliminates the agency risk as well (Tapscott & Tapscott, 2016).

Transparency in blockchain generates a significant value proposition to identify and validate the transactions. Each node on a blockchain is aware of the transaction and its content with a cryptographic secure connection (Lakhani & Iansity, 2017). Participants manage security, validity, and reliability with the contribution, authentication, and inscription process without compromising the transparency that creates and captures the business value in blockchain technology (Chong et al., 2019). The biggest value creation of transparency is to build trust among peers. Keeping the transactional records permanently ensures transparency in the layer (Pazaitis, De Filippi, & Kostakis, 2017). The infrastructure, participants, and output trust layers compose the transparency that brings confidence to each transaction that occurs securely in an anonymous way.

The sharing economy is a common practice for technological platforms. The idea of sharing economy makes everyone spend value to receive resources. After capturing the value from the resources, you try to rent these resources to others completely. However, in the metering economy, blockchain technology helps you to share your residual resources by having a decentralized value transfer protocol. You securely allow and assign a blockchain participant to consume your resources by charging or whatever the rules you designed in your smart contract to be processed in the network. Value creation occurs for tangible assets with a metering economy in the output trust layer too. Practical examples appear in the autonomous vehicle market that is built on an open transportation network where participants own their private encrypted key to reserve their car in a blockchain environment (Tapscott & Tapscott, 2016). Thus, metering on blockchain gives an opportunity to create a business value allowing participants to operate in remaining resources. Furthermore, the blockchain platform allows owners to track and check whether the smart contractual agreement is complied with (Tapscott & Tapscott, 2016). So, trust is built on the production value to capture the metering economy. As a result, blockchain technology diverting the sharing economy to the metering economy by delivering effective and efficient production values with the use of tangible and intangible assets by creating a revenue stream.

Supplying the products all over the market and tracing back to the root of the production place when it is needed to cause complications for customers, providers, and end-users. The blockchain output trust layer ensures all the participants identify the root of the transaction to reach the main cause. The Time-stamp properties of blockchain with transforming capability in the business model resolve inefficiencies and increases the quality of the product with traceability that creates and captures the production value chain for the businesses (Chong et al., 2019). Especially in supply chain practices, blockchain trackability captures the value for suppliers, producers, as well as consumers to track the source of information, product, and services to provide secure and trustable results.

A wide range of systems and models are designed with authority or some intermediary connection to build trust among participants as well as control the processes. The banking system is a well-known type of intermediary system that builds trust among two parties that creates and controls the transaction. At the same time authorities in every sector make sure each process is operated in accepted rules, regulations, and policies to establish concusses and agreements among the parties that involve the business processes (Conte de Leon et al., 2017). However, the blockchain business model disrupts the intermediaries and authorities by directly integrating the participants of the blockchain environment. It does not demolish the intermediary and authority for good but supersedes its functionality with a proof concept (Mougayar, 2016). The proof concept combines all these trust layers and establishes automated systems that control consensus securely over the system-defined algorithms, which removes the third-party involvement in the proposed blockchain business model. The autonomous agents act upon the consensus with which transaction values are transformed into a more valuable organization without the additional burden of intermediary and authority. The blockchain business model determines the changing customer need effectively with the production value of the model with distributed, secure, and direct communication.

4 Discussion and Conclusion

Technological innovations transform firm structures, value propositions, cost structures, revue streams that are established on the traditional understanding of business models. Blockchain technology is not a new technology, but it begins to disperse recently as an application. The properties, technical and practical capabilities of blockchain started to inject deviant promises for the business environment. Some of them are a bubble of technology, while others are accepted as a revolution in the business world. Financial institutions see as an opportunity to eliminate cost, additional processes, on the other hand, regulatory bodies perceive as a threat because of the implementation issues that eliminate the control over the system. A wide range of sectors little or more finds a solution for their businesses. Therefore, blockchain can be disruptive in every sector while it might be a dangerous tool that removes the authority on the processes. Too many hypes moving around the blockchain technology makes the technology more interesting to implement for companies.

The application that is built with blockchain technology is growing among different sectors which have traditional business models. Even countries are implementing their digital governance structure with a blockchain environment. Classical business models lack inclusiveness for a new digital ecosystem that needs to change the business understanding of processes and revenues. Besides digital innovativeness on the businesses, specifically, blockchain technology and its applications generate an exclusive environment. Consensus-driven, decentralized, secure, and distributed organizations with this technology are changing the way of the classical understanding of business processes from leadership to production and operation stage. Therefore, trying to define business models with traditional approaches to digital businesses will not help to understand and guide companies that wish to implement blockchain technology in their businesses. Previous researches (Chong et al., 2019; Mariappan, 2019; Morkunas et al., 2019; Nowiński & Kozma, 2017; Oh & Shong, 2017) investigated the relationships between blockchain and business model. Nevertheless, some of them modify the existing traditional business models, others create a model for a specific sector, or they only focus on digital transformation generally. Our approach is to establish a model to look at blockchain-specific properties under the different layers with different values by combining dynamic capability structures. This conceptual approach aims to reach a holistic way to understand and create a model that guides general business expectations that answers specific model questions. The proposed model framework explains each functional trust environment with its values to clarify investors' expectations on the properties of the blockchain. The model framework contribution is to build a clear business strategy with blockchain applications and show business leaders how each property of blockchain creates and captures specific values at every level of the trust. Every sector, company, or government that transforms its processes into a digital structure can capture a piece of value with dynamic capabilities by using the proposed blockchain business model. Also, this blockchain business model framework proposal might provide new opportunities for a wider perspective on the values of blockchain can create, the businesses can capture with it. Therefore, this holistic view of the blockchain business model needs to be tested empirically to improve a more constant and solid foundation for businesses that prefer to use and implement blockchain technology and its applications. Thus, every layer of the framework can be used independently or together to define blockchain business ecosystem values for different sectors. Consequently, this model would open a new research avenue to improve the maturity of the framework for the blockchain businesses that will scatter around in every ecosystem soon.

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Strategy Development to Improve the Business Performance of Nuclear Energy Companies

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Abstract In this study, it is aimed to develop strategies to increase the performance of nuclear energy companies. In this context, criteria based on a balanced scorecard have been determined. In order to determine which criteria are more important for nuclear energy companies, an analysis was carried out with the fuzzy DEMATEL approach. According to the results of the analysis, it has been determined that technological development issues are of vital importance for these companies. Similarly, customer satisfaction and cost analysis are other important criteria. On the other hand, the importance weight of qualified personnel is lower than the others. It is understood that nuclear energy companies should follow technological developments effectively. Otherwise, there is a risk of losing significant competitive advantages in this sector. Continuous changes occur in technological applications for nuclear energy generation. The most striking of these applications is that thorium is preferred instead of uranium in the energy production process. In this way, the risk of explosion of the nuclear power plant is eliminated. In addition, radioactive waste generated as a result of nuclear power generation is significantly reduced. It is inevitable to use this technology in nuclear energy production in the future. Therefore, it will be very difficult for nuclear energy companies that do not have this technology to survive in the market.

1 Introduction

Energy, which is necessary to meet the people's needs that diffuse more than one area such as housing, nutrition, and transportation, is an important element for the economy of countries (Li, Zhu, Yüksel, Dinçer, & Ubay, 2020; Zhong, Hu, Yüksel, Dincer, & Ubay, 2020). States are almost in competition to obtain energy used in

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sectors such as industry, housing, and transportation. The main reason is that states that have the energy that meets human needs and energy independence have a strong economy with the right policies (Qiu, Dinçer, Yüksel, & Ubay, 2020). The need for energy used for purposes such as electricity and heat generation is increasing day by day. In addition, the increasing energy consumption following the increasing energy needs also plays a role in the increase of environmental pollution (Du, Dinçer, Ersin, & Yüksel, 2020; Yüksel, Dinçer, & Uluer, 2020). The issue mentioned here is not due to the claim that energy consumption increases environmental pollution, but from the use of resources that will cause environmental pollution. These sources cause environmental pollution as well as play a leading role in carbon emission problems. Fossil fuels are one of the sources that are used with increasing energy needs and that can be described as harmful to the environment. Considering the exhaustion of fossil fuels, it would not be wrong to say that states and international organizations are turning to alternative energy sources. Nonrenewable and renewable energies, nuclear energy are the main known energy sources. Therefore, states meet their energy needs from these sources (Qi, Huang, Dinçer, Korsakienė, & Yüksel, 2020).

Nonrenewable energy is a type of energy that is not continuous and cannot be used again. Most nonrenewable energy sources are fossil fuels such as coal, gas, and oil. These substances were formed because of fossil reserves accumulated over millions of years (Zhou, Zhou, Yüksel, Dinçer, & Uluer, 2020). Therefore, fossil fuels are described as non-renewable. Because it takes millions of years to form. Therefore, the main component of fossil fuels is carbon. The carbon-based nature of these resources, which are important for the industry, causes negative environmental impacts, and the fact that they will be depleted has opened the nonrenewable energies to discussion in many areas today (Yuan, Zhang, Yüksel, & Dinçer, 2020). Thus, the advantages and disadvantages of this energy type can be mentioned. Compared to renewable energy sources, fossil fuels are more reliable in electricity generation because they are not dependent on factors such as daylight, rain, wind. They can be extracted and used relatively cheaply wherever they have reserves. However, the disadvantages of nonrenewable energies are also quite high. For example, coal is extracted from a mine and mining is one of the dangerous businesses. Coal miners are constantly exposed to toxic dust and the mines they work are in danger of explosion. Apart from that, when coal, natural gas, and oil are burned, a lot of toxic gases are released into the atmosphere. This causes air pollution and threatens human health. Also, since fossil fuels are carbon-based fuels, they are at the top of the global carbon emission problem. When the disadvantages of fossil fuels are compared to the risks of nuclear energy, it is a matter of discussion which is more harmful or dangerous (Liu, Yüksel, & Dinçer, 2020; Yüksel, Dinçer, Karakuş, & Ubay, 2020).

Renewable energy is a type of energy that can constantly renew itself and inexhaustible in nature. It is possible to talk about the advantages and disadvantages of renewable energies such as wind, solar, biomass, geothermal, hydroelectric, and ocean (wave and tidal) energy. Among the biggest advantages of renewable energy is the continuous renewable capacity mentioned above (Dinçer, Yüksel, Ubay, &

Karakuş, 2020). Apart from this, the possibility of renewable energies harming the environment is very low. Considering the acceleration of climate change and the carbon emission problem, it would be a very rational choice to meet the increasing energy need from renewable energies. Its positive effects on the environment, human health, and the reduction of climate change also appear in the field of economy. The maintenance cost of renewable energies is less than nonrenewable energy sources. The cost of dismantling the renewable energy facility and vehicles established is also low (Dincer, Yüksel, & Martinez, 2019; Yüksel, Dinçer, & Meral, 2019). In addition, it can be said that there is a positive influence on employment. Apart from these, when disadvantages are mentioned, more than one problem may be encountered. For example, the initial investment costs of renewable energies are quite high and cause various financial problems. Geographical and climatic constraints make it difficult to claim that renewable energy is a source that promises 24-h uninterrupted production. The inadequacies experienced in distribution and network points are one of the disadvantages seen in this regard. Despite all these disadvantages, the interest in renewable energies is not expected to decrease (Dinçer & Yüksel, 2019a, 2019b).

Nuclear energy is one of the important sources in meeting the increasing energy need, as it is a sustainable and carbon-free energy. Therefore, studies and discussions on nuclear energy are increasing day by day. It is possible to describe this energy from various angles, but basically it can be said that the energy obtained from the atomic nucleus through fission is called nuclear energy. Uranium, a powerful element to obtain this energy, is enriched and used as fuel because uranium is the element that contains the most protons and neutrons (Nazlioglu, Lebe, & Kayhan, 2011). A large amount of energy is released by dividing uranium. Neutrons cause this division by colliding with the uranium nucleus. This interaction causes a fission reaction. The dispersed neutrons crash into other uranium nuclei, creating new fission. Neutron holders made of materials such as boron are used to control the energy released. Uncontrolled energy has painful consequences. Therefore, neutron holders play a major role in energy production. The controlled nuclear reaction chain generates high temperatures. By converting high-temperature water into steam, it opens the way to generate carbon-free energy (Apergis & Payne, 2010). Because intense water vapor rotates the turbines and fulfills the motion energy condition required for electricity generation. The electricity generated in the generator by the rotation of the turbines is sent to the distribution.

Generating electricity from a nuclear power plant appears challenging but offers rich advantages. Carbon emission is a global problem as mentioned earlier. Nuclear energy, on the other hand, has the potential to give a positive momentum in the fight against global warming, as it is carbon-free energy. A great improvement can be achieved with nuclear energy regarding air pollution caused by nonrenewable energies (Wolde-Rufael, 2010). This advantage, which protects human health from air pollution, is one of the attractive aspects of nuclear energy. Other advantages that make nuclear energy impressive are the advantages explained for economic reasons. Because fossil fuels are running out, uranium as a fuel for nuclear energy is abundant (Yoo & Ku, 2009). In this regard, it should be noted that nuclear energy is much more sustainable than nonrenewable energy. Unlike renewable energies, nuclear energy, which promises uninterrupted energy for 24 h regardless of weather conditions, is more sustainable at this point than renewable energies. Countries that invest in nuclear energy avoid the current account deficit by reducing energy imports and reduce their energy dependency. In addition, employment areas can be created with nuclear energy and the energy needs of the industry can be obtained inexpensively. Therefore, considering that nuclear energy also provides energy security, it can be said that states and investors will continue to be interested in nuclear energy (Iwata, Okada, & Samreth, 2010).

It is known that the nuclear energy production process continues in more than one country. Along with the said production process, studies are also continuing to ensure nuclear safety. Because, besides the rich advantages of nuclear energy generation, there are also multiple disadvantages. First, it should be noted that nuclear energy is an energy that does not tolerate errors because uncontrolled energy generation process can cause destruction and too much loss. Depending on the nuclear safety, there are risks such as accident, explosion risk, nuclear waste disposal, terrorist attack, and earthquakes in the nuclear power plant. The magnitude of the risks clearly states that nuclear energy production requires a great deal of knowledge. Therefore, high knowledge accumulation is one of the first problems encountered. Other problems are based on economic factors (AlFarra & Abu-Hijleh, 2012). For example, the installation cost of nuclear power plants is very high and creates financial difficulties. The price of uranium to be used as a raw material can also be put forward as a disadvantage in this regard. Nuclear waste disposal process is a separate cost item. Disposal of nuclear waste is both costly and threatening human and environmental health when not managed properly. Considering the current disadvantages of nuclear energy and accidents caused by nuclear power plants throughout history, it has a bad image on the public side. Therefore, public acceptance can be stated as another disadvantage. Nuclear energy investments that are not based on popular acceptance will cause various political and economic problems. However, achieving a national consensus on this issue will play a positive role in increasing nuclear energy investments (Krane, Jaffe, & Elass, 2016). Thus, it can be argued that states and nuclear energy investors should pay attention to these disadvantages.

Nuclear energy investments are big investments like other energy investments. When considered together with the size of the risks, it becomes necessary to maximize the business performance of nuclear energy investments. This requirement raises the question of what affects the performance of Nuclear Energy investments. For example, nuclear power companies need to have hard financial management because of the size of these investments. Financial affairs that are not managed effectively can affect the growth performance of these companies and may result in bankruptcy. Another point is the issue of cost management (Jensen-Eriksen, 2020). Total costs of nuclear energy investments with cost items such as raw materials, waste disposal, and operation are high. Effective cost management is one of the factors affecting business performance. It is clear that the process of generating electricity from nuclear power plants can be made more efficient with a strong technological infrastructure (Huhtala & Remes, 2017). Thus, it can be argued that technological infrastructure is also one of the reasons that affect the business performance. Qualified personnel are one of the issues that directly affect nuclear energy investments and open the door to new investments. Qualified personnel will positively affect the business performance and increase productivity. It would not be wrong to say that it will positively affect public acceptance regarding the safety of nuclear power plants. Sensitivity to customer satisfaction can be counted as one of the factors affecting business performance (Buongiorno, Parsons, & Petti, 2018). The sensitivity shown to the customer will also contribute to making new investments. These examples can be shown among the factors that will affect the performance of nuclear energy enterprises and these examples can be increased.

In this study, it is aimed to evaluate the appropriate strategies to improve the business performance of nuclear energy companies. For this purpose, balanced scorecard-based criteria are taken into consideration. In this framework, cost management, customer satisfaction, technological infrastructure, and qualified personnel are defined as the significant criteria in this regard. On the other hand, to find more important factors, an analysis has been performed by considering DEMATEL methodology. With the results of this study, it can be possible to propose effective policies to improve the performance of the nuclear energy companies.

2 The Importance of Business Performance of Nuclear Energy Investors

Nuclear energy is one of the most important resources for countries and companies. As Pravalie and Bandoc said that nuclear energy is significant for economic growth. Hence, it decreases economic deficits and dependency among countries. For example, as Kok and Benli (2017) explained that Turkey is a foreign-dependent country to import energy sources and it causes current account deficits. So, nuclear energy will reduce dependency of countries. Also, Nazlioglu et al. (2011) studied in order to analyze causality between nuclear energy and economic growth. With regard to these, there are lots of researches that try to explain the relationship between nuclear energy consumption, CO_2 emission rate GDP, labor force, real gross fixed capital, and this relationship could depend on the time as long term and short term (Apergis & Payne, 2010; Iwata et al., 2010; Wolde-Rufael, 2010; Yoo & Ku, 2009). By looking at these, Shepherd (2018) pointed that nuclear power importance should be kept in the industry as International Energy Agency (IEA) reported. However, some studies denoted that these are not the cases. However, Saidi and Mbarek (2016) stated that there is no relationship between nuclear energy and GDP per capita in the short run, but the relationship exists between renewable energy (RE) and GDP per capita. So, countries and companies are paying attention and investigating a lot of factors to invest nuclear energy in order to provide efficient and effective performance from the nuclear energy system.

Cost of reactors is one of these factors. As dos Santos, Rosa, Arouca, and Ribeiro (2013) noted that nuclear energy reduces operating costs in business for Brazil and it provides energy security while satisfying electricity needs. Additionally, AlFarra and Abu-Hijleh (2012) stated that when compared with fossil fuel-based energy and nuclear resources in order to generate energy electricity and decrease cost of electricity. Nuclear fuel is more economical energy source than fossil fuels. On the other hand, people's acceptance can also create cost socially. With regard to these, Huhtala and Remes (2017) enlightened that nuclear power support rate will be low, and it will create social cost when the perceived risk rate is high for people because of nuclear accident possibility. These can influence revenue negatively which is obtained from nuclear energy.

Another crucial issue is that countries have started to phase out their nuclear reactors and it has become a trend between countries. However, it is also creating extra costs and affecting business performance. Therefore, Kim and Jeon (2020) explained that nuclear reactor phase out lead to decrease value added in nuclear industry, but RE is increasing its value added. Also, the impacts of decommissioning of nuclear reactors will be costly if management is weak. As, Fessenheim nuclear reactor decommissioning created too much cost. Hence, energy generation will influence negatively if the costly phase out stage remains like that (Mauger, 2018). So, Buongiorno et al. (2018) emphasized that nuclear energy has low carbon technology to produce electricity, but its cost is high to decrease CO_2 emission. Therefore, decarbonization costs will reduce when decreased nuclear reactor costs with technology improvements. Hence, technology and other strategic developments can decrease nuclear reactors' costs and increase their performance. For example, Middle East countries give importance to nuclear reactor investments even they have rich oil reserves because of national security, international relations, cost efficiency, energy security, technological developments, and increasing their strategic power among countries (Krane et al., 2016). Jensen-Eriksen (2020) added that the Finland government and businesses are also considering nuclear power to generate cheap electricity even it is costly and risky although they have alternative energy resources. However, government rejected fifth reactors proposals sent by business until businesses are presenting nuclear energy is green energy.

With regard to these, nuclear reactors' types, technologies, waste fuel technologies, tests, and fuel sources such as uranium (U-235) and thorium (Th-231) are also playing a significant role on cost, efficiency, and performance. Thus, Gao, Nam, Jang, and Ko (2019) examined that Gen IV reactors have secure, economic, and cost-effective technology. Developed nuclear fuel cycle technology should recycle spent uranium by supplying low nuclear power generated electricity cost in Korea. Hence, Yang and Zhan (2017) proposed a ceramic nuclear reactor type in order to provide high power electricity generation with sustainability and security. Also, spent uranium can be recycled again. Withal, high-performance materials are important in nuclear reactors for fission application. Gen IV sodium-cooled fast reactors are improving nuclear energy performance, efficiency, and security (Zinkle, Terrani, & Snead, 2016). Furthermore, Chmielewski and Szołucha (2016) stated that for a long time, efficient performance, waste management, fuel cycle, control process and safety, water chemistry control is important in the supercritical water-cooled reactor (SCWR).

On the other hand, fuel supply and cycle are also so considerable issues for nuclear reactors' performance. For instance, Meng and Yu (2018) remarked that uranium reserves may not be enough for the Chinese nuclear reactors in the future. So, they might have to import. With developing nuclear fuel cycle, the greenhouse gas (GHG) emission rate can be reduced significantly (Poinssot, Bourg, & Boullis, 2016; Zare, 2016). Moreover, Ozcan and Dincer (2016) analyzed that the Mg–Cl cycle was designed to produce H by nuclear power with low electrical work consumption. Therefore, electricity generation is also provided by H, it increases energy efficiency as well. Low carbon cost-effective sources are necessary for H thermochemical cycle for appropriate cost heat source in well-developed nuclear reactor design (El-Emam, Ozcan, & Zamfirescu, 2020).

Also, tests are made in order to provide and develop security and cost efficiency. For example, the ion beam test is made for providing more cost-effective and useful nuclear reactors (Heidrich, Pimblott, Was, & Zinkle, 2019). Moreover, Garrett, Smith, Smith, Heidrich, and Heibel (2016) examined into the heat engine is developed by using thermoacoustic engine technology for nuclear reactors to control temperature and power by getting energy performance and safety. Furthermore, Bedenko, Ghal-Eh, Lutsik, and Shamanin (2019) tested high-temperature gas-cooled nuclear reactor (Gen IV reactor technologies) in order to provide sustainability while operating with thorium–plutonium nuclear fuel cycle. So, they emphasized that nuclear power engineering improvement can solve computational, economical, and cost problems.

In addition to that, computational systems, artificial intelligence (AI) technology, and developing algorithms are improving the nuclear reactor performance, efficiency, and security. Also, Yeter-Aydeniz, Pooser, and Siopsis (2020) explained that technological improvements and developed quantum computation increase energy efficiency for the nuclear field and mitigate errors in the system. Accordingly, computational system is developed for creating digital doppelgangers and fast business process outcome for nuclear power facilities and (Belokrylov, Bol'shukhin, Komissarov, Petrunin, & Poverennov, 2020). Moreover, Yao, Wang, Long, Xie, and Wang (2020) remarked that technology and well developed small batch-size processing (SCNN) diagnosis system will prevent fault and provide safe energy generation from nuclear reactors. Besides, Khanal, Sundararajan, and Qiang (2020) investigated that nanotechnology with using nanomaterials in nuclear reactor is increasing nuclear safety, security, and efficiency. Furthermore, Fernandez, Tokuhiro, Welter, and Wu (2017) asserted that AI provides predictions and reports related to nuclear reactors in the process to avoid any nuclear accidents. However, Markard, Bento, Kittner, and Nunez-Jimenez (2020) remarked that China, Russia, and other stated-owned firms' countries can use nuclear energy as future energy, but other countries might not, because of nuclear is not struggling with climate change as developing renewable energy technologies. Also, nuclear is in decline as global stage because of growing opposition, hard licensing, safety concerns, low life cycle because of technology decline to the other resources and high costs. Otherwise, by looking at all nuclear technology developments, the UK, USA, and Japanese people are willing to pay for Gen IV nuclear energy, its R&D researches, and test even though they have strong opposers (Contu & Mourato, 2020; Murakami, Ida, Tanaka, & Friedman, 2015). Moreover, people's trust and acceptance are crucial. For instance, Vietnamese have trust problem to stakeholders about stakeholders' knowledge and transparency. So, Ho, Oshita, Looi, Leong, and Chuah (2019) said that Vietnam is not ready to manage nuclear power. With regard to these, social perception and governance of reactors with nuclear technology improvements are considered for sustainability in the energy sector and it affects willingness to nuclear pay (Jun, Kim, Jeong, & Chang, 2010; Petit, 2013).

On the other hand, the construction of nuclear reactor building and managing the process should be made properly. As Heffron (2013) lighted that with economic, social, and technological factors, construction project management is also momentous. For example, Siqueira et al. (2019) emphasized that time of construction should be considerable with other factors while investing. Zawalińska, Kinnunen, Gradziuk, and Celińska-Janowicz (2020) noted that location choice for nuclear reactors' construction is also affecting accessibility, economic development, efficiency, and energy security to perform in Poland. Therefore, Glinskii et al. (2020) developed a radiation level and subsoil status monitoring geo-environmental packets system. So, qualified administration design, planning of the process, auditing nuclear reactor plant constantly, education about nuclear power are recommended for regulating the safety of nuclear energy process in Pakistan (Karim et al., 2018). Otherwise, Kosai and Unesaki (2017) studied that electricity cut-off risk might be decreased in any accidents with System Interruption Nuclear Vulnerability Index (SINVI). For example, Kessides (2014) offered a small unit nuclear reactor for Africa in order to meet electricity demand, because they have no capital and management power to construct a bigger nuclear reactor. Another small nuclear power example is for the Arctic. Russia exports nuclear technology nuclear ships in order to increase energy performance and easy access (Gagarinskiy, 2018).

Another important factor is employees who work in nuclear reactors. Their knowledge, health, and motivation also affect the nuclear reactor process and performance. Fukushima workers experienced some problems because they usually remebered the accidients in their lives. It caused insomnia and illness (Ikeda, Charvat, Shigemura, Kales, & Tanigawa, 2019). That is why the workplace interpersonal support (WIS) program is developed in order to protect employees' motivation and get rid of workplace trauma after Fukushima. As a result, the program ended up with success (Takahashi et al., 2018).

3 An Evaluation for Nuclear Energy Companies

This study aims to propose appropriate strategies to improve the business performance of the nuclear energy companies. First of all, the criteria are selected based on the dimensions of the balanced scorecard approach. This method has four different dimensions, which are finance, customer, technology, and training. By considering these issues, the criteria are defined as cost management (*C*1), customer satisfaction (*C*2), technological infrastructure (*C*3), and qualified personnel (*C*4), respectively. The significance levels of these criteria are measured by using DEMATEL approach. This methodology is mainly used to weigh the factors according to their importance (Delen, Dorokhov, Dorokhova, Dinçer, & Yüksel, 2020). It has some superiorities in comparison with similar approaches in the literature (Korsakienė, Raišienė, Dinçer, Yüksel, & Aleksejevec, 2020). It can create an impact-relation map of the items (Wang, Liu, Dinçer, & Yüksel, 2020). This situation provides an opportunity to make a causality evaluation between the criteria (Zhang et al., 2020). In the analysis process, three different experts made evaluations regarding these four different criteria for nuclear energy investors. In this evaluation, experts used five different scales that are no influence (0), somewhat influence (1), medium influence (2), high influence (3), and very high influence (4). The details of the evaluations of three different experts are demonstrated in Table 1.

After that, these evaluations are used to find the weights of the criteria. In this process, firstly, an initial direct relation matrix is created. After that, this matrix is normalized. In the next process, the total relation matrix is calculated. This matrix is detailed in Table 2.

By considering the sum of the rows (*D*) and columns (*R*), the important levels of the criteria are defined. The details of these calculations are indicated in Table 3.

Table 1 The evaluations of the experts

Criteria	*C*1	*C*2	*C*3	*C*4
Linguistic value-evaluation of expert 1				
*C*1	0	3	1	2
*C*2	1	0	1	1
*C*3	4	4	0	4
*C*4	2	2	1	0
Linguistic value-evaluation of expert 2				
*C*1	0	3	2	1
*C*2	4	0	3	1
*C*3	4	4	0	3
*C*4	2	3	1	0
Linguistic value-evaluation of expert 3				
*C*1	0	2	1	2
*C*2	1	0	1	2
*C*3	4	4	0	4
*C*4	2	2	1	0

Table 2 Total relation matrix

Criteria	*C*1	*C*2	*C*3	*C*4
*C*1	0.19	0.40	0.22	0.29
*C*2	0.33	0.21	0.23	0.26
*C*3	0.62	0.67	0.21	0.55
*C*4	0.32	0.37	0.19	0.15

Table 3 The weights of the criteria

Criteria	*D*	*R*	*D* - *R*	*D* + *R*	Weights
Cost management (*C*1)	1.1022839	1.4728865	−0.3706026	2.5751704	0.2470443
Customer satisfaction (*C*2)	1.0283575	1.6481055	−0.6197481	2.676463	0.2567616
Technological infrastructure (*C*3)	2.0535265	0.8527627	1.2007638	2.9062892	0.2788095
Qualified personnel (*C*4)	1.0277939	1.238207	−0.2104131	2.2660008	0.2173846

Table 2 states that technological infrastructure is the most significant criterion for the performance of the nuclear energy companies. In addition, it is also determined that customer satisfaction and cost management play an important role. However, it is also found that the criterion of qualified personnel has lower importance by comparing with other factors.

4 Conclusion

Nuclear energy has become a seriously discussed issue, especially in recent years. There are some advantages that the use of nuclear energy provides to countries. Thanks to the use of nuclear energy, countries can produce their own energy. This situation is especially vital for energy importing countries. Owing to nuclear energy, these countries will not have to import energy from abroad. This situation will positively affect the current account balance of the country. In this way, it will be possible to contribute to the social and economic development of the country. On the other hand, no carbon gas is emitted into the atmosphere as a result of the use of nuclear energy. This helps to prevent the air pollution problem. In this way, it is possible to reduce the diseases caused by air pollution. This situation decreases the health expenses of the country. This will have a positive impact on the country's budget balance.

Due to these advantages, nuclear energy investments are of vital importance for the country's economy. Therefore, the performance of nuclear energy companies should be high. Otherwise, the problems these companies will experience will affect the country's economy negatively. There are some factors that affect the performance of nuclear energy companies. In order for these companies to have high performance, it is important that their technological infrastructure is high. In addition, qualified personnel also influence the success of these companies. In this study, it is aimed to develop strategies to increase the performance of nuclear energy companies. In this framework, four different criteria have been determined based on the balanced scorecard approach. In order to determine the important weights of these criteria, an analysis was carried out using the fuzzy DEMATEL method.

It is concluded that technological infrastructure is the most significant criterion for the performance of nuclear energy companies. Furthermore, it is also identified that customer satisfaction and cost management play an important role. However, it is also determined that the criterion of qualified personnel has lower importance in comparison with other factors. The results obtained indicate that nuclear energy companies should give importance to technological investments first. Technologies for nuclear energy generation are constantly evolving. As an example, the use of thorium instead of uranium in nuclear energy use has been discussed, especially in recent years. This approach reduces both the risk of explosion and the radioactive waste produced. However, in order to obtain nuclear energy with thorium, proton accelerator technology must be used. As can be seen from here, the possibility of using thorium instead of uranium in nuclear energy use increases with this technology in the following years. In this process, it will be very difficult for nuclear energy companies that do not have the relevant technology to compete with others.

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The Driving Force of Market Value and Financial Performance in Knowledge-Based Business Environment: Intellectual Capital

Fatih Yigit

Abstract This chapter focuses on the importance of intellectual capital (IC) as a driving force of the value creation process for firms and investigates the development of IC literature. Although considerable progress has been made in the last few decades, there are still important shortfalls. There is not a convenient measure to determine the IC efficiency while scholars have a consensus on the definition of IC. This difficulty arises due to the invisibility of IC and the inability to measure it exactly. Many measures have been suggested in time and the following studies have criticized these measures. The most widely used Value Added Intellectual Coefficient (VAIC) measure and its modifications are introduced briefly in this chapter. The importance of IC in a knowledge-based business environment requires more empirical studies and robust measures to explain the differences across industries and countries. Reporting systems should be also improved to achieve the information for more convenient measures. Recent studies emphasize the importance of integrated reporting (IR), which comprises both tangible and intangible assets.

1 Introduction

The importance of intellectual capital (IC) studies has incredibly increased over the last few decades. Martin-de Castro, Diez-Vial, and Delgado-Verde (2019), who comprehensively examine IC studies conducted in the last three decades, show that 553 studies were conducted from 1990 to 2016 and that these studies received 18,274 citations. When they examine the evolution through decades, they found that the number of studies which was 32 in the 1990s, increased to 393 in the 2010s. Both theoreticians and practitioners focus on the IC at the macro and micro levels. Wealth of Nations paradigm which heavily depends on tangible assets has changed to the IC of Nations in which intangible assets are more dominant. In addition to firm-level

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studies, some studies have been conducted at the country level. Lin and Edvinsson (2011) report the results of the findings regarding 40 countries using the national IC model and IMD World Competitiveness Yearbook for 14 years. They point out that IC is a critical indicator not only for firms but also for countries. Today the main driver of production, especially in developed countries, is invisible. This driver is named IC and there are some challenges to report and manage this production factor (Bismuth & Tojo, 2008). It is not easy to capture sufficient IC information from financial statements.

In this chapter, it will be focused on the importance of IC at the firm level. The purpose of the chapter is to review the IC literature and to highlight the importance of IC for market value and financial performance of firms. The business environment has changed from the transaction of tangibles to a knowledge-based business environment that heavily depends on intangibles. This new business environment requires considering intangible assets to determine the valuation of firms. It is vital to improve intangibles to move from a production based economy to a knowledge-based economy and to ensure sustainability in the medium and long term.

Especially, we could observe the change to a new business environment in developed countries. Guthrie and Petty (2000) report that there were eight capital-based firms in the top ten firms of Australia in 1980. This number decreased to four in 1987, and two in 1998. This sharp decrease indicates the trend of capital-based firms to service-based ones. As a first in the world, a company (Skandia) established IC function, which is headed by a director in 1991 (Edvinsson, 1997).

Edvinsson (1997) explains the importance of IC using a metaphor of a tree with roots and fruits. To have a tree with fruit is very important, for sure. But it is more important to have a tree with strong roots for sustainability. Management of the firm should focus on nurturing the roots rather than harvesting the fruit. IC is not easily observable, but it is vital for the sustainability of the organization. If the company management, which focuses on fruits by neglecting the roots, sees that the crop they receive has decreased after a while and investigates the reason, it will not be easy for them to treat it if they determine that there is a problem caused by the roots.

All companies produce goods and/or services with their resources. IC is probably one of the most important sources to carry the company to a better position. However, it is difficult to provide adequate empirical support because of some reasons. First, it is not clear how to measure the IC. Edvinsson and Malone (1997) simply define the IC as the difference between book value and market value of a firm. But this measure could not explain the magnitude of the IC due to the important factors which are mentioned below. Second, many firms are not willing to disclose their IC. Third, the financial statements which report the IC are not sufficient to understand everything regarding these firms. Cuozzo, Dumay, Palmaccio, and Lombardi (2017) analyze 246 IC articles from two specialist and eight generalist journals over the period 2000 and 2017 to exhibit major themes of IC studies, investigate the theory evaluation, and guide to future research. They criticize using only annual reports for IC studies and recommend different data sources to reveal hidden, interesting, and new information about the issue. Traditional financial reporting is not adequate to catch the exact information about IC and its components.

Integrated reporting (IR) is the first disclosure instrument that requires information about IC. Because of its comprehensiveness and convenience of the needs of all stakeholders, it is spreading fastly. IR involves three constituents of IC named as structural capital, human capital, and relational capital. So, it will be easier for investors to get information about companies' IC sources. It is expecting that IC resources will be more important for all parties interested in the sustainability of the company. Lastly, the language in the academic world is not standardized related to this research field. Cuozzo et al. (2017) draw attention to the difference in the language between American and European and Australian researchers. While European and Australian researchers use the "intellectual capital" term, American researchers use the "intangible assets" term for the same concept. In this chapter, "intellectual capital (IC)" and "intangible assets" will be used synonymously.

Martin-de Castro et al. (2019) who examine the development of IC studies comprehensively to understand its nature and its implications, divide the process into three main stages: the development of business focus (1990–1999), IC management and measurement models (2000–2009), and IC in practice (2010–2016). They exhibit four areas that are expected to improve in future studies: IC measurement, IC disclosure, IC in a new business environment, and its role in human resources applications.

Dumay (2012) points out the danger regarding the legitimacy of the IC concept due to the lack of enough empirical support. The empirical findings do not show that the companies use the IC as a driver of the value creation process. He associates this problem to the barrier effect of two seminal IC theories which are not proved in practice.

After the introduction section, the remainder of this chapter proceeds as follows. Section 2 exhibits the different definitions of IC. Section 3 introduces the discussion of major IC theories regarding its effects on market value and financial performance. Section 4 presents the different measures which are widely used. This section also explains the Value-Added Intellectual Coefficient (VAIC) measure briefly. Section 5 reviews the literature, and the final section is the conclusion.

2 Definition of Intellectual Capital

There are different perspectives on the definition of IC in the literature. But many scholars agree that the IC is invisible, difficult to measure, and an important factor that positively affects the value and performance of a firm although it could not be seen in the balance sheet directly.

Edvinsson and Malone (1997) simply define the IC as the difference between book value and market value of a firm. Another measure is Tobin's Q, the ratio of market value to book value, to determine the IC (Edvinsson, 1997). The difference between book value and market value is called goodwill by Horibe (1999) and he reports that the book value is 62% of a firm's worth in 1982 while this ratio is 38% in 1992 for manufacturing firms. This determination shows the increasing importance of invisible assets in the worth or market value of firms. It is expected to observe this effect in the service sector than in non-service sectors. However, this simple definition is not trustable because of two reasons. First, the book value of assets is generally not the fair value of them. Second, the value of liabilities may change in time and this changes the book value of equity.

Hall (1992) classifies IC as assets and skills. Assets that are under legal protection include trademarks, patents, copyright, registered designs, contracts, trade secrets, reputation, and networks. The oldest one of intellectual assets is trademarks, which are based on Roman law. And the first patent belongs to Phillipo Brunillesci who invented a floating crane in Venice. IC, which are skills, involves know-how and culture. The main characteristic of assets is belongingness while skills may leave in a takeover. Hall (1992) entitles the assets as people independent, and the skills as people dependent.

According to the most known definition of Stewart (1997), IC is the sum of everything and everybody that provides a competitive advantage to the company. Stewart (1997) defines the IC as the composition of knowledge, intellectual property, intellectual material, experience, and information that can be used to create wealth. Dumay (2016) replace "wealth" with "value" in this definition. He defends this approach with two arguments. First, he indicates that most IC theoreticians and practitioners refer to "value-creation" rather than "wealth-creation." Second, he highlights that the IC measurement unit is not always money which is the only measure of wealth. He also defines four kinds of value: monetary value, utility value, social value, and sustainable value. Monetary value is essential for other forms of value. The creation of monetary value is important and essential, but not the priority of operation when we consider the long life of an organization. Utility value is the usefulness of organizations' products. Social value is the benefit of an organization to society. Sustainable value is the ability to satisfy the needs of society without compromising the future generations.

Sveiby (1997) describes three dimensions of IC: internal structure, external structure, and employee competence. Employee competence is the ability to create tangible and intangible assets, and is directly related to employee skills, education, and experiences. It is the main component due to the impossibility of a company without employees. Several compensations to employees are the invisible financing of this component. Internal structure involves systems, models, concepts, and patents that are owned by firms, but created by employees. Organizational culture is also considered a part of the internal structure. The external structure is defined as the relationships with customers and suppliers, and comprises reputation, brand, and trademarks.

Edvinsson (1997) divides IC into structural capital and human capital. Structural capital comprises organizational capital and customer capital. Organizational capital involves innovation capital and process capital. Structural capital may be owned by a firm. But human capital is got out of hand when the employee goes home. The company leadership should make all the necessary efforts to transform human capital into structural capital. Company leadership should know that human capital that cannot be converted into structural capital will be a heavy loss for the company due to the many costs incurred in human capital.

Bontis, Keow, and Richardson (2000) identify the IC as the compound of customer capital, structural capital, and human capital. Customer capital is closely related to the marketing process and customer relations. Structural capital is a nonhuman knowledge store of the firm as a system, databases, and anything which adds value to the firm. Human capital means the value creation capability of employees for the firm. Employees may acquire this capability through experience, education, and genetic inheritance. Bontis et al. (2000) highlight the importance of human capital in the keystones of IC.

3 Discussion of IC Theories

Dumay (2012) discusses two major theories that try to explain the interest in IC. The reason for choosing these two theories is stated as the identification of the most cited books and articles referring to these theories with the IC literature and the fact that these theories are still discussed by the authors who do not defend the vitality of IC. He classifies these theories as grand theories that are formulated by generalizing and abstracting the relationships and ideas rather than arriving with empirical findings.

The first of these theories consider IC as the difference between book and market values (Lev & Zarowin, 1999; Mouritsen, Larsen, & Bukh, 2001) and this difference is affected by the improvement of IC. This idea was supported by the increase in the difference between book value and market value in the 1980s and 1990s. Lev (2001) exhibits that the mean market-to-book ratio of S&P 500 companies increased from 1 to nearly 6 between the early 1980s and March 2001. He reports that only one dollar of each six dollars market value appears in financial statements while the other five dollars represent intangibles. The huge market-to-book ratios of firms encourage the interest in IC (Stewart, 1997). Dumay (2012) argues that the difference between book and market values could not represent the IC, which is not provided in financial reports. Because the market value of assets is generally higher than their book value and a part of the difference between book and market values of equity should be referred to these assets rather than IC. Brennan and Connell (2000) also criticize this theory by indicating three important weaknesses. First, the difference cannot completely be based on the value of the IC because of the anomalies arising from the cost accounting system. Second, the share price fluctuations lead to changes in IC value. Third and the last, the difference does not make sense about the components of IC.

The second theory argues that IC disclosure causes greater profitability by reducing the cost of capital. Bismuth and Tojo (2008) argue that many firms are forced to improve their IC and use it efficiently to gain more profit. They suppose that sufficient information about intangible assets helps investors to decide by reducing information asymmetry. If investors find the future earnings and risk predictable, market liquidity increases and secure funds at a low cost of capital becomes available. Bozzolan, Favotto, and Ricceri (2003) argue that information about intangibles is one of the five kinds of information from the stakeholders' perspective by considering interviews which are conducted by Pricewaterhouse Coopers. Yao, Haris, Tariq, Javaid, and Khan (2019) argue that the positive effect of IC on financial performance depends on the use of intangible assets. Because of the difficulty of evaluating these resources, the relationship may not be linear. Their empirical research indicates that the relationship is inverted U-shape and supports the idea of a nonlinear relationship. Dumay (2012) also suspects this theory because of the unwillingness of many companies to disclose their IC. He remarks on the reasons for this fact as biased information disclosure, willingness of only particular firms for IC disclosure, and difficulty in maintaining a relationship between IC and value creation.

The firms tend to disclose the biased and positive information which is beneficial for them rather than unbiased and negative information which may be harmful. It is clear, negative information causes a loss of capital and a decrease in the market value of firms. Dumay and Tull (2007) examine the disclosures that are classified price sensitive in the Australian Stock Exchange. They have classified these disclosures in terms of their character (bad and good news) and components of IC (structural, human, and relational). They investigate the effect of disclosure on the abnormal return of share price by using the event study method. The findings indicate that the announcements which are classified as bad news negatively affect share price, while the relationship between good news and share price is positive. The second reason for the invalidity of the theory is that only particular firms are willing to IC disclosure. If the theory was valid and IC disclosure was reducing information asymmetry, almost all firms would be eager to disclose about IC, but it is not. Mouritsen et al. (2001) argue that IC is principally related to organizational, human, and customer resources of the firm. And they also mention that the access to low-cost financial resources is not the reason for IC disclosure. Bruggen, Vergauwen, and Dao (2009) emphasize that the IC disclosure decision is not the result of the effort of reducing information asymmetry. Thirdly, Dumay (2012) compares IC investment with gambling. In gambling, if you invest more, the possibility of winning would increase. In their example, Dierickx and Cool (1989) also compare firms that continue to invest in R&D with those hoping to win the big jackpot.

4 Measurement of IC

Despite the increasing attention to the effects of IC on market value and financial performance of firms, a convenient measure is still unavailable. The simplest way to measure IC is the difference between book and market value of equity. But this approach involves many problems. First, this difference cannot be completely attributed to IC. A part of the difference may be related to the nonrealistic value of tangible assets. The second problem is related to market value, which is shares outstanding multiplied by the share price. The share price changes at any time and not stable to determine the IC (Brennan, 2001).

Another approach bases on the measurement of hidden assets with the Skandia Navigator, which is first used by a Swedish company, Skandia. Edvinsson (1997) briefly clarifies the six focus areas of this approach by comparing it to a house. The roof is the financial focus. Walls are process focus and customer focus. The soul is the human focus. And the platform is a renewal focus and development focus which are highly critical for sustainability. This measurement method is not convenient due to the unavailability of the required information in terms of external users (Brennan, 2001).

Pulic (1998) and Pulic (2004) suggest one common indicator called Value-Added Intellectual Coefficient (VAIC) to provide information about the value creation efficiency of three major components of IC: capital employed, human capital, and structural capital. The VAIC is the sum of these three measures' efficiencies and the higher VAIC means value creation efficiency is higher. Firer and Williams (2003) emphasize two advantages of using VAIC as the indicator of IC. First, this measure is a standardized measure to compare firms and countries. Second, the data depends on financial statements that are audited by professionals.

The determination of VAIC has simply three steps. The first step is the definition of value added (VA). Secondly, capital employed (CE), human capital (HU), and structural capital (SC) should be calculated. Lastly, the components of VAIC, value-added efficiency of capital employed (CEE), value-added efficiency of human capital (HCE), and value-added efficiency of structural capital (SCE) would be calculated.

The VA is the difference between output and input according to the stakeholder view. A broader measure of VA measure is the firm performance in terms of all stakeholders while accounting profit considers the returns to stockholders only. The calculation of VA may be stated as Eq. (1) where R is a change in retained earnings; S is sales; C is costs of goods sold; DP is depreciation; W is wages; I is interest; DD is dividend; and T is tax.

$$R = S - C - \mathrm{DP} - W - I - \mathrm{DD} - T \tag{1}$$

When we arrange the equation, we achieve Eq. (2) where both sides of the equation represent the VA to employees, lenders, governments, and stockholders.

$$S - C - \mathrm{DP} = W + I + \mathrm{DD} + T + R \tag{2}$$

After rearranging the equation by accepting that the sum of dividends and retained earnings is equal to net income (NI), value added to stockholders would be seen clearly.

$$\text{Value added (VA)} = S - C - \mathrm{DP} = W + I + T + \mathrm{NI} \tag{3}$$

Pulic (1998) and Pulic (2004) calculate CE as the sum of physical capital and financial assets. So CE is total assets minus intangible assets. HU is the total expenditure on employees. And the SC is the VA minus HU.

Three VAIC components are calculated as in Eqs. (4)–(6). CEE and HCE are the efficiencies of each dollar that is invested in tangible assets and employees, respectively. Finally, the VAIC measure is the sum of all these three components.

$$\mathrm{CEE} = \mathrm{VA}/\mathrm{CE} \tag{4}$$

$$\mathrm{HCE} = \mathrm{VA}/\mathrm{HU} \tag{5}$$

$$\mathrm{SCE} = \mathrm{SC}/\mathrm{VA} \tag{6}$$

$$\mathrm{VAIC} = \mathrm{CEE} + \mathrm{HCE} + \mathrm{SCE}$$

Chen, Cheng, and Hwang (2005) argue that the structural capital measure is incomplete, while the other two components are convenient. They propose to use advertising and R&D expenditures to capture the remaining information about structural capital and confirm that R&D expenditure has a significant positive effect on profitability and market value.

Along the advantages of VAIC, it contains some limitations. The most important limitation is that VAIC does not include relational or customer capital which is the main part of IC theoretically. To avoid this limitation, some scholars adapt the original VAIC measure by adding relational capital efficiency (RCE). In this approach, the modified VAIC (MVAIC) is the sum of CEE, HCE, SCE, and RCE (Yao et al., 2019). RCE is relational capital (RC) divided by VA and RC is the sum of marketing, advertising, and selling expenses. Nimtrakoon (2015) also adopts the VAIC measure by adding RCE which is marketing cost divided by VA.

$$\mathrm{RCE} = \mathrm{RC}/\mathrm{VA}$$

$$\mathrm{MVAIC} = \mathrm{CEE} + \mathrm{HCE} + \mathrm{SCE} + \mathrm{RCE}$$

Ståhle, Ståhle, and Aho (2011) criticize the VAIC methodology in different aspects. They argue that the VAIC measure has not enough information about IC and only indicates the efficiency of capital investments and labor. On the other hand, they assert that the components of VAIC are overlapped and have serious problems regarding validity.

Maditinos, Chatzoudes, Tsairidis, and Theriou (2011) mention the failure of VAIC measure to determine the IC efficiency due to the inconsistent results of empirical studies. They also suggest that the VAIC measure disregards the firm risk. They argue that the VAIC methodology fits developing countries better than developed countries. The main reasons are the easy implementation and basic financial reports requirements.

5 Literature Review

The first studies on this issue serve theoretical background or empirical evidences, which are dependent on surveys or former IC measures. Hall (1992) reports the results of a national survey that addresses 847 CEOs in the United Kingdom to assess the relative contribution of IC factors on business success. According to the results, reputation and know-how are the most important factors in business success. They conclude that analyzing intangible assets is an important factor in the management process in terms of theoretical and empirical perspectives.

IC reporting system of Australian firms is examined by Guthrie and Petty (2000). They conclude that the basics of IC are not understood well and not reported in a good framework. According to the paper, IC reporting considers intellectual property rights, human resources, and organizational environment as the components of the IC. They compare Australian and European firms and deduce that the ability of European firms outperforms to reflect their IC to annual reports.

Using a survey of 107 respondents, Bontis et al. (2000) investigate the effects of different dimensions of IC on Malaysian firms' performance. Their results indicate that human capital has significant effects on customer capital and structural capital for both service and non-service industries. However, the effect of human capital is greater for the service sector as expected. They also conclude customer capital has a significant effect on structural capital regardless of sector. Finally, structural capital has a significant effect on performance.

Brennan (2001) investigates the market values, book values, and annual reports of 11 knowledge-based Irish companies. Their results show that there are significant differences between book and market values. It is found that the level of IC is at an important level and the annual reports are not enough to disclose the IC. The empirical findings related to the effects of IC on market value and financial performance have become plentiful after the development of VAIC measure. Most of the studies have been conducted in service industries that are expected to be under more influence of IC.

Nimtrakoon (2015) examines whether IC efficiency may affect the market value and financial performance of ASEAN firms in the technology sector using the MVAIC measure as the indicator of IC efficiency. She could not find any significant differences in MVAIC measures across countries in the sample while the effects of the components are different. The study concludes that IC has positive effects on market value and financial performance. According to the results regarding the effects of MVAIC components, CEE and HCE are more influential than SCE and RCE on MVAIC.

Ozkan, Cakan, and Kayacan (2017) have made an attempt to investigate the relationship between IC and financial performance over the period 2005 to 2014 using the data of 44 Turkish banks. They calculate the IC by VAIC measure and conclude that VAIC has not statistically significant effect, but CEE and HCE components have positive effects on financial performance while CEE has a more significant effect compared to HCE. The findings also show that HCE is the most important determinant of VAIC.

By considering the knowledge-based nature of financial institutions, Yao et al. (2019) studied the effect of IC on the performance (profitability and productivity) of 111 Pakistani financial firms between 2007 and 2018. By using VAIC and MVAIC as the measure of IC, they conclude that the relationship is inverse U-shape. This means the increase of IC efficiency leads to an increase in performance, but after a certain level, the sign of relationship changes, and an increase of IC efficiency decreases the performance. The findings of the study confirm that the human capital component of IC is the most effective factor in the performance of financial institutions. This study provides evidence about the existence of a certain level of IC for performance.

Some researches on non-service industries have been also conducted. But their findings are not as clear as the studies from service industries. Using VAIC measure for 75 publicly traded South African firms, Firer and Williams (2003) study on the relationship between IC and traditional performance measures: market valuation, productivity, and profitability. Their results suggest that the physical capital component of IC has a significant effect on performance. The other results are mixed and do not confirm the expectations.

Chen et al. (2005) investigate the relationship between the IC and market value and financial performance of Taiwanese companies using VAIC measure. The results indicate that IC affects market value and financial performance positively. According to the result of the study, IC may be the leading indicator of future financial performance. They also conclude that the components of the VAIC measure have more explanatory power for the regression between IC and market value than the aggregate measure does. According to this result, they argue that investors pay attention to these components differently.

Maditinos et al. (2011) study the effects of IC on market value and financial performance of 96 Greek companies from four different industries over the period 2006 to 2008. They could not provide evidence to support most of the hypotheses except the positive effects of HC on market value and financial performance. They conclude that investors pay attention to the HC only to determine the market value.

Joshi, Cahill, Sidhu, and Kansal (2013) investigated how financial performance was influenced by IC and its components in Australian financial firms between 2006 and 2008. They found that two-thirds of firms have a low level of IC efficiency and the VAIC measures are different across sub-sectors. Investment firms have a higher level of VAIC in comparison with other subsectors. Dzenopoljac, Yaacoub, Elkanj, and Bontis (2017) examine how corporate performance reacts to IC in the Arab region using VAIC measures. Their results show that SC and CE affect earnings and profitability; HC affects market performance.

Xu and Li (2019) have tried to analyze whether IC may affect the financial performance of 496 SMEs in China's manufacturing industry by using MVAIC methodology. Their results reveal the positive relationship between these variables and CEE, HCE, and SCE are the most important factors while RCE has less influence. They also point out the difference between high-tech and non-high-tech companies. The effects of IC on efficiency and earnings are more significant in non-high-tech companies while the effect of IC on profitability is more significant in high-tech companies.

Bayraktaroglu, Calisir, and Baskak (2019) offer a different modified version of VAIC to measure the IC efficiency by extending the model with customer capital efficiency and innovation capital efficiency. Using the data from Turkish manufacturing firms, the results show that the innovation capital efficiency moderates the relationship between SCE and profitability. It means that the effect of SCE on profitability increases as the innovation capital efficiency increases.

Parshakov and Shakina (2020) develop the criticized aspects of the content analysis method and conclude that companies do not disclose IC at a sufficient level. Their findings are consistent with previous studies that find the financial statements incomplete for the information of IC. Salvi, Vitolla, Raimo, Rubino, and Petruzella (2020) also use the content analysis to investigate the effect of IC disclosure on the cost of capital. Their findings indicate that IC disclosure affects the cost of capital negatively. They attribute the inconsistent results in previous studies to the lack of sufficient IC information in the traditional financial reports and difficulty to collect the information from different sources. Integrated reporting has the potential to eliminate the inconsistency in the literature by providing information that will allow us to observe the relationship clearly.

6 Conclusion

The importance of IC studies has sharply increased over the last few decades. However, it is difficult to provide adequate empirical support because of some reasons. First, it is not clear how to measure the IC. Second, many firms are not willing to disclose their IC. Third, the financial statements that report the IC are not sufficient to understand everything regarding these firms. Lastly, the language in the academic world is not standardized related to this research field. While European and Australian researchers use the "intellectual capital" term, American researchers use the "intangible assets" term for the same concept.

Although there are different views about the definition of IC in the literature, many scholars agree that IC is invisible, difficult to measure, and an important factor that positively affects the value and performance of the firm although it could not be seen in the balance sheet. There is also a consensus on human capital, structural capital, and customer capital components of IC.

The theoretical background points out two significant relationships between IC and market value, and financial performance. But this theoretical expectation needs more empirical supports. Up to now, empirical results are inconsistent in different countries and sectors. Besides some of the studies suggest a linear relationship, some of them argue a nonlinear relation between the variables.

Despite the increasing attention to the effects of IC on market value and financial performance of firms, a convenient measure is still unavailable. The most useful measure is VAIC and its modifications. However, these measures could not satisfy the needs exactly. Further researches should criticize the measures correctly and make effort to adapt these measures to the knowledge-based business environment.

On the other hand, if you have a convenient measure, it is difficult to obtain confidential information about IC. It is known that financial statements do not meet the information requirements. Integrated reporting (IR) appears to be an important and useful tool to meet this deficiency. IR outperforms other types of reporting documents by combining both financial and nonfinancial information to explain the value creation exactly.

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Strategic Decisions and Agile Decision Sets in Energy Investments

Sebahattin Kılınç

Abstract Strategic decision-making has become a matter of primary importance in management. The uncertainty nature of the competitive environment has increased the difficulty of decision-making process for leaders in business. Information technologies are changing rapidly, and new situations arise. As a result, finding the best option for decision makers is very difficult. Since the decision-making process expresses a result, it is seen as a unique event, and for this, it may sometimes mislead parties. However, when the leader expresses the decision, it seems like one process. For this reason, it is important to study this process. Energy demands of countries are changing rapidly in parallel with development, industrialization, urbanization, the spread of technology, prosperity, and population growth. Energy, which is an indispensable resource for sustaining the economic developments of the countries and ensuring the modern living standards, should be supplied in a continuous, safe, and low-cost manner. Because energy has an important place in production activities, it is one of the most important factors that determine the international competitiveness of countries. The limited energy resources in the world and the increasing energy demand increases the importance of the energy policies of the countries. Within the scope of the research, strategic decision-making processes, importance and features of the energy sector, strategic management, and application examples in the energy sector are examined.

1 Introduction

Strategic management has gained importance in the face of increasing competition all over the world. All organizations operating not only in the private sector but also in the public and third sectors (nonprofit voluntary sector) have started to pay more attention to strategic thinking, strategic planning, and strategic decision-making in the face of globalization and competition. Indeed, before 1980s, strategic

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management was known and implemented only by multinational companies, large conglomerates, and companies in the private sector, while today many organizations use strategic management as a tool. The different definitions for strategic management in the literature are due to the various approaches to cope with the strategies. The strategic management is mainly defined as a process, directed by top management to determine fundamental aims or goals of the organization, and ensure a range of decisions that will allow for the achievement of these aims or goals in the long term, while providing for adaptive responses in the short-term (1) Firms in the energy sector aim to complete the process of strategic management like their competitors. They will achieve their goals and respond to the differences in the market to develop the firm. The strategic management process should involve some titles: (Seidel, 2007) (1) Clarifying the aims and goals, (2) Analyzing the Environment, (3) Explaining the possible relevant school programs, (4) Strategic Analysis, (5) Competitive Strategies, (6) Predicting the future, (7) Determining the strategies, and (8) Applying the Strategies (Seidel, 2007).

Strategic management is a management technique that enables the determination of future goals and objectives in all businesses operating in the private, public, and nonprofit third sectors and determining what needs to be done to achieve these goals (Yener & ve Arslan, 2019). Decisions to be taken in business management can be grouped under two headings. The first of these are the decisions that must be taken to run daily routine jobs and their effects are limited to the short term. The second one is to make decisions about important strategic issues that will affect the future of the business. The effectiveness of the current and future performance of the business depends on the effectiveness of such managerial decisions. Successful organizations are organizations that can make better and faster decisions and implement these decisions more quickly.

Strategic decision-making has become a matter of primary importance in management. The uncertainty nature of the competitive environment has increased the difficulty of decision-making process for leaders in business. Information technologies are changing rapidly, and new situations arise. As a result, finding the best option for decision makers is very difficult. Since the decision-making process expresses a result, it is seen as a unique event, and for this, it may sometimes mislead parties. However, when the leader expresses the decision, it seems as a one process. For this reason, it is important to study this process.

Energy demands of countries are changing rapidly in parallel with development, industrialization, urbanization, the spread of technology, prosperity, and population growth. Energy, which is an indispensable resource for sustaining the economic developments of the countries and ensuring the modern living standards, should be supplied in a continuous, safe, and low-cost manner. Because energy has an important place in production activities, it is one of the most important factors that determine the international competitiveness of countries. The limited energy resources in the world and the increasing energy demand increases the importance of the energy policies of the countries.

Within the scope of the research, strategic decision-making processes, importance, and features of the energy sector, strategic management, and application examples in the energy sector are examined.

2 Literature Review

2.1 Strategic Decision-Making Processes

Strategic decision-making is considered in conjunction with the potential to create not only the current position but also the future position in the competition. However, creating a future position involves a difficult process, or it is not easy to express the strategic decision-making process theoretically and practically. The main reason for this is the multiplicity, diversity, and quality of the factors affecting the process (Papatya & Uygur, 2019).

The increasing importance of Energy and Environment issues from the 1970s to the present has brought another issue to the agenda as well as performance measurement in the studies conducted on these issues; “Energy and Environmental Decisions.” In general, energy and energy-related environmental issues are complex and contradict many goals. Often, they involve a large amount of uncertainty, long time frame, capital intensive investment, and many different interest groups, each with a different trend (Zhou, Ang, & Poh, 2006).

Due to these features of Energy and Environment issues, the decisions to be taken on these issues are in a structure that combines more than one purpose, criterion, or quality. As of these structures, Energy and Environment decisions are included in the field of application of decision analysis, which is one of the subjects of Management Science. Decision analysis can be defined as a method to propose various action styles by examining the problems that may be encountered in decision-making process in businesses by using mathematical models, numerical, and statistical techniques (Yener & ve Arslan, 2019). Decision analysis techniques find application areas in many subjects such as human resources management, financial management, and production management. This is also the case for businesses operating in the energy sector. Since the 1960s, studies have been carried out using decision analysis techniques in many areas such as planning, investment, technology selection, project evaluation, and determination of environmental policies (Atıcı & Ulucan, 2009).

Decision-making, defined as the heart of business execution, is vital for organizations. The reasons why the concept of SDM is so important for organizations can be listed as follows (Verma, 2014):

- Management functions cannot be implemented properly without organizational decisions.
- No function can be performed without a decision.

- Decisions are taken for specific purposes and the degree of achievement of these goals evaluates managerial performance.
- It helps to create plans and policies.
- Considering the advantages and disadvantages, it ensures the selection of the best alternative.
- Right decisions ensure successful activities in organizations.

In this section on the analysis of the concept of strategic decision-making (SDM), the main reasons, concept components, theories, models, and approaches of SDM will be discussed and examined.

2.2 Significance and Main Justifications

Business executives are faced with an ongoing decision-making situation to continue their activities and to sustain their existence accordingly (Arslan & ve Yener, 2020). Even the smallest activity of the business is the result of a decision. In times when the rate of change and uncertainty are low and the competition is not intense, business managers can continue their existence with the traditional decision they made for the short-term future. However, with the industrial revolution, factories have increased, mass production has started, and decision-making has become more complex.

Moreover, the rapid spread of globalization and the speed of development in technology have further increased the environmental uncertainty and consequently the risk factor (Yener, 2018). All these situations prompted business executives to search for a new concept for performing their decision-making activities. Strategic decision-making appears as the matured concept of this quest. However, at this point, it would be appropriate to explain the following issues: Where the concept of strategy exists, there must be competition and uncertainty. The strategy requires distant and long-term decisions focused on the outcome determined to achieve the goals, also by examining the activities of competitors. As a result, businesses must be strategic when making decisions for the long and long-term future in today's environment where uncertainty and risk factor are intense. Strategic decisions must incorporate basic features such as being creative and innovative, change oriented, sustainable, and effective. These basic features are tried to be analyzed in titles in the continuation of the study (Papatya, 2007).

2.3 Sustainability

Business managers, technological, economic, and ecological environment etc. for the sustainability of decisions. Factors must consider. Because the effect of an unsustainable activity and a decision made will be low. Sustainable impact will both reduce the cost burden of the business and create an operational advantage (Papatya, 2007).

The ability of the company to reach sustainable resources and markets means being able to compete and sustain competition. It is envisaged that the enterprise will do some strategic tasks and activities immediately. In other words, besides doing the requirements of the current change, the business must read the change trends of the future, produce the innovation needed, have strategic cooperation that will create energy and manage the relations, develop the resources and basic skills, create a strong information system that will process the data, and perform some basic tasks and studies.

2.4 Change Direction

In today's world, where the pace of change is high, the decisions taken by the enterprise for the long and long-term future are focused on change and development. Considering that the change itself changes, the enterprise is expected to perform change constantly and persistently in the face of ever-changing expectations, needs, products, processes, spaces, environments, and mentalities. This is possible by the fact that the business reads the future and is different from the competitors (Papatya, 2007). Being change oriented is an approach that responds to the performance goals of the business such as the creativity and market advantage of the employees. Everything must compete with itself and in any condition that takes place outside of itself, and in each stage, it needs to be better, more competent, and different than the previous stage. The continuous change and development effort coincide with the "Kaizen" approach, which is one of the most important principles of the Japanese management philosophy.

Victor H. Vroom emphasized that the effectiveness of the decisions made can be measured by decision makers reaching the right results (Vroom, 1973). Effective decision is about the manager's determining the correct goals and using the resources at the right place and time to achieve these goals. Ensuring that the resources are used at the right time and in the right place can be considered as a process of guessing the future and carrying out behavior toward minimizing potential risks under conditions of uncertainty (Özdemir, Yüksel, Gümüşoğlu, & Şevkinaz, 2007). Effective decision process depends on an effective management approach. For effective management, business managers must be competent and sufficient in terms of knowledge and application in production, finance, and marketing.

2.5 Decision Environment

Managers must consider the current environment in the decision-making process. Decision-making environment is examined in two ways: The first one is in terms of the decision maker/s, and the second one is the current environment and conditions during the decision-making. Whether the decision maker is a single individual, or a group greatly affects the decisions. Because, if the decision maker is the only individual, the decision is limited by the individual's instincts and personal abilities. A decision-making group is enriched by their different instincts and abilities. On the other hand, the current conditions are very important at the decision stage. Because the decision is a future-oriented concept, it is the business of deciding and planning what to do in the future. In this case, managers face environments of uncertainty, risk, and uncertainty (Karalar, 1999). The details are given in Table 1.

2.6 Natural Gas in the World

Natural gas is one of the fossil fuels that have an important share in the world's primary energy consumption. 23.4% of the world's primary energy consumption in 2017 was provided by natural gas-sourced fuels. In long-term projections, it is predicted that natural gas, which has become widespread throughout the world since the 1990s, will be the only fuel among fossil fuels whose consumption share will increase. As of the end of 2017, the proven natural gas reserves amounted to 193.5 trillion m^3. Approximately 58% of this amount is in four countries (Russia, Iran, Qatar, Turkmenistan) that can be considered close to each other.

In 2017, natural gas production increased by 130.6 billion m^3 (3.68%) compared to 2016, reaching around 3.680 billion m^3. Approximately 37% of the world's natural gas production was realized by Russia and the USA in 2017. When Iran and Qatar are added to this group, it is seen that the total natural gas production of four countries realizes almost half of the global production. Qatar largely liquefies its natural gas (converts it into LNG) and transports it to other countries through the Strait of Hormuz. Russia and Iran mostly export through pipelines.

According to 2017 world natural gas consumption data, 32% of approximately 3.670 billion m^3 consumption was realized in the USA and Russia. Total consumption increased by 96 billion m^3 compared to 2016, and within the scope of clean energy policies, China made a significant contribution to the growth of consumption with an increase of approximately 31 billion m^3. The needs of the largest natural gas in which Turkey belongs in the European continent. In 2017, approximately 242 billion m^3 of production was carried out on the continent, and approximately 532 billion m^3 of consumption was achieved and 304 billion m^3 of natural gas was supplied from outside the continent.

Turkey's natural gas consumption of the population in a way that is proportional to the growing industrialization and urbanization. Consumption rate of Turkey's

Table 1 Strategic decision-making environments

Environments	Explanation
Ambience environment	It is an information environment in which the decision maker is previously known for each alternative or strategy. Managers can accurately predict the results in a certain environment. However, when it is desired to foresee a distant and long future, this will not be so comfortable. There are many environmental changes and impacts. In this respect, it is not realistic to approach decision-making in certain conditions. However, any meaningful data generated and obtained in the market can be an important guide in the decision phase. These data can be versatile and dimensional. For example, by analyzing the data obtained from the market with various statistical analyzes, it is possible to meet the market demand in the most efficient way by trying to determine the relations with the market variables.
Environment	Average, standard deviation, and coefficient of variation are referred to as evaluation statistics related to managerial decisions that provide an expected return or assessment of risk. Risk is the situation where each alternative is known to have a certain result, but these known results are only probabilities. Risk can result in harm or benefit. It is the risk environment that determines the risk. In general, risk environment is the environment where it is not possible to calculate objective probability values. In this environment, the decision maker decides with subjective possibilities based on his/her experiences and personal opinions. The accuracy of the decision is also an indicator of the advantage.
Environment of uncertainty	While knowing that certain options will have certain results, they are situations where the possibilities for these results are unknown. It is not denied that every decision will have certain results in an environment of uncertainty. However, the possibilities for these results are unknown. Accordingly, managers cannot measure which decisions and strategies are better than others and cannot implement the strategy that is superior to others. In an environment of uncertainty, decision makers must make decisions with insufficient and scarce data. In general, in the environment of uncertainty, the decision maker must calculate each alternative based solely on its worst return. If the choice is made on the worst return of the alternative to be chosen, every result to be obtained other than this result will be more positive.

Reference: Karalar (1999)

natural gas production, although usually less than 2%, in 2017 this rate was realized as 0.66%. Natural gas production, which was around 969 million m^3 in 2008, declined to 354 million m^3 in 2017. Turkey has made a breakthrough in natural gas distribution in recent years. While natural gas could be distributed in only six provinces prior to 2001, at the end of 2017, natural gas distribution could be made in all provinces except Artvin, Şırnak, and Hakkari.

Although the countries with the highest natural gas reserves around Turkey do not meet even 1% of the annual consumption of about 18.5 billion m^3 of reserves and low production. The production amount, which tends to decrease continuously after the production of 969 million m^3 in 2008, was realized at the level of 354 million m^3 in 2017. 53.9 billion m^3 of natural gas consumption in 2017 was the highest increase in the history of Turkey consumption by approximately 15% compared to the previous year. An important reason for this increase is that natural gas power plants work more than expected to close the gap, as hydroelectric power plants produced far below average in 2017. This role of natural gas in electricity generation raises the issue of implementing different mechanisms.

2.7 Oil Reserves and Production in the World

The size of the world's crude oil reserves as of 2017 1.7 trillion barrels in total. Regional basis of the Middle East as of the end of 2017, the world's largest oil reserves It seems to have part of it. Reserve size idle East, Central and South America, and North America. It is followed. Venezuela, Saudi Arabia, Canada, Iran, Iraq, Russia has the world's largest proven oil reserves those countries. 70% of the world's oil reserves OPEC, which includes predominantly Middle Eastern countries in the country. The average life of the world's petroleum reserves in 1980 While 30 years, the newly found reserves in countries in the Middle East an average of 43 years in the 1990s, in 2008–2009 With the effect of reserves discovered in Venezuela, It has increased to around 50 years.

The regions where oil is produced the most are North America and the Middle East. From 2000 to 2017 much of the increase has been covered by the Middle East, the Commonwealth of the United States (CIS), and North America. According to the International Energy Agency (IEA) data, world oil production was 92.4 million barrels/day in 2016 and it is estimated that this value will increase to 101.9 million barrels/day in 2040. In 2017, oil consumption was 98.2 million barrels/day. The oil consumption since 1980 compound annual growth rate is about 1.3%. Top 10 oil consuming countries in the World Its share in the total is around 60%. When these countries are evaluated in terms of GDP size, it is noteworthy that it is among the largest economies in the world. According to USA-EIA data; in 2016 year 43% of oil consumption is transportation, 19% petrochemical and industry, 14% buildings and electricity production, the rest aviation, etc. It has been used in other industries. When the average costs incurred by oil producing countries to produce a barrel of oil are examined; -most the Middle East, which includes Kuwait, Saudi Arabia, Iraq and Iran, countries; It draws attention that the costliest countries are America, Venezuela, Norway and Mexico.

New investments for oil production will continue in the 2018–2030 period. To be obtained from new fields the production cost of oil per barrel will also vary between regions. Oil after new investments the cost of producing is estimated to be between 20 and 65 dollars/barrel.

2.8 Electricity Sector in Turkey

Turkey's electricity sector, security of supply policy centered approach is developed in accordance to contribute to economic growth and prosperity of the country. In Turkey for a long time, the public electricity service provider operating in the hand of a vertically integrated structure is presented. Electricity production and distribution activities were separated in the 1990s, initiatives were initiated for private companies to participate in the investment and operation process and various models were tried. With the legal regulations and decisive liberalization steps in the early 2000s, the electricity sector has evolved into a competitive model in which current multi-actor and activities are separated.

The liberalization process of the electricity market, which started in 2001 with the establishment of the Energy Market Regulatory Authority (EMRA), entered a new era with the latest regulation in 2013. Within the framework of the Electricity Market Law No. 6446, Enerji Pazarları İşletme A.Ş. (EPİAŞ) was established. In this new period, which started with the establishment of EPİAŞ, financial reconciliation works started to be carried out under EPİAŞ. With the new intraday market (GİP) put into operation by EPİAŞ, estimations of production facilities based on renewable energy sources, which are producing irregularly, have been made during the day.

As of 2018, privatization of electricity generation and distribution activities has been completed. Except for the transmission activity that remains under public responsibility, a competitive environment was ensured with the liberation of end users. Since the transfer of the previous operator, the Market Financial Reconciliation Center (PMUM), EPİAŞ started to manage its day ahead and intraday markets. Balancing power and ancillary services markets run the responsibility of the market, the present system operator in Turkey Electricity Transmission Company (TEIAS) shall be vested. EMRA is responsible for the regulation, supervision, and all licensing work of all activities in the electricity markets, among other energy markets.

Actors of the electrical system are presented in the chart below. Among the duties of EPİAŞ, also called the market operator; there are issues such as making financial settlement transactions related to production and consumption in the electricity market, managing organized markets, recording tradable transactions, and ensuring reliable reference prices.

On the production side in the electricity sector, Elektrik Üretim A.Ş. There are facilities belonging to (EÜAŞ), Build Operate/Build Operate Transfer (BOT/BOT) plants and private sector plants. Turkey EGC share of around 68% in the total installed capacity at the beginning of the 2000s, with the effect privatization of power plants at the end of 2017 It has decreased to 23%. If this share is around 60% of Turkey's total production in 2002 was down to 16% at the end of 2017.

Since the end of the 1990s, power plants within the scope of the BOT and Operating Rights Transfer (IHD), which have an installed capacity of about 3000 megawatts (MW), have been put into operation. The operating period of these power plants by the private sector has ended for some of them, and for some of them will be over in the coming years. A public share increase is expected since these plants will be transferred to EÜAŞ. Although a public share increase is expected due to the transition of these plants to EÜAŞ. It is possible to say that the private sector's share in the electricity portfolio will not decrease due to the expectation that new investments of private companies will be activated and privatization of power plants transferred to EÜAŞ will be made.

System operator TEİAŞ, which ensures the transmission of the generated electricity to the consumer and is responsible for transferring it to the distribution network, is also responsible for the balance of the system and the balancing power market. TEİAŞ continues its activities with its central units and load distribution units spread across the country in accordance with the new market structure within the framework of its transmission license. Turkey's electricity system since 18.09.2010 Date of European Transmission System Operators Network (ENTSO-E) is operated as a synchronous parallel.

In 2004, Turkey Electricity Distribution Company (TEDAŞ) after receiving the scope of privatization, electricity distribution and sale activities are divided into 21 separate distribution areas. With the completion of the tender for privatization of electricity distribution in Turkey between the years 2008 and 2013 it is carried out by 21 private distribution companies. In the past years, distribution companies have also been supplying electricity in the region they oversee. Due to the changing practices over time, the electricity supply duty was separated from the distribution companies and given to the supply companies. Sales authorization was obtained from electricity distribution companies and the power to sell consumers was transferred to electricity supply companies.

Supply companies are divided into two as electricity supply companies and electricity supply companies in charge of their duties. While responsible supply companies can sell electricity to all consumers, supply companies with different licenses can only sell electricity to eligible consumers.

2.9 Strategic Management in Energy Sector

The various concerns related to the energy sector are often dynamic, international, and multi-dimensional because of the vital role of energy both in daily life for each individual and its importance as a valuable source to the production process which exchanges the profits and services (Bhattacharyya, 2007). Billions of people are trying to access reasonable, affordable, and reliable services of energy which is the main difficulty in consistent development (DFID, 2002; EIA, 1998). Three vital points for the countries that have rich resources are: organizing the effects of other producer countries, management of the resources, and sector in the domestic area (Bhattacharyya, 2007). For the last few decades, the energy evolution shows that oil has substituted for electricity worldwide. As the oil lost its market in the 1970s during the oil shocks, it could not regain afterward. The reason for the oil's arising place at the energy consumption level is almost full dependence of the transport sector. Therefore, any kind of alternative applicable substitute in transportation may finish the oil-era. Rising prices of oil encourage to find alternatives (Bhattacharyya, 2007). An applicable substitute in transportation will cause changes in the energy markets. The countries that import the oil will be relieved from concerns about security. Also, the countries exporting the oil will face the end of the limited source (Bhattacharyya, 2007). For both the developed and developing countries those of which face poor resources, there are many different challenges (Bhattacharyya, 2007). The most striking challenges are (Cole, 1997): (1) Tolerating the price shocks and their effects (Bacon, 2005; Robinson et al., 2000), (2) Safety of the energy supply (Toman, 2002), (3) Investments (IEA, 2002, 2003), and (4) Searching for alternative methods for energy access troubles (DFID, 2002; IEA, 2002; WEC, 1999).

Consistent solutions for energy access problem can neither originate from financed energy supply, nor the limited solutions which focus on one side of the problem. Although both resource-rich and resource-poor countries apply various precautions to save environment, high demands with increasing supply set a threat for consuming and producing countries. A major problem is how to meet the needs without negative effects on the environment. When it comes to environmental management and security, transition of the energy and new energy carriers seem to cause extra difficulties. The disagreement about the choice of proper technological devices, adjustive invention, and economic means would go on, yet as there is not a global solution, for now, all the alternatives seem to remain at local level (Bhattacharyya, 2007).

Decentralized and renewable energies rely on “Small is beautiful” view, in contrast to the scope and scale finance-dominated energy area. Our limited information about the management of small energy systems and organization of the activities pose a main obstacle. The management of decentralized systems is not same as conventional approach about providing energy via centralized systems. The necessary skill for such new kinds of activities may be hard to find locally and capacity development is required. Also, since the private investors focus on profitable, high-cost markets, in some areas the failure of market is possible. However, low marginal cost of supply attracts little interest. The intervention of the government is suggested by traditional economics, but governments do not have the skills for the activities of decentralized energy systems. Generally, governments handle the issue in centralized aspect and implement it at all levels. In order to initiate such activities facilities can be provided (Bhattacharyya, 2007). The existence of public good argument (bigger societal benefits compared to the prices of certain technologies like nuclear energy), government intervention in the energy sector framed by ownership or through regulatory prices (Jaccard, 1995).

Although there are some uncertain issues about the timing and form of the next transition, controlling the transition and preparing strategies are still within vital difficulties. Such points trigger some concerns like; the timing of the action, acting in a specific area or not, whether the preferred action would succeed or not, or the alternatives would turn out to be important or not. Oil depletion leads to a general debate on the future energy transition, suggesting that before the depletion of oil, an alternative will take place. An alternative to oil will highly affect the economies of the rich countries in the sector, which may lead to a price war in the market. The price war strategy and a new substitute for oil will cause remarkable changes in the energy sector in the future. On the other hand, experience shows that the experts' consensus view failed to contribute to the energy sector. Just after the oil shocks in the 1970s, the nuclear was estimated to be the fuel of the future, but gas became a more valuable energy carrier instead. Renewable energies failed to penetrate the energy scene. The experts may be wrong. The resource-rich countries have come to the limelight because of the energy scarcity. In order to support the economic growth, the profit from the resource development, leads to the revenue management aspect. As they have limited institutional capacity and economic problems, they have difficulty in using revenues. If the resource development blocks the economic development, the hardship is to reduce the unexpected effects. The search for solutions has not been completed yet, if this decelerates the resource development, new obstacles may emerge both for consuming and for producing countries. While the consumers face the possible high prices, the producers may encounter resource obsolescence. For the consumers controlling the energy price volatility and providing enough supply at the average price seem to be the priority. Additionally, the problem of energy access necessitates new ideas and initiatives. The alternative strategies that rely on overall economic development, selective intervention, free trade, and access to low cost and adjustive technologies may help better. However, with signs of the unsustainable energy practices and the background of the sustained market, failures affect the sector policies, and the sector needs a certain shift to turn to a sustainable way. It can be concluded that, the sector requires to organize in another way and change the policies through the practices at different stages. The most important management challenge is to answer how to manage the sector in a sustainable way (Bhattacharyya, 2007).

3 Discussion and Conclusion

In the competitive environment, which has increased with the effect of globalization recently, it is much more important for businesses to choose and apply strategies that are suitable for them to survive and succeed. The strategic management model helps businesses to systematically analyze the situation, identify themselves and their products, the industry, and the market in which they operate, identify their customers and competitors, and determine their mission, vision, and strategic goals. In addition, the effectiveness of the operational plans created as a result of the strategic decisions will be reviewed and taking the necessary measures will enable businesses to be more efficient with more effective strategies.

Strategic management and decision-making process also provide great benefits for the energy sector. In this context, making the highest contribution to the country's welfare by evaluating energy and natural resources in an efficient and environmentally sensitive manner; to make the necessary plans to meet the energy needs; to take the necessary measures for the production, transportation, and distribution of energy resources and energy in accordance with plans and programs; to take the necessary measures to establish and operate the production, transmission, and distribution facilities of energy resources in the most appropriate way for national interests and modern technology; to encourage studies on the research, development, operation, control, and protection of energy resources are extremely important.

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Students' Satisfaction with Applications Implemented in Distance Education Process During the Pandemic Period

Başak Gezmen and Ihsan Eken

Abstract Since the COVID-19 epidemic outbreak, which occurred in December 2019 and resulted in profound changes and transformations in our lives, was declared to be a pandemic, our country has also faced numerous restrictions in a large number of areas. The differences that have emerged in all spheres of our lives also reveal themselves in the field of education and training. The gates to a brand-new digitization-focused era have opened for both instructors and students. Individuals who spend their time during the pandemic period at home are involved in the distance learning process and experience the education field on the digital world. At this juncture, education and training institutions have preferred implementing various applications. One of these most preferred applications is Teams, which is tailored for security-based teamwork and collaboration, providing audio- and video-based chat and communication opportunities. In this study, one of the quantitative research methods, the survey method, was used. Due to the pandemic, the survey was conducted over the Internet, via e-mail, and social media channels. The study population consisted of 519 students studying at Istanbul Medipol University Faculty of Communication. Due to the size of the population and the pandemic, students were selected through convenience sampling method. The aim of the study was to determine the relationship between the current satisfaction levels of the participants with using the app "Microsoft Teams" and the solution proposals to enhance the current level of satisfaction. Various hypotheses were tested within the scope of the study. Differences were particularly observed between the departments in which the students study and the medium they used most frequently to log into the Microsoft Teams application and the subheadings (customization, convenience of use, and possibility to select) that lead to student satisfaction. Differences were found between the departments that are particularly prone to online training and other departments that prefer online training (computers) to a lesser extent. Similarly, differences were also observed between users who use the Microsoft Teams app on a

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desktop or laptop computer and participants who logged into the application using a smartphone or tablet.

1 Introduction

The coronavirus pandemic, which has affected the whole world, continues to show its effect rapidly in our country. The coronaviruses, which are a large family of viruses, can cause disease in humans and animals. COVID-19 is a new type of coronavirus that emerged in Wuhan Province in China in December 2019, and a disease that develops with respiratory symptoms such as fever, cough, and shortness of breath. It was defined as a virus on January 13, 2020, as a result of the research undertaken. The disease, which was first seen in the animal market and seafood in the Wuhan region, was rapidly transmitted from person to person and spread to other cities in Hubei province and the countries all over the world (Sağlık Bakanlığı, 2020).

The COVID-19 outbreak spread very quickly first in China and its regions, and later in many countries. In terms of spreading rate, loss of life, number of infected cases, it is known to be more effective than other epidemics such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS), which are among the most important diseases of recent years. As a result of the rapid increase in the number of cases and the number of deaths in China, on 23 January the transportation was stopped in Wuhan, and quarantine measures began to be implemented. WHO (World Health Organization) declared a "global emergency" on 30 January. The first death outside of China was seen in the Philippines in February, followed by the first case in the African Continent in Egypt. The first fatal case of the COVID-19 virus was seen in France in the European continent. Outbreaks rapidly continued in South Korea, Iran, and Italy, and the number of deaths from the virus exceeded 100 in Italy in March. As a result of this situation, education was suspended in schools and universities in Italy until March 15, and as a result of the rapid spread around the world, an "emergency" was declared in California, America (Aytekin, 2020).

The first coronavirus case encountered in Turkey was disclosed to the whole nation by the Minister of Health, Fahrettin Koca on 11 March. After stating that the first patient had come from Europe and that his/her test results were positive, the tests of a second person were found to be positive on 13 March. On 12 March, the decisions taken after the meeting held under the chairmanship of President Recep Tayyip Erdoğan were announced. Following the emergency of COVID-19 disease in Turkey, new regulations for educational institutions became necessary (BBC Türkçe, 2020). Within the scope of the measures taken, it was decided to close down all schools, including the higher education institutions. In this context, the coronavirus, which continues to show its effect rapidly all over the world, has started to require serious changes in the education system. Each country has begun to adapt activities of distance education in line with its technological infrastructure. In this sense, the usage of Microsoft Teams is increasing during the pandemic as an application of choice for many educational institutions in Turkey.

2 Usage of Microsoft Teams in Distance Education During the Pandemic Period

Microsoft Teams application is offered under three main headings: for business, home, and education. The application, which has properties such as online meetings and calls, video conferences, screen sharing, file sharing, special backgrounds, instant messaging, also provides health services, field workers training applications, and workflows for distance learning and distance working opportunities (Microsoft, n.d.).

Microsoft Turkey Corporate Business Productivity and Security Applications Sales Director Ozan Öncel defines Microsoft Teams as Microsoft's secure, communication, and collaboration platform. The point that should be understood from the communication here is that the application provides the opportunity to make audio and video-based conversations from any device connected to the Internet wherever you are. At the same time, you can integrate Teams, which is used as a cloud switchboard, independently into your existing switchboard, or run it without a switchboard connection, and also, you can use it as a switchboard at the same time. The advantages it provides in terms of working together are related to the fact that it maintains at its core the range of Office 365 products and its most-used productivity applications such as Word, Excel, and Outlook applications. The Microsoft Teams application, which is suitable for working as a team, is designed as a collaboration platform with the features of creating teams and making relevant areas for these teams, sharing files from these areas, chatting, and working with applications within Teams without installing or opening other applications.

Drawing attention to the huge increase in the number of users during the pandemic period, Öncel states that the number of users increased by 12 million in just 1 week. Emphasizing how much Microsoft Teams is being used and keeping track of usage increases, Öncel stated that based on the number of daily active users, 150,000 in Turkey, they take into account the fact that everything has a scale given a large number of increasing users and that they are working on the necessary measures.

Standing out among digital business platforms, Microsoft Teams is a business application that is rapidly increasing its user base around the world day by day due to the coronavirus pandemic. The application, which is preferred by many educational institutions during the pandemic period, aims to ensure uninterrupted, efficient, and safe usage by teams everywhere. Thanks to the new features added to the application, MS Teams supports employees and health sector experts, especially those who lack technological support. A real-time noise cancellation feature minimizes annoying background noise such as keyboard keys or external sounds. With the feature of raising hands during the video conference, it is possible to speak comfortably in meetings attended by a large number of people. Teams Reservations provide advantages to users in terms of scheduling doctor appointments and creating reports. At the same time, with the possibility of chatting in a separate window, which is a new feature, ongoing conversations are made more efficient. The number of users of the application, which brings new features for industrial field workers, is increasing day by day (hurriyet.com.tr, 2020).

Microsoft Teams, with successful examples of use in the field of distance education, by universities, high schools as well as elementary schools in Turkey, is a program designed, by its nature, to enable working together. What should be understood from working as a team is that educational institutions could be transformed into a classroom. The application, which makes distance education convenient with its communication features, is equipped with the productivity features of Office 365.

The teacher can easily create a virtual classroom as a platform in the application where he/she can share his/her notes and the notes each student takes. In the use of the application provided free of charge to educational institutions, firstly, under "Creating a Team" on the main page, when you click "Create a Team," any team can be selected on the screen that will appear. Students who will join the team later can be added in by using the search method to find them. You can participate in meetings, record important meetings deemed necessary, mention specific people to see messages, and organize a file attached to the meeting. By using the tabs that appear on the upper right of the screen and are easily accessible by everyone, team members can have quick access to services and files. There is no investment cost because the distributed application is a cloud service (Microsoft, n.d.).

Microsoft Teams, which has a few more alternatives in the market, is also a highly preferred application in workplaces. In education, the State provides service through the EBA system. However, it is used not to interrupt but to strengthen the communication between the classroom teachers and the students. Many universities prefer the application to implement their content and curriculum to deliver them.

Microsoft Teams is a much more dynamic and modern version of Skype application in terms of audio and video algorithms. The system does not completely break the connection when a problem occurs over the bandwidth. Considering the increase in the number of users from time to time because everyone is at home, Internet disconnections occur. At this point, the system reduces the quality of the application and provides service continuity. The most important thing is that in Teams, the Internet is not completely disconnected, but the image quality is reduced, and Teams can continue following an automatic tuning. If there is no Internet connection, then the chat conversations made are kept in the background and presented to the disconnected party when the connection is restored for the sake of continuity (hurriyet.com.tr, 2020).

3 Customer Satisfaction-Based Approach

The concept of customer satisfaction is one of today's new concepts that emerged with the effect of the new period marketing strategies in the axis of the changes in the 1990s within the framework of competition conditions. Factors such as technology, time, and speed have become the keywords this century. As competition increased and reshaped very rapidly according to the conditions of the market, customer behavior began to change and transform. All companies must analyze the changing attitudes and behaviors of the customers well and carry out strategic studies. Businesses based on customer satisfaction now have to take into account their customers' views on their goods and services. Today, the ultimate goal of businesses is to create and implement a business culture by prioritizing customer requests and needs (Demirel, 2017).

Following the public relations activities carried out for a company by correctly determining their policies and strategies, the company should make efforts to inspire confidence and influence the target audience's feelings and thoughts about the company. It should adopt the principle of making an effort to become a prestigious organization. The main goal should be to maximize the economic and social interests of the organization. In general, the effort to create a positive image for organizations is important and the necessity of making this effort sustainable should be emphasized (Onal, 2000). In every institution, all public relations practices have the task of ensuring the communication between the institution and the target audience, contributing to business objectives and creating a common base (Balta Peltekoğlu, 2016).

Customer satisfaction, which has been among the issues focused on sensitively in recent years, is generally an emotional reaction. Customer satisfaction is also defined as the degree to which needs and expectations are met. On the axis of customer satisfaction, which is among the strategic tools of the competitive market, to increase satisfaction and make it successful, it is necessary to increase common values and targets. At this point, attitudes will provide a positive breakthrough. In the evaluation of satisfaction relationship by Hon and Grunig, customer-oriented satisfaction studies that necessitate long-term and serious strategic studies for organizations and also require spending time and resources are evaluated as follows: In the satisfaction structure, which is considered as an effective tool in understanding the quality in the communication process of the target audience and the organization, a satisfactory relationship emerges when one of the parties takes a step toward the other in maintaining positive relationships (Çelebi, 2019).

Many definitions are made for the customer service. It is seen that definitions in this field focus on both the operator and the consumer. The customer service, which are the actions, processes, and performances that the organization adds to the product before, during, and after the sale, is composed of the things developed by the business to provide time and place benefits to the customer during their purchasing process. Convenience is everything that brings comfort and creates value. It can also be defined as the ability of the business to satisfy customer demands and needs, which determines that values can be added to the goods or services and to understand what customers buy (Sariyer, 2011). Among the most important issues is the necessity of meeting customer expectations in the best way. Customer relations should be manageable and sustainable, as well as there should be a meaningful link between the wishes and needs of the customer and the structure and values of the organization (Demirel, 2017). Today, customer satisfaction measurement studies have become very important for both organizations and buyers. Every organization can make serious investments in these studies. Systematic and strategic studies and inferences for the future are available. This has become very important in corporate planning for the future (Schukies, 1998).

4 Method

The survey method, which is one of the quantitative research methods, was used in the study. The online questionnaire method was adopted in the study since it is difficult to reach the participants and the questionnaire cannot be done face to face due to the pandemic. The use of the online survey method has increased, especially with the widespread use of the Internet, thanks to features such as the users having at least one e-mail address and social media accounts. The SurveyMonkey application was used for the survey method applied in the study. Before starting the survey in the research, because the scale used in the survey is in a foreign language, the questions in the questionnaire were studied with a small group and the expressions of the incomprehensible questions were corrected. Participants of the study were not included in the population of the research. Due to the pandemic, the convenience sampling model was used to determine the participants of the study. The participation of the students within the faculty was ensured by sending a questionnaire link through their supervisors. The study includes all of the students within the Faculty of Communication at Istanbul Medipol University. For this purpose, a survey was conducted with 519 students (participants) within the faculty. The most important feature of the participants in the study is that the students conducted their lessons online via the Microsoft Teams application during the spring semester of 2019–2020. With 12 faculties, 5 institutes, 4 vocational schools, and 1 higher education institution, Medipol Istanbul University is one of Turkey’s largest private universities, providing education to 30.3 thousand students employment to 2700 staff (academic and administrative) as of 2019 (Medipol, n.d.). The most important limitation of the study is that only the communication faculty is selected as the sample. Apart from this faculty, there are 11 faculties and different academic units, and the students studying in these units were not included in the study.

5 Purpose and Importance

During the pandemic period, there have been changes in almost all of the work people do face to face and in their habits. One of the most important of these changes was experienced in the field of education. During the pandemic period, face-to-face education activities started to be carried out via television and the Internet as a form of distance education. Almost all educational institutions from elementary schools to universities provide their educational services online. Online education is carried out through various computer programs. Various programs enable teaching online. Among these programs, the Microsoft Teams application can be preferred with many affiliated applications that work with the Microsoft brand. Although the Teams application is primarily considered for business meetings, it has been modified in time and started to be used in education. With the use of Microsoft Teams application in education, one of the most important criteria for students and educators is whether the application is satisfactory or not. The Microsoft Teams application, which is constantly in competition with other distance education applications, tries to ensure customer satisfaction by offering connections, add-ons, and innovations with other applications connected to the Microsoft company in digital environments. The status of the participants using Microsoft Teams application will be examined in the study, including gender, department of study, customer service for Microsoft Teams application, personalization, ease of use, selection, security, and privacy, as well as participants' satisfaction. The study aims to determine the relationship between the current satisfaction levels of the participants and the solution proposals in enhancing the current level of satisfaction with using the application "Microsoft Teams."

6 Evaluation of the Findings

It is aimed to create a homogeneous group of participants in the study concerning the gender variable. It is observed that a homogeneous group is formed on the gender variable as a result of the study. Two hundred seventy-two of the participants in the study are females. The percentage of female participants in the study is 52.4. Two hundred forty-seven of the participants in the study are males. The percentage of male participants in the study is 47.6.

When the departments of the participants in the study are examined, it is observed that there are six departments in the faculty of communication. These departments are Journalism, New Media and Communication, Media and Visual Arts, Radio Television and Cinema, Public Relations, and Advertising. The Public Relations and Advertising department is available in both Turkish and English, but within the scope of the research, these two were considered as a single department. When the departments of the participants in the study were examined, it was observed that 153 participants studied in the Department of Media and Visual Arts. The percentage

Table 1 Information related to the scale

Variables	Section	AVE	CR	Cronbach Alfa
Personalization	6	0.76	0.93	0.851
Ease of use	16	0.81	0.95	0.947
Being able to make choices	4	0.75	0.93	0.833

of participants who study in this department is 29.5. It is observed that 139 participants studied in the Public Relations and Advertising department. The percentage of participants who study in this department is 26.8. It is seen that 115 participants studied in the New Media and Communication department. The percentage of participants who study in this department is 22.1. It is seen that 59 participants studied in the Radio, Television and Cinema Department. The percentage rate of students studying in this department is 11.3. It is seen that 53 participants studied in the Journalism Department. The percentage rate of students studying in this department is 10.2.

One of the most important variables in the study is with which device the participants log in to Microsoft Teams application the most. Depending on the size of the devices, especially according to the screen size, there may be differences in the screen design. The screen of a smartphone is smaller than that of desktop or laptop screens. Due to its small size, there may be differences in the properties that make up the design such as scrolling menus, toolbars, and texts. 307 of the participants in the study stated that they log in to Microsoft Teams application mostly from their laptops or desktop computers. The percentage of participants using the application from a laptop or desktop computer is 59.1. The number of users who log in to the Microsoft Teams application via smartphones or tablets is 212. The percentage of participants who log in to the application via smartphone or tablet is 40.9.

In the study, the scale developed by Mary Wolfinbarger and Mary C. Gilly (Wolfifinbarger & Gilly, 2003) was used to measure satisfaction level following the demographic questions. Some sections and questions in the scale were removed. Certain titles were established using this scale. These are; customer service, personalization, ease of use, being able to make choices, security, and privacy. The number of questions regarding the scale related to the study, AVE (Average Variance Extracted), CR (Composite Reliability), and Cronbach alpha coefficients are presented in Table 1.

When the AVE and CR values of the variables were examined within the context of the study (Table 1), it was observed that the smallest AVE value of the study was 0.75 with "being able to make choices," and the highest AVE value was 0.81 with "ease of use." It was determined that the smallest CR value of the study was 0.93 with "selection" and "personalization," and the highest CR value was found to be 0.95 with "ease of use." When the validity of group variables was examined within the context of the study, it was observed that the variable with the highest reliability was "ease of use" with 0.947, and the variable with the lowest reliability was "being able to choose" with 0.833. Independent samples t-test examines the comparison of the averages of two separate samples for certain variables. In other words, it examines whether the difference between the averages is significant or not to a certain extent (Gürbüz & Şahin, 2016).

In the study, it is investigated whether there is a difference in the significance rate of 0.05 about the opinions on the ease of use of the Microsoft Teams application by the participants who mostly use a smartphone or tablet and a laptop or desktop computer. Based on this, it is desired to collect the opinions of the participants who log in to the application using 307 desktop or laptop computers, 212 smartphones or tablets on the "ease of use" with 16 questions and a 5-point Likert-type scale. For this, H0 and H1 hypotheses are formed below:

1H0: The opinions of the participants in the study about the "ease of use" variable does not differ significantly according to with which device they access the application the most.

1H1: The opinions of the participants in the study about the "ease of use" variable differ significantly according to with which device they access the application the most.

Data obtained from 519 people in the research was used to investigate whether the views of the participants in the study about the ease of use variable differ significantly according to the device with which they log in to the Microsoft Teams application.

According to the findings obtained from the independent *T*-test results, a significant difference was found between the participants' views on the variable of ease of use ($t_{(519)} = 8167; p < 0.05$). The average of the opinions of the participants using a laptop or desktop computer on the ease of use variable (Avg. = 4.09; S.D. = 0.86) was higher than the average of the participants using a smartphone or tablet (Avg. = 3.43; SD = 0.83). These results show that the participants who use laptops or desktop computers have a more positive opinion about the ease of use variable than the participants who use smartphones or tablets. According to the findings obtained as a result of the test, the H1 hypothesis is accepted. In other words, there is a significant difference between the opinions of the participants using a laptop or desktop computer and the participants using a smartphone or tablet about the ease of use variable.

In the study, it is investigated whether there is a difference in the terms of the significance rate of 0.05 about the opinions on "personalization" of the Microsoft Teams application by the participants who mostly use a smartphone or tablet and a laptop or desktop computer. Based on this, it is desired to collect the opinions of the participants who log in to the application using 307 desktop or laptop computers, 212 smartphones, or tablets on "personalization" with 6 questions and a 5-point Likert-type scale. For this, H0 and H1 hypotheses are formed below:

2H0: The opinions of the participants in the study about the personalization variable do not differ significantly according to the device with which they access the application the most.

2H1: The opinions of the participants in the study about the personalization variable differ significantly according to the device with which they access the application the most.

Data obtained from 519 participants in the research was used to investigate whether the views of the participants in the study about the personalization variable differ significantly according to the device with which they log in to the Microsoft Teams application.

According to the findings obtained from the independent T-test results, a significant difference was found between the participants' views on the variable of personalization ($t_{(519)} = 8019$; $p < 0.05$). The average of the opinions of the participants who use desktop or laptop computers about the personalization variable (Avg = 3.92; SD = 0.85) was higher than the average of the opinions of the participants who use smartphones or tablets about the personalization variable (Avg = 3.52; SD = 0.84). These results show that the participants who use laptops or desktop computers have more opinions about the personalization variable than the participants who use smartphones or tablets. According to the findings obtained as a result of the test, the H1 hypothesis is accepted. In other words, there is a significant difference between the opinions of the participants using a laptop or desktop computer and the participants using a smartphone or tablet about the personalization variable.

In the study, it is investigated whether there is a difference in the significance rate of 0.05 about the opinions on "being able to choose" of the Microsoft Teams application by the participants who mostly use a smartphone or tablet and a laptop or desktop computer. Based on this, it is desired to collect the opinions of the participants who log in to the application using 307 desktop or laptop computers, 212 smartphones or tablets on being able to choose with 4 questions and a 5-point Likert-type scale. For this, H0 and H1 hypotheses are formed below:

3H0: The opinions of the participants in the study about the variable, being able to choose, do not differ significantly according to the device with which they access the application the most.

3H1: The opinions of the participants in the study about the variable, being able to choose, differ significantly according to the device with which they access the application the most.

Data obtained from 519 people in the research was used to investigate whether the views of the participants in the study about the variable, being able to choose, differ significantly according to the device with which they log into the Microsoft Teams application.

According to the findings obtained from the independent *T*-test results, a significant difference was found between the participants' views on the variable, being able to choose, ($t_{(519)} = 8861$; $p < 0.05$). The average of the opinions of the participants using a desktop or laptop computer about on the variable of being able to choose (Avg. = 3.89; SD = 0.85) was higher than the average of the opinions of the participants using a smartphone or tablet (Avg = 3.37; SD = 0.84). These results show that the participants who use laptops or desktop computers have more opinions about the variable, being able to choose, than the participants who use smartphones or tablets. According to the findings obtained as a result of the test, the H1 hypothesis is accepted. In other words, there is a significant difference between the opinions of the participants using a laptop or desktop computer, and the participants using a smartphone or tablet about the variable, being able to choose.

The ANOVA test, also known as variance analysis, is used to analyze the averages of two or more groups. In other words, the independent *t*-test generalizes two or more groups (Gürbüz & Şahin, 2016).

It is investigated whether there is a difference at the significance rate of 0.05 between the participants' views on personalization about the department in which they studied. In the context of the research, for this purpose, 6 questions and a 5-point Likert-type scale were applied to 519 students who had studied in five different departments. For this, H0 and H1 hypotheses are formed below:

4H0: The opinions of the participants in the study on the personalization variable do not differ significantly according to the department in which they studied.

4H1: The opinions of the participants in the study on the personalization variable differ significantly according to the department in which they studied.

According to the findings obtained from the results of the ANOVA test, there is a significant difference between the participants' views on personalization concerning the department in which they studied ($F_{(1.128)} = 4.964$, $p < 0.05$). In other words, personalization differs according to the department in which they studied. According to these results, the H1 hypothesis is accepted. When the results of the multiple comparisons Tukey test, which shows the pair of groups which the differences originate from, are examined, no significant difference is found between the personalization variable of the participants and in which department they studied: Radio-Television and Cinema (Avg. = 3.92; SD = 0.63), Media and Visual Arts (Avg. = 3.83; SD = 0.62), and New Media and Communication (Avg. = 3.80; SD = 0.60). However, there is a difference between the participants who have studied in Public Relations and Advertising (Avg. = 3.29; SD = 0.69) and Journalism (Avg. = 3.32; SD = 0.70). In other words, it has been observed that there is a significant difference between the personalization of the participants who studied in the departments of Radio, Television and Cinema, Media and Visual Arts, New Media and Communication, Public Relations, and Advertising and Journalism.

It is investigated whether there is a difference at the significance rate of 0.05 between the participants' views on the ease of use about the department in which they studied. In the context of the research, for this purpose, 16 questions and a 5-point Likert-type scale were applied to 519 students who had studied in five different departments. For this, H0 and H1 hypotheses are formed below:

5H0: The opinions of the participants in the study on the ease of use variable do not differ significantly according to the department in which they study.

5H1: The opinions of the participants in the study on the ease of use variable differ significantly according to the department in which they study.

According to the findings obtained from the results of the ANOVA test, there is a significant difference between the participants' views on ease of use concerning the department in which they studied ($F_{(2.358)} = 6.479$, $p < 0.05$). In other words, ease of use differs according to the department in which they studied. According to these results, the H1 hypothesis is accepted. When the results of the multiple comparisons Tukey test, which shows the pair of groups which the differences originate from, are examined, Radio Television and Cinema (Avg. = 3.95; SD = 0.64), Media and Visual Arts (Avg. = 3.88; SD = 0.63), and New Media and Communication (Avg. = 3.85; SD = 0.61), there is no significant difference between the ease of use variable of the participants and in which department they studied. However, there is a difference between the participants who have studied in Public Relations and Advertising (Avg. = 3.39; SD = 0.68) and Journalism (Avg. = 3.29; SD = 0.71). In other words, it has been observed that there is a significant difference between the ease of use of the participants who studied in the departments of Radio, Television and Cinema, Media and Visual Arts, New Media and Communication, Public Relations, and Advertising and Journalism.

It is investigated whether there is a difference at the significance rate of 0.05 between the participants' views on the variable, being able to choose, about the department in which they studied. In the context of the research, for this purpose, 4 questions and a 5-point Likert-type scale were applied to 519 students who had studied in five different departments. For this, H0 and H1 hypotheses are formed below:

6H0: The opinions of the participants in the study on the variable, being able to choose, do not differ significantly according to the department in which they study.

6H1: The opinions of the participants in the study on the variable, being able to choose, differ significantly according to the department in which they study.

According to the findings obtained from the results of the ANOVA test, there is a significant difference between the participants' views on being able to choose concerning the department in which they studied ($F_{(1.816)} = 5.624$, $p < 0.05$). In other words, "being able to choose" differs according to the department in which they studied. According to these results, the H1 hypothesis is accepted. When the results of the multiple comparisons Tukey test, which shows the pair of groups which the differences originate from, are examined, Radio Television and Cinema (Avg. = 4.01; SD = 0.67), Media and Visual Arts (Avg. = 3.98; SD = 0.63) and New Media and Communication (Avg. = 3.91; SD = 0.61), and Journalism (Avg. = 3.89; SD = 0.64), there is no significant difference between the variable, being able to choose, and in which department the participants studied. However, there is a difference for the participants who have studied in Public Relations and Advertising (Avg. = 3.17; SD = 0.64). In other words, it has been observed that there is a significant difference between the variable, being able to choose and the departments of Radio, Television, and Cinema, Media and Visual Arts, New Media and Communication, Public Relations and Advertising, and Journalism in which the participants studied.

7 Conclusion and Suggestions

At the beginning of March, the first case of COVID-19 was encountered in Turkey, and as soon as outbreaks began it became necessary to take some measures. It was decided to close down the schools, including higher education institutions, and continue education through distance education. In line with their technological infrastructures, countries have continued their education through applications of mass media such as radio and television. Microsoft Teams application, which enables educators to continue their lessons in controlled and secure online classrooms, is among the applications most preferred by education institutions during this period. With all the advantages of Office 365 in the application, you can make meetings with team members at the same place, share files and notes, and do many more activities. Considering the rapid development of technology in the future, the subject of a new era of online education with the creation of virtual classrooms are among the topics that will come up in the future.

The study took place at İstanbul Medipol University which is one of Turkey's largest private universities. Out of 30,000 students, 519 students from the Departments of Public Relations and Advertising (which is considered as a single department in Turkish and English), Radio Television and Cinema, Media and Visual Arts, New Media and Communication, and Journalism at the Faculty of Communication of the university participated in the study. Within the context of the study, a homogeneous group was formed in terms of the gender variable. Two hundred seventy-two females and 247 male students participated in the study. One of the most important variables in the framework of the study is the way by which the students log in to Microsoft Teams application the most. Three hundred seven students participating in the study stated that they logged in to the application with the help of a desktop or laptop computer, while 212 students stated that they logged in to the application mostly via a smartphone or tablet. The Cronbach alpha values of the sections that make up each subsection of the scale developed within the scope of the study vary between 0.833 and 0.947. Based on this, it can be said this is a highly reliable study. Various hypotheses have been developed within the scope of the study. The two most important variables for the study are the department in which the students study and the device with which they log into Microsoft Teams application the most. Within the scope of the study, it was observed that students' login with devices with smaller screens such as smartphones or tablets than devices with desktop and laptop screens caused various problems in the ease of use of the application. It is understood that the students can use the application better on the larger screen, and it is more difficult to find the options in the menu on smaller screens. Participants realized "personalization" or "being able to choose" variables as more usable by desktop and laptop computers than by smartphones or tablets. It has been observed that there are differences in terms of the departments in which students studied and their satisfaction. It has been observed that students studying in Media and Visual Arts, Radio Television and Cinema, New Media, and Communication departments, who take relatively more computer-assisted courses than other programs, are more satisfied with the practice than students studying in Public Relations and Advertising and Journalism departments. Since students who study in these departments are more familiar with computer programs, they may be more familiar with personalization, being able to choose and menus in the application, so the ease of use may differ from students who have studied in other departments. Particularly, thanks to universal usability and accessibility, the sections in the applications can be similar to each other. This situation could enable students to use the application more easily by having more ideas about it. However, there are differences between the students using the application on the big screen and the students using the application on the small screen. Designing on the big screen can be easier than the smaller screen. Practitioners who design on a small screen can conduct more tests on this subject, increasing the usability of the application and consequently the customer satisfaction. This study includes only a certain portion of the students using the Microsoft Teams application and different results can be obtained if it is applied to different faculties and universities and even to different age groups.

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Analysis of Determinants of the High Technology Export in Turkey: Policy Recommendation for High-Tech Companies

Yakup Küçükkale and Zafer Adalı

Abstract This study analyzes how to improve and build high technology export strategies for high tech companies in Turkey. In this framework, oil prices and the real effective exchange rate are selected because Turkey's export companies hugely depend on imported inputs, and oil prices are essential imported products. Besides, the real effective exchange affects the cost of the imported inputs and shows countries' comparative advantages in foreign trade. Within this context, comprehensive different theoretical frameworks and literature reviews are presented to lead the companies' correct way. Subsequently, an investigation is performed with Vector Autoregressive Analysis (VAR) on data covering 2016-Q1 and 2018-Q3. According to results, the real effective exchange rates and oil prices have an essential impact on the high-tech companies' performance. Regarding the relationship between the real effective exchange rate and the high-tech exports, the J curve condition is valid. Besides, an increase in oil prices leads to expanding the high-tech exports in Turkey from the first month to the third month because the oil-exported countries are imperative partners for the Turkish export companies. Furthermore, the effects become reversed since an increase in oil prices leads to production costs. Regarding the results, the energy diversification policies, less dependent imported inputs, and expanding the market will contribute to developing the high-tech exports in Turkey.

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1 Introduction

The development and growth strategies have been highly debated topics in the literature because every developing country wants to achieve the highest industrial level, and every developed country wants to protect its position and boost its performance. Among the development strategies, export-led growth has been one of the most attractive strategies. It has received colossal attention since the 1960s because many Asian countries have achieved high economic growth and development by utilizing the export growth strategy. However, many developed countries, especially the USA, Britain, Japan, and Germany, have continued to produce different new products dominant in daily lives such as Mobile phones, the Internet, and computer that protect their position and boost high standards of life. In this sense, there is profoundly struggle in the market, and every country strives to improve its technology, which stimulates its export performance. Producing and improving high technology products is one of the leading competition areas and countries concentrating on improving their innovation and technology capacities to create new high-tech products that can wipe out their old substitutes because new products have superior qualities than others (Ekananda & Parlinggoman, 2017; Kabaklarli, Duran, & Üçler, 2017).

In two decades, many growth miracles and preventing steady-state situations in developed countries have resulted from international trades based on high technology. High-tech products boost countries' performance and result in positive externalities and dynamism in the economy. The high export-led growth strategy is that high technology products provide essential contributions to countries to increase their comparative advantages and accelerate the dynamic economic environment. This strategy is not a new phenomenon in the economic literature. The technology improved, and capital accumulation has been accepted as the growth engine since classical economists. Since then, many spectacular authors confirmed that technology improved leads nations to acquire new products and production process, speeding up economic development. Moreover, many endogenous economic growth theories emphasized that innovative products representing high tech play a vital role in the technological advancements, which creates comparative advantages in trade (Romer, 1986; Robert, 1988; Van den Berg & Lewer, 2015). In addition to the theoretical framework, many empirical studies concluded that technological progress spurs international trade, which results in higher economic growth (Easterly & Levine, 2001; Edwards, 1998; Frankel & Romer, 1999; Levine & Renelt, 1992). High Technology Export is associated with highly innovative and advanced technological goods and services produced by the advanced technology industries. Generally, these firms specialize in Aerospace, computers, electric machines, scientific instruments, and pharmaceuticals, which require high R&D spending, sustainable and tremendous funds, and highly qualified labor forces (Kabaklarli et al., 2017).

Many researchers endeavored to investigate the determinants of high-tech exports due to the beneficial effects of high-tech export on the economy. This growing interest in examining the factors inducing high-tech export undoubtedly contributes to recommend the policy guides and market strategy for the policymakers and managers. In developing countries, Foreign Direct Investment, the cost of inputs, Research and Development Expenditure, and the Real Effective Exchange Rate are among the most used variables to understand high-tech products' nature. FDI plays a vital role in generating and improving high-tech products because developing countries generally have low-level domestic savings, inadequate technical and management skills. However, many inputs imported developing countries have encountered bottlenecks such as higher oil prices in development paths. Furthermore, input price fluctuations make developing countries more vulnerable to externals shocks. Hence, investigating the effects of the export products' inputs is recommended to sustain the development strategy. R&D is also another inducing determinant because R&D leads to the creation of knowledge accumulation, innovations, and technology. The real effective exchange rate also plays a vital role in export performance. The traditional view suggests that a currency depreciation leads to the expansion of the export; on the contrary, the controversial look confirms that a currency depreciation shrinks trade performance because of the supply-side channels and unsatisfied Marshall-Lerner Condition.

As for Turkey, the 1980s have been regarded as the breaking point in development and growth strategy. Since the 1980s, many structural and legislative adjustments have been implemented for the transition to the free market considering the January 24th decisions. The amendments are based on export-led growth, privatization, and financial liberalization. Though the amendments have changed the Turkish economy, and Turkey displays a significant manufacturing headquarters for several companies, growth and development miracles like Asian countries' experience did not experience Turkey (Alıcı & Ucal, 2003). The main reason for not catching up with developed countries is that Turkey is exposed to a middle-income trap because its products are generally based on low and medium technology products. Turkey should concentrate on generating and improving high technology products to integrate its economy with high-income groups. That is why examining and understanding the high-tech products seem to be contributing study for the Turkish economy. This study investigates the effects of three essential factors involving Oil prices and the Real Effective Exchange Rate of high-tech exports by using VAR model on quarterly data covering the period between 2016-Q1 and 2018-Q3. With the help of this analysis, it can be possible to generate strategies and policies to improve Turkey's export performance.

2 Literature Review and Theoretical Framework

It is confirmed that oil price fluctuations have a massive impact on the global economy. The first study aiming to investigate the effects of the oil price on the economy is conducted by Hamilton (1983). The result of the study showed that there is a significant correlation between recessions experienced by the US economy and oil shocks. Since then, many studies tried to investigate the impacts of the oil price changes on the real economy, and these studies supported that an increase in oil price sharply negatively influences economic performance (Barsky & Kilian, 2004; Carruth, Hooker, & Oswald, 1998; Cologni & Manera, 2008; Hamilton, 2003, 2009; Kilian & Vigfusson, 2013; Lardic & Mignon, 2008; Phelps, 1994). It is also confirmed that the importance of oil in the economy at present is not necessary on the contrary to the 1970s and 1980s because of the more efficient use of oil, using alternative energy sources, lower real wage rigidity, and knowledge on how to deal with the oil shocks (Blanchard & Gali, 2007; Baumeister & Peersman, 2013; Blanchard & Riggi, 2013; Edelstein & Kilian, 2009). Besides, some researchers tended to concentrate on the effects of oil changes on international trade. For example, Backus and Crucini (2000) found evidence that trade volatility has been more linked to the oil price shocks than the real exchange volatility since the collapse of the Bretton Woods. Schubert (2009) also emphasized that an increase in oil price changes leads to a shrunk trade balance of oil-importing countries since oil is directly or indirectly used as inputs for production. The effects of the oil price change on the trade are associated with many country's specific features, such as the economic development level, its relative positions as an oil-exporting or oil-importing countries.

Various mechanisms in the literature are used to explain oil price changes' effects on the country's export level. The first mechanism can be classified through the impacts of production cost changes resulting from the oil price fluctuations. For example, oil and its derivatives are essential raw materials used directly or indirectly in the production. An increase in oil price leads to higher production costs, which reduces the comparative advantages in foreign trade. Another mechanism suggests that when the country's main international trade partners are oil-imported countries, raising oil prices causes low foreign demand for the country's goods. Nevertheless, in a case for country's trade partners oil-exporting countries, the country's export performance may be rising because of receiving high revenue of the oil-exporting countries that arose from increasing oil prices. Besides, higher oil prices also influence inflation, money demand, and household saving patterns, which result in a higher interest rate. The mechanism linked to the effects of the oil price change on the money markets will harm investment decisions and funds by using exporter firms. In the long run, the country's export performance is shrunk because of higher inflation and higher interest rates (Hodula & Vahalík, 2017). The mechanism between oil shocks and global trade is explained through understanding the uncertainty channel. The mechanism suggests that the oil price volatility creates uncertainty about the oil price's future, which produces the firms to postpone international investment and leads to a decrease in consumer demand, which influences the imported commodity's purchase (Chen & Hsu, 2012).

General sight related to the relationship between sharply rising oil prices and economic performance argues that the sharp increase in oil prices induces imitating economic performance and increasing inflation in oil-imported countries. Besides, many studies in the literature investigate the effects of oil-price change on exports. Their results vary because each research focuses on different oil shocks, using the different econometric methodology, time, and countries' unique features such as different institutional, tax structures, oil-imported or oil-exported. Abimanyu (2016) aimed to investigate Indonesia's oil price changes by employing Johansen co-integration analysis over the period between 2000: Q1 and 2016: Q2. It was approved that there is a positive relationship between oil prices and exports.

Iwayemi and Fowowe (2011) concentrated on the impacts of the oil price shocks on the Nigerian economy by evaluating the time between 1985 and 2007. They concluded that the favorable oil price shocks are not significant determinants of the Nigerian economy. Faria, Mollick, Albuquerque, and León-Ledesma (2009) evaluated the effects of the oil price change on Chinese exports by appropriating ARDL method. They established that an increase in oil price leads to higher exports in China, and they laid the groundwork for this finding through excess labor supply in China. Aziz and Bakar (2011) strived to examine the effects of the oil price shocks on the Malaysian economy. They suggested an asymmetric relationship between the oil price shocks and exports, and the oil price shocks seem to induce exports.

Aziz and Dahalan (2015) endeavored to detect the asymmetric effects of oil price shocks on the economic performance of ASEAN-5 over data covering the period between 1991 and 2014 by utilizing unrestricted panel VAR method. According to the results, they stressed that the existence of the asymmetric impact among variables is confirmed, and an increase in oil shocks has a negative outlasting influence on exports. Wang, Zhu, and Wang (2017) investigated the impacts of oil shocks on exports by focusing on the data belonging to Chinese industrial enterprises' firm-level. They also attempted to examine the oil and non-oil intensive industries' response to oil supply and other oil-specific shocks. According to the SVAR model result, they found that the duration of Chinese export is negatively associated with oil supply and other specific shocks. On the other hand, there is a positive relationship between oil-demand shocks and export. They also indicated that the negative impacts of oil-supply and aggregate demand shocks on export duration are more petite than industries based on energy-intensive than in sectors linked to non-energy intensive.

Hodula and Vahalík (2017) researched to provide evidence from the relationship between oil-market fluctuations and European Monetary Union (EMU)'s technological structure exports over the period between 2002 and 2015. They applied a time-varying parameter VAR model. The model results emphasize that higher crude oil production leads to lower production costs and therefore promotes all EMU exports. The global demand shocks seem to be negative factors influencing high-tech exports because of the deferred investment determination process. It is also underlined that raising oil prices generate an only marginal impact on export in EMU. Chen and Hsu (2012) aimed to investigate the impacts of oil price volatility on foreign trade of oil-imported countries, and they concluded that the oil-imported countries' international trade is negatively associated with oil price volatility.

Regarding the Turkish economy, several studies found a distinct conclusion. For example, Altintaş (2013) aimed to determine the factors specifying Turkey's exports by focusing on the period between 1987 and 2010. As a result of ARDL and causality test, it was found that there is a positive relationship between an increase in oil price and exports, and the elasticity is statistically significant and 0.22. In parallel with Altintaş (2013)'s findings, Rasmussen and Roitman (2011) also confirmed that there is a positive nexus between oil prices and Turkish exports in the light of the multicountry analysis. In other respect, Çulha, Özmen, and Yılmaz (2016) proved that the effects of oil price changes on exports are limited with the help of the dynamic panel analysis. Koşaroğlu, Şengönül, and Karadaş (2018) also aimed to detect the impacts of oil price changes on exports by applying ARDL method, and their results also approved that a rise in oil price stimulates Turkish export performance. Basarır and Ercakar (2016) researched the relationship between crude oil price changes and the current account by employing monthly data covering between December 1991 and January 2016. They tried to find a piece of evidence by utilizing VECM and Granger causality analysis. Because of the econometric test, it was confirmed that there is a mutual causality between crude oil price changes and the current account deficit. Beşel (2017) applied the Gregory–Hansen co-integration and Toda–Yamamoto analysis to the nexus between the current account deficit and oil price in Turkey. According to models' results, it was underlined that there is a long-term relationship between the oil price and the current account deficit, and the causality direction running from oil price to the current account deficit is confirmed. Most of the studies focused on the relationship between oil price changes and exports through the current account regarding the Turkish economy. These studies viewed that Turkish export performance strictly relies on imported intermediate goods, and crude oil is the dominant figure in the intermediate products in Turkish production. These studies mostly concluded that an increase in oil prices has a detrimental impact on the current account deficit in Turkey (Dam, Göçer, Bulut, & Mercan, 2012; Gün, 2011; Karabulut & Danişoğlu, 2006).

On the other hand, some studies found limited or no relationship between oil prices and the current account deficit (Özlale & Pekkurnaz, 2010; Peker & Hotunluoğlu, 2009). Typically, in Turkey, a fall in oil prices will improve the current account balance because oil is an essential input. Turkey is one of the leading oil-imported countries, and Turkish economic performance is strictly linked to oil price fluctuations. Besides, foreign demand (income) theoretically plays a vital role in export performance, and the income elasticity of exports appears to differ across different export markets. About one of the third of Turkish exports is materialized to oil-exporting countries. This proportion has increasingly continued to rise in the last decade. That is why there are no conclusive results related to an oil price change on the exports.

There is a massive debate on the relationship between the real effective exchange rate and the exports in the literature. Thus, the discussion results in two alternative views. The first, the traditional view, is associated with the international competitiveness of domestic countries. A depreciation boosts economic activity because of the increase in foreign goods' prices relative to domestic goods. A shrinkage induces lower domestic goods prices and higher the prices of the foreign goods, stimulating the international competitiveness, which swifts prices demand from other countries' goods to local products in the global market (Dornbusch, 1988).

On the other hand, there is a controversial view in which a currency depreciation has a detrimental effect on the economy through various mechanisms. The negative impact of the currency depreciation on trade performance results from unsatisfied Marshall–Lerner condition. This side suggests that a currency depreciation leads to the expansion of the trade deficit because of rising import prices and shrinking export prices when imports exceed exports (Hirschman, 1949). Another reason for the controversial view is related to supply. The supply-side view is associated with the cost of production. The supply channel mostly plays a vital in the semi-industrialized country where the manufacturing of the inputs is massively imported. For example, the oil, natural gas, other raw materials, machines, equipment, and software are imported for domestic production, and their costs are following the exchange rate changes (Bruno, 1979; van Wijnbergen, 1989). A currency depreciation leads to higher production costs, which dominate the incentive from lower relative prices for domestically traded goods (Kandil, Berument, & Dincer, 2007).

Kasman and Kasman (2005) conducted a study to investigate the effect of real exchange rate volatility on Turkey's exports by using quarterly data covering the period between 1982 and 2001. To achieve their study's objective, they employed the co-integration and error correction model, and they tried to show the dynamic relationship between real exchange rate volatility and exports. Their results posed that export is positively related to real exchange rate volatility.

Nazlioglu (2013) made a study to analyze the effect of exchange rate volatility on Turkey's top 20 export industries' major 20 trading partners. To eliminate the aggregation bias problem, disaggregate trade data covering 1980 and 2009 is used. The panel co-integration analysis was employed to achieve objectives. As a result of the investigation, it was underlined that the real exchange's impact appears to differ across industries. Besides, a decrease in the values of the Turkish lira stimulates Turkish industry-level exports. Yüksel, Kuzey, and Sevinc (2012) also tried to study the relationship between real exchange rate volatility and export for the time covering 2003:02 to 2010:12. As a result of OLS estimation, their results showed a negative correlation between exports and exchange rate volatility. Özbay (1999) tried to examine the effects of exchange rate uncertainty on export by employing GARCH model to data covering 1988: Q2 to 1997: Q2. The empirical result confirmed that real exchange rate uncertainty harms exports.

Kotil (2019) researched to examine the nexus among the variables consisting of the exchange rate, imports, and exports. The VECM model and causality analysis were employed to achieve the research's aims. According to time series analysis, it was found that there is only a causality relationship between exports and imports, and the causality direction running from imports to exports is proven. Karamollaoğlu and Yalçin (2019) tried to analyze the relationship between real exchange rates and exports related to Turkey's manufacturing firms. They concentrated on FX exposure and various firm features because the real exchange rates' movement may have a different impact on macro- and micro-evidence. Considering this view, they concluded that the Turkish lira's real depreciation spurs export share. The positive effect of Turkish lira value changes is muted to some firms heavily dependent on imported inputs.

Gül conducted a study to establish a demand-side model to detect export demand response to real exchange rate and foreign income. However, the nonlinear ARDL (NARDL) model is employed to resolve exports to real exchange rate depreciation and appreciation. As a result of the nonlinear estimation techniques, it was defined that change in the real exchange rate has an asymmetric impact on exports, and Turkish lira appreciation has a more substantial impact on exports than Turkish lira depreciation. Altintaş, Cetin, and Öz (2011) investigated the long- and short-run linkage between exports and exchange rate volatility in Turkey by employing quarterly data covering the period between 1993: Q3 and 2009: Q4. They applied multivariate co-integration and ECM techniques, and the models posed that real exchange rate volatility positively spurs exports.

Gül and Ekinci (2006) strived to study the linkage between the real exchange rates and exports in Turkey by applying the Granger causality analysis over the data covering the period between 1990 and 2006. As a result of the causality analysis, they reported a one-way causality direction that ran from exports to the real exchange rates. Aktaş (2012) studied the relationship between the real exchange rates and exports by using quarterly data from 1989: Q1 to 2008: Q4. The VAR model is employed to detect the linkage, and its result showed no statistically meaningful relationship between the real exchange rate and exports. Kiziltan and Ciğerlioğlu (2008) strived to examine the nexus between the real exchange rate and export and imports in Turkey by using quarterly data linked to 1982–2005. They applied co-integration methods in order to find a conclusion, and the results of the time series techniques posed that a change in the real exchange rate has no impact on exports: so their findings support Aktaş's (2012) founds.

Palazzo and Rapetti (2017) focused on the performance of Argentina's export performance during the period between 2002 and 2008 as they examined the effects of the real effective exchange rate on the exports in Argentina. They emphasized that a stable and competitive real active exchange is a favorable event that provides a more robust macroeconomic environment and prevents external shocks' vulnerabilities. The Argentina economy is more vulnerable to external and internal shocks, and they recommended that policymakers follow policies related to a stable and competitive real exchange rate, which promotes favorable aggregate investment. Ndou, Gumata, and Ncube (2017) attempted to assess the effects of real exchange rate fluctuations on exports and GDP during and post the recession in 2009. They found that REER appreciation shocks have a tremendous and adverse impact on export.

Mordecki and Miranda (2019) examined the response of four selected countries' (Brazil, Chile, Uruguay, and New Zealand) commodity exports to the REER volatility. GARCH and IGARCH models are used to detect the dynamic relationship between exports and The REER volatility between 1990 and 2013. They concluded that only Uruguay's commodity exports significantly depend on the REER volatility. De Vita and Abbott (2004) focused on US exports to real exchange rate volatility by applying ARDL methods. As a result of the model, it was defined that the fluctuation of REER substantially influences the export volume though the sign and magnitude of this impact deviate across the destination's market.

3 Methodology and Result

The effects of the real effective exchange rate and the oil price change on high-tech exports are analyzed using VAR model. VAR model is a natural and essential model for the analysis of the multivariate time series, and it is advantageous to investigate the dynamic behavior of economic and financial time series. Within this context, we use quarterly data covering the period between 2016-Q1 and 2018-Q3, and all data is achieved from EVDS. VAR model is improved by Sims (1980), and it is generally used to analyze the dynamic effect of a random change on variables. Every endogenous variable in the system is constituted as the function of the lagged values of all endogenous variables.

A VAR model can be exhibited in matrix notations as to the following (Maddala & Lahiri, 1992; Yu et al., 2019):

$$y_t = A_1 y_{t-1} + \ldots + A_P y_{t-P} + m + \varepsilon_t$$

In the equation, y_t refers to $k \times 1$ vector of endogenous variables, m represents as a $k \times 1$ vector of constant, A_1, …, A_P show $k \times k$ matrices of coefficients to be measured, and … serves as a $k \times 1$ vector of white noise process. When $k = 2$ and $p = 1$ are assumed, the VAR model is constructed as follows (Johnston & DiNardo, 1963; Yuksel, Ubay, & Sezer, 2020):

$$y_t = \begin{matrix} y_{1t} \\ y_{2t} \end{matrix} = \begin{matrix} m_1 \\ m_2 \end{matrix} + \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{matrix} y_{1,t-1} \\ y_{2,t-1} \end{matrix} + \begin{matrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{matrix} = \mathrm{m} + \mathrm{A} y_{t-1} + \varepsilon_t$$

This form can be shown via equations as below:

$$y_{1t} = m_1 + a_{11} y_{1,t-1} + a_{12} y_{2,t-1} + \varepsilon_{1t}$$

$$y_{2t} = m_2 + a_{21} y_{1,t-1} + a_{22} y_{2,t-1} + \varepsilon_{2t}$$

Therefore, each variable is expressed as a linear combination of lagged values of itself as well as of all other variables in the system. Firstly, it is obligatory to investigate the stationary properties of the variables employed in the study to avoid artificial regression results (spurious regression). This objective will examine whether the series includes a unit root or not; it is required to detect the variables' I (0) or I (1) characteristics. Augmented Dickey–Fuller (ADF) test is employed for this objective (Dickey & Fuller, 1979). We will use Schwarz Information Criteria (SIC) to determine a suitable length in every model (Kalkavan, Eti, & Yüksel, 2020). Concerning the ADF, the null hypothesis suggests that the series has a unit root; in other words, it is not stationary. Table 1 exhibits achieved test findings and variables' unit root features.

Table 1 Results of unit root test

Variable	ADF (Original level)		ADF (The first difference)	
	Constant and trend	Constant	Constant and trend	Constant
Log HTE	−2.7279 (0.203)	−0.8683 (0.786)	−8.9093 (0.000)	−8.8684 (0.000)
LogOil	−2.2296 (0.463)	−2.1287 (0.234)	−6.0700 (0.000)	−6.1248 (0.000)
LogREER	−0.746 (0.963)	0.7557 (0.992)	−6.7964 (0.000)	−6.1457 (0.000)

The results of the ADF unit root test indicated that all of the variables employed in the study are not stationary in the log level at 5% level of significance. In other words, the null hypothesis is failed to reject in which they have unit root in the level because their calculated "*t*" statistics are less than the critical values at 5% level. Then, we employ the ADF test in the first differences, and the series at first differenced becomes stationary because measured *t*-statistics exceed the critical values at 5% level.

The second step of the VAR Model is lag determination. The latter plays an essential role in the building of the VAR Model and Impulse-Response function. Within this objective, optimal lag should be determined in terms of minimum values, which ensure all diagnostic tests. The likelihood ratio statistic is used, which attends the chi-squared distribution to determine the proper number of the lag length. There are some commonly used information criteria for the determination of the lag, such as The Akaike Information Criteria (AIC), the Hann-Quinn Criterion (HQC), the Final Prediction Error (FPE), and the Schwarz Information Criterion (SIC). Considering the AIC, the lag order chosen is three. This optimal lag ensures the inverse root of AR characteristic polynomial, which exhibits all the specifications of root means settled within circles. However, the optimal lag should be determined to avoid autocorrelation and heteroscedasticity problems. Then, the LM statistic for the serial correlation and the white Heteroscedasticity test emphasizes that there is no serial correlation and heteroscedasticity concerning three lags.

Then the establishment of the VAR model, the interpretation of the variables should be followed. Still, The VAR model is not a sufficient model to interpret the dynamic relationship among the variables. The impulse response analysis plays a beneficial role in analyzing the variables' short-run dynamics. The impulse-response functions show that each variable answers to one standard deviation shocks of other variables. Table 2 posits that the high-tech exports respond to one standard deviation shocks of the oil price and the real effective exchange rate.

As seen in Table 2, an increase in the real effective exchange rate (the depreciation of the Turkish lira) causes a deterioration in the high-tech export performance during the first 4 months. On the other hand, the depreciation effects turn to be an improvement in the high technology exports beginning from the 4th month up to the seventh month. The dynamic relationship between the real effective exchange rate and high-tech exports confirms that the J curve in the international trade theory exists

Table 2 The impulse-response function (Response of the high-tech export)

Period	DLOGHTE	DLOGOIL	DLOGRER
1	0.144181	0.000000	0.000000
2	−0.111628	0.024442	0.002607
3	0.022384	0.029475	−0.034530
4	−0.048502	−0.031410	−0.020645
5	0.084416	−0.010973	0.032492
6	−0.061089	0.010501	0.011799
7	0.036759	0.020569	−0.018909
8	−0.041962	−0.016583	−0.010398
9	0.049804	−0.003589	0.014628
10	−0.042675	0.001321	0.004024

in high-tech exports. Furthermore, it can also be understood that an increase in oil price leads to an improvement in the high-tech exports beginning from the first month up to the third month. These effects became adverse beginning from the 4th and 6th months, and then this effect is neutralized. This dynamic relationship can be commented on as follows: an increase in foreign income plays a vital role in export performance. An increase in oil price leads to the expansion of the oil-exported countries' income, and the oil-exported countries are essential markets with one of the third of Turkish exporters.

4 Conclusion

The development and growth strategies have been reshaped and changed concerning high competition in the international market. Within this context, each country wants to achieve the highest standard of living and or protect and continue to improve its position in the world market. The export-led growth strategy is one of the leading strategies in the literature, and many former developing in Asia such as Japan, South Korea, have improved their position and became a hub of production and technology. The export-led growth strategy is based on innovation, technology, and the dynamic market condition, which increases countries' comparative advantage, the influential market environment, new products, and positive externalities. Undoubtedly, innovation and technology are some of the leading and irreplaceable factors which produce and promote new products, and the performance of the innovation and technology can be expressed in the high technology export. Concerning the meaning, the high technology export is linked to innovative and high advanced technological products and services developed by the advanced technology firms. Therefore, high-tech products comprise aerospace, computers, electric machines, scientific instruments, and pharmaceuticals. In the case of Turkey, there has been growing interest since the 1980s. The Turkish economy has been oriented into export-led strategies by experienced many structural and legislative adjustments. Since this date, Turkey became a vital manufacturing center producing various technology goods and services, but its performance is not enough to achieve the highest level. Consequently, the Turkish economy encounters a middle-income trap because its products are generally based on the low and medium technology levels. We will investigate the high technology exports and their two essential determinants of the real effective exchange rate and the oil prices within this scope by using the VAR model.

According to the VAR model results, the J curve condition is valid for the Turkish economy in terms of the dynamic effects of the currency's depreciation on exports. The impulse-response function shows that the depreciation of the Turkish lira (an increase in the real effective exchange rate) induces a deterioration in the high-tech exports in 4 months, and the depreciation is converted into a positive impact on the high tech export beginning from the 4th month up to the seventh month. This dynamic relation is expressed as a J curve in the literature. In addition to the real effective exchange rate, the impulse-response function's results emphasize that the oil price changes also play a vital role in high-tech exports. An increase in the oil price leads to expanding the high-tech exports in Turkey from the first month to the third month. The foreign partners' income is an essential factor influencing the host countries' goods and services, and the oil-exported countries are imperative partners for the Turkish economy. One of the third of Turkish exports is associated with the oil-exported countries.

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Technology Entrepreneurship and Access to Financial Resources in Turkey

Faik Tanrıkulu and Mertcan Ermiş

Abstract Technology entrepreneurship plays a dominant role in the economy and development of the country, especially in this period of increasing competition and globalization. Related developments contribute significantly to the country's welfare and development level traditional commercial and craft habits have been transformed through technological advances. Developing countries attach importance to strong technology-based sectors to sustain growth and create employment for young people. For this reason, country ministers determine technology entrepreneurship as the primary target and strategy. Turkey, with 754 billion dollars, is the world's 19th largest economy by GDP. Currently, the state of technological entrepreneurship in Turkey comprises 60% of the country's economy (as created by the private sector) and will be examined within our study. In addition, whether this entrepreneurship has access to sufficient financial resources and the changes and innovations made in this field within other countries will also be compared.

1 Introduction

Technology entrepreneurship occurs when entrepreneurs come together, formally or informally, to establish links between companies and institutions and manage performance in the local entrepreneurial environment. In addition, this entrepreneurship model is considered as the establishment of the ecosystem by coming together with entrepreneurs such as universities, development agencies or financial institutions, companies, and angel investors in the field of technology. This ecosystem consists of the interaction of seven characteristics, such as financial capital, equipped talent, market potential, culture, and regulations, and in fact, these seven elements

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work together to provide the environment for successful tech entrepreneurship. At this point, developed countries can offer a larger volume and various capital resources to the relevant companies. Yet, deep and efficient securities markets and the frequency of mergers or acquisitions reveal financial possibilities against the challenges of entrepreneurship (Mason & Brown, 2014).

During the periods where Turkey was closed to the outside, and with the hefty quota on import duties or overseas products, there was a time that Turkey had faded on the globally competitive field. Thus, over time, entrepreneurs had become hesitant to take risks and tried to protect their profits in the domestic market. Today, it seems almost impossible to stay away from competition in an economic system where the world is shrinking and borders are disappearing. In recent years, the importance of entrepreneurship has been understood, and new studies are emerging with the contributions of both state and private sector organizations and clearly. The success and continuity of initiatives have been a constantly discussed topic. Developed economies of the world aim to increase the sustainability of entrepreneurs and their contribution to the country's economy by developing alternative financing models to those countries that provide financial support in many areas (Sönmez & Toksoy, 2014). Nowadays, it is not enough for businesses to use their own capital. Moreover, they need external financing support. Financing is provided through financial leasing, bank loans, venture capital, and various loans provided by domestic and foreign financial institutions.

In this article, firstly, the general state of technology entrepreneurship in the world, and secondarily within Turkey, has been examined. As well, the accessibility to adequate financial resources by entrepreneurs will be discussed. In addition, obstacles faced by entrepreneurs have been investigated, and finally, various examples of multiple combinations of technology and entrepreneurship with significantly different characteristics and socioeconomic impacts are included.

2 The Effect of Technology Entrepreneurship on Economic Growth

The effect of technology entrepreneurship on economic growth and development is gradually increasing. Individuals, companies, and countries want to improve their welfare by taking advantage of technology entrepreneurship (Bailetti, 2012). Roja and ve Năstase (2014) emphasize that the difference in development between different cities changes depending on the successful use of technologies and the promotion of technology entrepreneurship. Countries will need new initiatives in the future, unlike conventional business models. For this reason, countries should determine strategies and action plans for technology entrepreneurship to increase both the growth of the economy and the entrepreneurial potential.

In the report titled "The Dawn of the Deep Tech Ecosystem," published by Boston Consulting Group and Hello Tomorrow in 2019, he reported that private investments in technology categories globally increased by more than 20% annually from 2015 to 2018, reaching $18 billion, and financing provided to biotechnology, one of the technology-based areas, reached 7.9 billion in 2016 (from 1.7 billion dollars in 2011). Additionally, significant investments have been made in augmented virtual reality, space, and drone companies. Likewise, capital financing increased significantly from 104 million dollars in 2011 to 3.5 billion dollars in 2015. The report explains that investors and companies have started to turn to technology and determined their growth strategies accordingly. In particular, the USA and China account for 80% of the financing provided to global technology companies between 2015 and 2018. In particular, the financing provided by China to technology companies has increased by more than 80% between 2015 and 2018. On the other hand, the finance provided to technology companies by the USA increased by 10% during this period. Again, according to the same report, around 8700 technology companies in nearly 70 markets benefited from this funding, benefiting from technological breakthroughs that require intensive R&D (De la Tour, 2019).

3 Factors in Strengthening the Technology Entrepreneurship Ecosystem

Although there are many actors in the development of technology entrepreneurship, the role and influence of the state are more important. Because state policies are determinant in encouraging all entrepreneur candidates and actors and in the formation of the entrepreneur ecosystem. In particular, the state has a significant role in bringing stakeholders together and directing young entrepreneurs to this area. Significant successes have been achieved in countries where government policies play an effective role in this area. These countries have provided significant benefits in the growth of companies and the country's economy with the policies and government incentives they have developed for knowledge-based sectors (Bosma et al., 2019).

Young entrepreneurs and newly established companies can emerge if they have easy access to financial resources. Banks play a critical role in this process, and for entrepreneurs, banks are often the only option for outside capital. Other forms of financial intermediation generally arise in more sophisticated economies, and as countries' financial systems deepen and expand, companies can access different sources of financing, including stock and bond markets. Access to these resources is not easy for newly established companies, though. For this reason, entrepreneurial companies, who might be at the establishment stage, where they cannot obtain bank loans, often obtain private financing from friends or families. These challenges are more intense for entrepreneurs in developing economies. While official financial support is more cost-effective for companies, financing from family or friends is generally costly and not officially binding. In summary, the effects of technology entrepreneurs on the country's economy seem to be greater in countries where financial resources are easy to access (Larry, Klapper, & Love, 2010).

In particular, the lack of access to capital is one of the biggest obstacles to entrepreneurs in terms of both starting new businesses and expanding their business since such companies do not have strong tangible assets that can be used as collateral. According to a business survey conducted by the World Bank with more than 130,000 companies in 135 countries (World Bank, 2016), 27% of firm owners reported that one of the biggest obstacles to growth is access to capital. Access to finance is mentioned more frequently by companies, especially in developing countries, and these problems are experienced more intensely, especially during the establishment phase of companies or in the first 3 years. In the 1970s, for example, banks facilitated access to financial resources (such as microcredit), without providing financial asset collateral, and over time, these supports attracted more attention. Thus, international support was applied to both start-up companies and individuals with low-income levels to encourage entrepreneurship (Ibid, 2016). At the same time, the debate continues whether microcredits alleviate poverty. Similar debates also question the extent to which microcredit encourages transformational entrepreneurship rather than supporting entrepreneurs who make a living.

In addition, the potential of microcredit organizations reaching larger scales due to their high transaction costs is questioned. While microcredit institutions face the same constraints as traditional banks, an increasing number of microcredit institutions have changed their business models in two different ways. First, it has turned into financial instruments by expanding its product range with tools, such as savings and insurance. Second, the acceleration of digital finance has led these institutions to benefit from network effects and economies of scale, gradually reducing their spending rates. These innovations in financial technology have led to optimism that the financing gap typically faced by start-up companies can be reduced (Armendariz & Morduch, 2015).

On the other hand, advances in digital finance affect different industries as well. For example, entrepreneurs can more easily access capital from friends or family, even if they are overseas, due to technological advances in money transfer services. At the same time, new financial intermediation types have emerged thanks to the investments made in financial technology. In the crowdfunding market, consumer loans are the leaders, according to transaction amounts, while commercial loans are in the second category (Gürünlü, 2018). In recent years, peer-to-peer (P2P) loans have increased rapidly in both developed and developing economies, serving as an intermediary between borrowers and lenders and through an increasing number of internet platforms. In this business model, platforms analyze the credibility of loan applications based on "big data."

4 Access to Finance by Technology Companies in Developing Countries

Especially during the establishment phase, companies need other sources of finance—other than their own equity. As time progresses, this need may increase in the growth and development stages of companies. First, it consists of various supports such as banks, credit institutions, and venture capital funds, in addition to personal savings that are often called informal resources, which includes family, friends, and angel investors.

It is thought that developing countries will not be able to reach the desired level of development and growth rates if they cannot continuously improve their financial systems. Although the access of companies to bank loans generally increases as the country's economy grows, the ratio of bank loans to that of the gross national product offered to entrepreneurs in developing economies is quite low. In these countries, companies tend to depend heavily on the financing resources they provide internally (Böyükaslan & Tiryakioğlu, 2016).

While emerging markets attracted only 13% of global venture capital investments in 2007, their shares almost doubled in 2015 to 24%. In fact, China and India have attracted more venture capital than any other venture company in Europe. With this form of financing, competition is increasing, and venture capitalists have started to focus on investment opportunities in other developing economies. In the world's two most populous economies, venture capital investments have increased with the spread of e-commerce and the internet. In China and India, companies called "unicorn" have a value of more than $1 million and focus on e-commerce and consumer internet. The economic crises experienced in regions such as Southeast Asia, Russia, and Latin America, during the late 1990s, caused venture capital investments bankrolling emerging markets to disappear. However, risk or venture capital has increased again with the growth of the world economy. In the period of 2014–2015, venture capitalists, entrepreneurs in developed countries (other than the USA) invested $81 billion in developing markets. As a result of this growth in venture capital, emerging markets have absorbed more than a quarter of global venture capital in the past 2 years (Gürünlü, 2018).

In the report prepared for the Kinsey Global Institute, it is estimated that the global gap between the loan amount and the amount of funds needed by SMEs (small- and medium-sized enterprises) is 2.2 trillion dollars. In total, 200 million SMEs are out of service or underserved by banks (Roxburgh, Luhn, & Piotrowski, 2011). While this number includes micro and informal businesses, many of these companies are mainly small- and medium-sized businesses with the potential to be job creation and growth engines. Some of these companies can access short-term credit. However, medium- and long-term loans, which are especially critical for entrepreneurs, are often not available.

Indeed, the rate of providing financial support (secured by showing the personal assets of newly established companies as collateral in developed countries) is twice as high as in developing countries. In addition, the required collateral rates are generally twice or three times that of developed economies. Unfortunately, this mostly affects young companies. In addition, the repayment interest rates of the finances provided are high, a situation that becomes extremely costly for companies who need to borrow money from banks. The total credit deficit of SMEs in Latin America was 620 billion dollars as of 2016, and this figure is greater than in other regions. Approximately 40% of this amount arises from SMEs receiving insufficient service from banks in Brazil. Developing Asia, South Asia, Southeast Asia, and Chinese countries receive insufficient services from banks, and 23 million companies have been restricted from borrowing in India. Regional differences in the number of companies that receive fewer services from banks largely reflect the total number of SMEs in each region of the world. Additionally, there is little regional difference in terms of the share of total SMEs receiving services from banks. While this rate is 48% in South Asia, it reaches up to 53% in Africa. Especially in African countries, more than 70% of SMEs receive incomplete or inadequate service (Manyika, Lund, Singer, White, & Berry, 2016).

Micro and small-scale companies have an essential share in developing economies, but it does not seem easy for them to compete with developed countries, especially as access to credit and financial systems is not easy in these countries. According to the data obtained from the World Bank Business Surveys, only 18% of the firms in developing economies benefited from the loans offered by the banks in the first 2 years. In addition, more than 30% obtained financial resources through informal means, and companies that have survived for more than 10 years use less informal finance. The relationship between firm age and funding sources has been explored. In this study, it has been observed that in countries with strict legal rules and better credit knowledge, young companies have easier access to bank finance than older firms.

Some countries have made reforms to give entrepreneurs easy access to credit. In this regard, innovations have been made: opening new credit bureaus or registration institutions, reporting historical data, providing online credit information, reporting retail and service data, and providing credit scores. Countries where credit information is shared with credit reporting service providers generally have a higher ratio of private loans to GDP. More firms in these countries tend to have bank loans or credit lines, but generally, fewer loan applications are made (The World Bank, 2010). However, the extent to which credit reporting service providers have access to bank loans depends on the scope of available data. Efforts are underway to build a broader network using data from a wide range of sources and industries, including retail, small business, microfinance, corporate credit cards, and insurances in those countries where credit reporting service providers are located.

It is an essential problem in which there is no separate financing department in enterprises. Also, it is not monitored the information and financial flow sufficiently by the authority of companies. Managers generally have little information about financing and accounting. Financial management is carried out by managers and partially accountants in these enterprises, and financial alternatives, credit valuation, and financial functions show reflexes depending on their knowledge and skill. Having alternative resources such as angel investment, forfaiting factoring, barter, venture capital, and necessary legal regulations will give opportunities to entrepreneurs to adapt to changing conditions with minimal bureaucracy. Thus, the capacity of entrepreneurs, operating and wanting within the country, will increase and compete in the global market. Incentive programs should be developed according to the scale of enterprises to increase the share of enterprises in the use of credit within the national economy. Micro Enterprises could not provide guarantees demanded by banks (Edvos, Yeh, Carter, & Tagg, 2007).

For this reason, they receive negative results from their balance sheet tables. Those enterprises face high-interest rates due to the increased credit risk. The assurances of small business owners are of great importance in the development of loan incentive programs according to scales. Micro enterprises guarantee their assets for taking credit. In case of bankruptcy, the business owner faces the risk of losing all his assets. This situation also causes a low share of enterprises in the use of credit within the country.

5 Technology Entrepreneurship in Turkey

The contribution of angel investor financing, which is widely used globally for national economies, is enormous. As a result, the interest in angel investment techniques is increasing, with the investment share of angel capital up to 100 billion dollars. It is obvious that entrepreneurship activities are a significant factor, especially in accelerating the advancement of developing countries.

Turkey, in terms of angel investment and entrepreneurship, is one of the countries with the highest potential in the world. There is a total of 5.334 entrepreneurs within the technoparks, all of which started operating in 2001. The revenue generated by the companies in 2018 increased by 23.1% compared to 2017. In 2011, Angel investment, which began in Turkey, has become a rising topic. It is estimated that in the country, there are nearly 600 angel investors, and their investments exceed over 50 billion Turkish lira. Although necessary legal arrangements about angel investing in Turkey are still new, the realization of job creation, the development of advanced technology products, and the role of SMEs in the production angels investments are increasing daily (Kurnaz & Bedük, 2017).

Great technology companies began to emerge in the country, providing profit increase and capital inflow. These companies include Trendyol, Yemeksepeti, Opsgenie, Gram Games, GittiGidiyor, and Markafoni. Mutual funds, angel investors, and investment networks totaled $112.2 million in 2017. Furthermore, in 2018, this amount decreased from $112.2 million to $58.7 million. In addition, 89% of the investments made in 2018 were seed investments (Unsal & Sagiroglu, 2020).

Technology companies are increasing their share in world trade, and the companies that earn more than $1 billion in capital are called Unicorn ventures. The US venture capital investor and founder of Cowboy Ventures, Aileen Lee, first mentioned this term in 2013 in her article titled “Welcome to The Unicorn Club: Learning from Billion-Dollar Start-ups.” Firms with a value exceeding $10 billion are also called decacorn, and those with a value exceeding $100 billion are called hectocorn enterprises. The first attempt in Turkey to the level of Unicorn Club is Peak Games (Altunkaya, 2020).

According to research carried out in Turkey between 2010 and 2018, only 33 out of 440 venture investments consist of technology companies. While the total investments of these companies are 607 million 343 thousand 347 dollars, it includes only 38 million 597 thousand 600 dollars of technology venture investments (Unsal & Sagiroglu, 2020).

When the data related to technology initiatives in Turkey is observed, especially high-tech manufacturing remains low. According to official statistics in the 11th Five-Year Plan, the rate of high-tech products in industry exports was 3.2%, and the aim is to increase this ratio to 5.8% by 2023 (Stratejik Plan, 2019).

In the 10th Development Plan, announced in 2012, a ratio increase from 3.7% to 5.5% was set, but there has been no significant improvement in this period. According to official statistics, this rate is well below the average of 24% of the world's countries. In Turkey, which is in the category of developing countries, the technology production rate is relatively low compared with other developing countries (Onuncu Kalkınma Planı, 2013).

Although Turkey has made significant progress in exporting mid-high-tech products within the last 10 years, it has not been easy for Turkey to permanently reduce both the current account deficit and the stable growth environment without making a breakthrough in high technology.

In order to improve all these issues and to support high-tech initiatives, it was decided to improve and support the following issues in the 11th Presidential Development Plan.

Institutional capacity and system will be established to ensure the needs-based monitoring of domestic companies with high technological capabilities, which are of particular importance, and policies regarding the measures to be taken in terms of economic security will be developed.

- To increase high-tech manufacturing in Turkey, incentive programs to increase the FDI will be applied.
- Domestic companies operating in high-technology sectors with high growth potential will be matched with international investors, and their investments based on technology transfer will be supported.
- Within the scope of the Industry Innovation Network Mechanism Program, high-technology product development, commercialization of high-technology product development, and commercialization of company consortia will be supported by paying particular attention to priority sectors.
- The necessary ecosystem will be established in R&D, production, qualified human resources, and legislation, especially in areas requiring high technology, such as biotechnological drugs (Stratejik Plan, 2019).

In addition, the Ministry of Industry and Technology has initiated an intensive program for deep technology initiatives in the "Technology Oriented Industry Move

Program, which aims to produce high value-added products with domestic capabilities."

- The share of medium and high-technology products in exports will grow from 36.4% to 3.2% in 2018, and the target of 44.2% is set for 2023, with the aim of 5.8% growth.
- The size of technology-based investments is expected to be around 60 million dollars in 2018 and 5 billion TL in 2023.
- The number of Turkish initiatives with a value of more than 1 billion dollars is targeted to be 10 Turcorns in 2023.
- The share of medium and high-technology products in exports will increase from 39% to 50% (Eleventh Development Plan 2019–2023, 2019).

Turkey's technology entrepreneurship indicators, reflective of its performance, give results comparable with countries at similar levels. Indeed, Turkey's entrepreneurs forecast indicators to create innovation, growth, and new job creation are in a better position compared to peer countries. When indicators were analyzed for entrepreneurs to innovate, a high number of registered trademarks in Turkey were displayed. However, at the international level, the country cannot show the same performance, especially in the field of patent registration. Other indicators that indicate the economic contribution, such as the proliferation of new technology initiatives and high values, in addition to company exit data, are moderate. As in many economies, Turkey has not yet had a technology-based "unicorn." Despite these statistics, increasing the share of the country's information industry and contributing to Turkey's economy emerges as a clear direction of development (TÜSIAD, 2009).

6 Entrepreneurship Financing in Turkey

Access to financial resources of companies in Turkey usually consists of public resources, and the banking system is the most important financial resource provider. In addition, private venture capital companies can provide significant financial resources for entrepreneurs outside of this system. At the same time, different financial supports are offered to entrepreneurs. While providing financial opportunities to public entrepreneurs and SMEs for their activities, it also encourages entrepreneurs with indirect support, such as loan guarantees and loan interest support. In addition, public institutions help companies with support, including tax advantage and social security premiums. The supports, as mentioned above, with public resources, are also called direct and indirect supports.

As in many countries, banks in Turkey also facilitate credit support to companies on a considerable scale. However, small businesses may have problems in accessing bank loans compared to large companies. While this situation is more intense in developing countries, it is less common in developed countries. This is because banks are unwilling and inexperienced to lend to small businesses. Therefore, from time to time, public banks implement advantageous loan support programs for medium-sized companies. These supports mostly consist of low-interest or long-term bank loans (Yüksel, 2011, p. 2). One of the biggest obstacles to the establishment and growth of SMEs in Turkey is the high lending rates. In addition, the weak financial and institutional structure of medium-sized companies is one of the factors that make it difficult to access credit. At the same time, most of the medium-sized companies operate as family businesses. These companies experience difficulties in their corporate structuring, as well as issues such as research and development, human resources, and financial management. Problems similar to this can hinder competition in many aspects, such as the development and financial access to companies. In countries with high national income, 50% of the loans are given to SMEs. In Turkey, these rates are at 24%. Also, 57% of companies in Turkey have easy access to credit, and companies' access to credit is quite high as compared to other countries. Companies rely more on banks for investment financing, and medium-sized enterprises tend to use bank loans in this regard. Forty-seven percentage of the investment finance of such companies consists of bank loans (World Bank, 2010).

Venture capital, one of the rapidly developing alternative financial resources in the world, has recently attracted considerable interest. Venture capital aims to realize the investment ideas of young and fast-growing companies with insufficient financial power. Over time, the venture capital company, first applied in the USA, has started to gain a foothold in other countries. However, venture capital in Turkey has not been applied at the desired level, but with the regulations of the Capital Market Board of 2014, venture capital has started to attract a partial interest.

Moreover, angel investment supports also offer opportunities for entrepreneurs. The angel investment sector, which became official in 2013, is supported by the government. This situation provides a tax exemption of 75% or close to 100% for investors who make angel investments for public entrepreneurs. In comparison with other countries, the incentives that are applied in Turkey are quite attractive for angel investors.

On the other hand, for the Turkish market, micro finance services are preferred by poor households, as well as micro or small enterprises. Related businesses use these financial services to develop their activities, establish a business, or meet their consumption and other needs. Direct or indirect sector representatives demand these financial services, especially the agricultural sector (Gökyay, 2008).

The Mudaraba system in Turkey, a form of financing of entrepreneurship by providing alternative finance by participation banks, is an essential tool. This system is only offered to entrepreneurs by participation banks. Banks lend the funds they collect to their customers as loans. However, financial statements are a prerequisite for loans to be given to entrepreneurs in participation banks, as in many banks. Beginner start-ups are outside the traditional lending process because they do not have both financial statements and sufficient operational history. Currently, the share of investment in the Mudaraba in participation banks in Turkey is not even 1%. In contrast, this rate is 3.9% in the world (Er, Sahin, & Mutlu, 2015).

7 Conclusion

Countries need young entrepreneurs and innovation investments to develop and have a say in the economy. States must constantly update appropriate incentive terms and financial instruments to support and encourage entrepreneurs. Banks significantly encourage entrepreneurs in developed countries by providing appropriate financial instruments. Contrary to this, in developing countries, companies of small- and medium-sized enterprises that do not have a credit history or have insufficient resources to provide guarantees cannot reach their financial resources at the desired level.

It is thought that the economic growth rates of the countries will increase if the restrictions on financial instruments are reduced. Albeit partially, the lending of bank loans to the poor and micro enterprises has led to the emergence of microfinance institutions. Despite this, there are no clear conclusions about the extent to which microcredit promotes entrepreneurship or reduces poverty by these institutions. Likewise, the fact that these institutions have similar constraints to traditional banks has been another criticism. Furthermore, high transaction costs and low credit amounts have been extensive.

In addition to classical financial instruments, different finance supplies have significantly developed in recent years. Financial tools, such as digital finance and crowdfunding, have also emerged. Digital financial instruments are now available to customers at a low cost, and any digital transaction can leave a data track that can provide lenders to improve their credit scoring systems. This feature is essential for traditional banks and new internet-based P2P platforms that are gaining significant momentum in many emerging economies. Banks can cooperate more with financial technology companies and follow financial borrowing and follow-up loan opportunities. In this way, companies that cannot get enough service from banks, due to their low collaterals, can be included in the financial system. If these or similar collaborations deepen and reach more volume, their financial supplies and the number of entrepreneurs may increase over time.

The young and dynamic population, qualified labor force, growing consumer demand, and higher entrepreneurial expectations are opportunities that Turkey has. In a country where the young population is high, it is crucial to train a wide array of entrepreneurs in varied sectors who have good business ideas and can bring innovation. However, in Turkey, the lack of sufficient entrepreneurial experience and difficulties regarding access to the necessary financial resources for the training of entrepreneurs can create multiple problems. Despite all of these alternatives, the number of business ideas that can be developed or can be marketed in Turkey is very small. Therefore, entrepreneurs should be trained, and access to alternative financing resources should be facilitated to eliminate these problems. Especially with the global crisis, we are experiencing because of the pandemic process, it is necessary for businesses to have easier access to credit and financial opportunities. In particular, the different financial resources of entrepreneurs should be diversified. Necessary steps can be taken in this regard, such as legal regulations and reducing bureaucracy. Thus, by providing opportunities such as barter and venture capital—especially angel investment—entrepreneurs will be able to develop competitive opportunities on a global scale.

For angel investors and entrepreneurs in the technology areas in Turkey, financial incentives should be created that include elements such as the establishment of investment funds, as well as public and private partnerships. In addition, in the financing, public institutions should offer advantages to start-up companies and young entrepreneurs. Angel investor networks play an essential role for entrepreneurs who have a new business idea and want to bring this idea to life. Thanks to these networks, more angel investors and entrepreneurs will come together, thus encouraging a larger number of entrepreneurs. The angel investment ecosystem, which creates a significant investment environment in the world, will lead to progress in entrepreneurship if given the necessary support.

As a result, the presence of a large scale in the informal economy in Turkey and the inability to data on entrepreneurship does not make possible Turkey's performance to compare with other countries. On the other hand, it is referred to as two basic obstacles to the development of SME's supportive conditions in Turkey. The first is the lack of access to the appropriate financing conditions, and the other is that SMEs have weak characteristics in terms of the profile required by the international business environment. In this context, it is necessary to take policy action for micro enterprises. It would be useful to take all stakeholders under the umbrella of responsibility, along with the university, private sector, non-governmental organizations, and public administration, according to prepared and updated SME Action Strategy by the state planning organization. SMEs are extremely significant for the Turkish economy, but most of them have problems in getting the support they need. The business support process has a structure with one-time services without coordination institutions, which is focused mostly manufacturing sector. Financial resources are limited, and it gives signals about the existence of a structure that would be felt mainly in the bureaucracy.

In order to enable the development and innovation environment of SMEs in Turkey, it is necessary to draw attention to the following areas: to create a more coordinated and functional structure to maintain innovation policies to maintain competitiveness, to improve the conditions of national IT infrastructure, developing local and regional action plans for innovation, to prepare better conditions for the development and entrepreneurship activity of SMEs; economic and political stability, and Raising awareness of EU program participation.

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The Administration of Foreign Exchange Risk for Sinaloa's Micro Industries

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Abstract The present work is related to the administration of the exchange risks in an industrial microenterprise of Sinaloa, and its objective is to contrast the effect obtained on the decision-making process by managing the exchange risks inherent in the businesses that buy imported raw materials in order to be able to produce their goods that they commercialize. For this reason, it is based on literature review contained in scientific articles, books, and theses where evidence was found that it is possible to reduce risk through the use of derivative instruments such as European futures and options contracts. The methodology is qualitative with the case study. The results indicate that it is possible. The results indicate that it is possible to manage the exchange risk using derivative products in the microenterprise studied.

1 Introduction

Administration is the science that oversees planning, directing, organizing, implementing, and controlling the resources of an organization. Its importance lies in the application or not of the scientific knowledge generated in the administrative area as a fundamental tool in all types of companies. This work is focused on the management of external risks in the company, such as the risk of the exchange rate that, even though it is an external threat to organizations, can be managed.

This article is composed of an introduction, theoretical framework, methodology, analysis, and presentation of results, discussions, conclusions, and recommendations. The research follows a qualitative methodology with the modality of a case study. The data analysis was carried out from the qualitative and quantitative

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approaches. Atlas.ti, RStudio, and Risk Simulator were used in this study. First, it is important to understand the background in the business area in Mexico. In Mexico, the situation for newly created companies is complex, various internal and external factors afflict entrepreneurs. According to Gascón (2012), between 350 and 400 thousand Small and Medium Enterprises (SMEs) are created annually in the country, of which half close during the first year, and only 10% continue in the next 5 years. The National Institute of Statistics and Geography (INEGI), through the Statistical Directory of Economic Units (DENUE), published in 2014 that a total of one million 584 thousand 927 businesses closed or suspended activities. In addition, for every ten companies that open in Mexico, eight correspond to micro-sized companies. The importance of micro and small companies lies in that they constitute an important contribution to the national economy, a situation expressed in the country's Gross Domestic Product (GDP), with a 52% share in 2010. The INEGI economic census, in 2014, shows that 94.3% of companies in Mexico were micros. If the Mexican economy is objectively analyzed, it is largely supported by the participation of these units as generators of employment sources and providers of goods and services.

Now, regarding the state of Sinaloa, according to data provided by the National Statistical Directory of Economic Units (DENUE, 2016), 91.51% of state companies employ up to 10 employees. In the city of Culiacán, Sinaloa, the trend persists given that 90.18% of economic units have fewer than 11 employees and only 9.82% of companies are more than 11 (INEGI, s/f). Regarding the personnel employed in 2013, in Mexico, the total occupation was 21,576,358, of which 8,580,027—that is, 39.79%—corresponded to people who worked in micro-enterprises (INEGI, 2015, p. 19). In this context, where the economic and social importance of micro-sized companies is observed, it is decided to study this business stratum. Specifically that of the manufacturing industry sector of manufacturing of integral kitchens and modular bathroom furniture in Sinaloa. According to a consultation in DENUE of INEGI, there are 156 economic units of this line.

According to data provided by Banco de México, on January 1, 2014, the exchange rate of the Mexican peso/US dollar was quoted at 13,1011. In June 2016, a new resistance of 19.1283 was presented, outlining the dollar. Diaz and Venegas-Martínez (2001) affirm that a company whose main input is imported requires derivative instruments that allow them to manage risk. They propose the use of futures on agricultural products because even though Mexico has an organized market that offers hedging for all economic sectors, products from the deregulated or over the counter [OTC] market are used. Salazar Garza (2012) differs from these authors arguing that hedges with derivative products are very expensive for Mexican companies, so they suggest the use of the fuzzy logic model to forecast exchange rates and manage this risk without contracting derivatives. Likewise, for the study being carried out, another turn that is also affected by the variation in the exchange rate of the Mexican peso/US dollar is the manufacture of integral kitchens and modular bathroom furniture in Sinaloa. So, the Carpical company is selected.

According to the National Statistical Directory of Economic Units, in the state of Sinaloa, 572 companies were identified, of which 559 are micro-companies dedicated to the manufacture of integral kitchens and modular bathroom furniture. Likewise, it was found that in Culiacán, 98.59% of the total companies are of micro size. In other words, of the total, only one is small (DENUE, 2016). It is worth mentioning that as they are micro or small-size companies, they are usually managed by the owners themselves, who in most cases have little or no administrative knowledge that impacts the development of the company and the industry. The problem of this industry lies in the fact that the main input used in the elaboration of integral kitchens is of foreign origin; the finished products are made up of 80% imported wood.

Based on the foregoing, the object of study of this research is a micro industrial company dedicated to the manufacture of wooden furniture and serves as a livelihood for five families from Sinaloa. The company was founded in 2005 under the name of Carpintería Caldera, supported by a financial resource granted by the Aguilar Padilla government in Sinaloa. Through the development secretary in charge of C. Jesús Vizcarra Calderón with an amount of $47,000.00 in materials and equipment for the manufacture of wooden furniture in favor of the three owners: Martha Graciela Lizárraga Morales, Ramón Caldera Castro, and Luis Fernando Caldera Lizárraga settled in March 4, colony in the city of Culiacán.

In 2013 the company changed its address and business name, remaining as the property of a natural person named CarpiCal. The new sales office and manufacturing workshop were domiciled in Lomas del Bulevar in the PEMEX neighborhood of the same city where they currently remain. Two sales agents work in the office, responsible for prospecting and following up on clients until the sale is effective. A manufacturing carpenter, cutter, and painter are employed in the manufacturing workshop, with the same owner being responsible for coordinating both areas, as well as serving as company administrator. There are two transport vehicles, one destined for the hauling and installation of wooden furniture and the other for the quotation of jobs and the purchase of materials.

Its clients are emerging as young, newlyweds who are in the process of furnishing their home, childless or with young children. Its suppliers are national companies: Triplay Market. Conglomerate of ten Mexican companies that distribute products derived from wood as well as BASA plates and hardware. Local company that distributes door plates, hardware, and furniture accessories. Northwest Woods Group. Leading supplier of high-quality imported woods offering plywood, mahogany, and cedar plywood for sale from Southeast Asia (Thailand, Malaysia, and Vietnam). Currently, the mission is "To make our clients' ideas come true in wood, guaranteeing them quality in the personalized service we provide to each one of them and the happiness of having a fitted kitchen, closet or door to suit them." Where its three main products are listed, being the integral wooden kitchens the product with the highest sales.

Its vision is "To be distinguished as a leading company in the manufacture of integral kitchens, closets and wooden doors with a presence throughout Sinaloa" expresses the intention of opening branches in Ahome and Mazatlán to cover the length of the state, as services are currently provided to a distance of up to 300 km with reported sales in Mazatlán for $56,000.00 and in Ahome $29,000.00 in 2016. In this context, the central question for the article is how to apply foreign exchange risk management in order to face the negative effects of the depreciation of the Mexican peso on the cash flows of industrial micro-enterprises that acquire imported raw materials for their production processes? There are many sub-questions in that case, such as:

1. What are the exchange risks to which the Carpical microenterprise is exposed as an industry that purchases imported raw materials for the development of its finished products?
2. How does foreign currency risk management impact on the decision-making process for the acquisition of imported raw materials in industrial companies that manufacture integral kitchens?
3. What are the hedging instruments that the international currency market offers to face exchange risk for micro-sized companies in the acquisition of raw materials in dollars?

Besides research questions, this article aims to know the impact of exchange risk management on the purchase of materials to face the negative effects on cash flows and positively impact the decision-making process for the acquisition of imported raw materials from industrial micro-enterprises. From Culiacán, Sinaloa. There are also many sub-targets in that case, such as:

1. To identify the exchange risks to which the Sinaloa industrial microenterprise is exposed and describe the one with the highest incidence.
2. To determine the impact of risk management on decision-making for the acquisition of imported raw materials from the Sinaloa industrial microenterprise.
3. To identify the hedging instruments that are offered in the international currency market that allow to face better the financial risk of the microenterprise in the acquisition of imported raw materials.

With the guideline of these, some hypothesis was determined as follows:

Hypothesis 1 (H1): Risk management through the use of derivative instruments facilitates the process of designing strategies for purchasing decisions in micro-companies that acquire quality imported raw materials in the city of Culiacán, Sinaloa.

Hypothesis 2 (H2): The identification of the foreign exchange risks to which the industrial microenterprise is exposed allows them to be managed efficiently through the design of appropriate strategies for the company.

Hypothesis 3 (H3): Determining the impact of foreign exchange risk management facilitates the decision-making process for purchasing imported raw materials in industrial companies that manufacture integrated kitchens.

Hypothesis 4 (H4): Hedging instruments offered by the international currency market such as futures and options contracts are adequate to face the exchange risk for micro-sized companies in the acquisition of raw materials in dollars.

2 Theoretical Framework

This section presents a tour of the accepted theories. As indicated (Hernández Sampieri, Fernández Collado, & Baptista Lucio, 2014), the theoretical framework consists of theoretically supporting the study once the research problem has already been raised.

2.1 Risk Management

According to Samaniego (2008), the risk is the possibility of loss or not, according to the commitments to which a company is subject. The risk consists of the degree of variability of the returns (the received) in relation to the expected. In other words, when an asset is acquired, it is expected to yield returns, but there are not always returns, and sometimes money is lost with the investments (Van Horne & Wachowicsz, 2002). Business risk is the impact and likelihood that a threat may adversely affect an organization's ability to achieve its business strategies and objectives (Ker, Barnett, Jacques, & Tolhurst, 2017; Kim & Yasuda, 2018). According to the IMEF (2003), the risk is implicit in business. For entrepreneurs to accept a deal, they must place risk in a position that is tolerant, since it can be minimized, but never eliminated.

2.2 Risk Classification

According to Van Horne and Wachowicsz (2002), there are two types of risks: systematic and non-systematic. The first refers to what affects the market in general terms, it is also known precisely as market risk and "obeys the uncertainty associated with the entire economy" (Mankiw, 2012, p. 583) such as a physical reform, variations in the situation of the energy world or changes in export and import policies.

2.3 Foreign Exchange Risk Management

The risk management industry provides vital services to both speculators and risk managers. The decision to purchase currency hedges depends on exposure and risk aversion.

According to Keat and Young, the company is exposed to three types of currency risk:

1. Operational
2. Transaction
3. Accountant

The correct use of hedges reduces the variability of the company's cash flows, which reduces the chances of closing the business. The objective of a hedging program should be that currency hedges increase the expected value of cash flows in national currency and reduce their variability (Kozikowski, 2013). According to González-Aréchiga, Díaz, and Venegas-Martínez (2001), to obtain the net position in foreign currency, a company or natural person has to add all its assets denominated in foreign currency and must subtract all the liabilities in the same currency. If the result is a positive amount, it corresponds to an active position, otherwise it corresponds to a passive position in foreign currency.

The measurement of exposure to foreign exchange risk and interest rates consists of quantifying the maturity gap or net position of assets and liabilities. Once the position in foreign currency has been determined and quantified, the most suitable one to hedge the exchange risk must be selected among the alternatives available in the market (Iqbal, 2017).

2.4 The Currency and Derivatives Markets

The renowned economist Paul Krugman and his colleague Obstfeld (2012) indicate that due to their strong impact on the current account and other macroeconomic variables, exchange rates are one of the most important prices in an open economy, as is the case in Mexico. It should be noted that exchange rates play a fundamental role in international trade, since they allow comparing the prices of goods and services produced in different countries (Annelies, Mark, Roel, & Sigrid, 2020). The currency market, according to Kozikowski (2013), is the largest and most liquid financial market in the world, it is known as the exchange or forex market. In this market, banks, companies, and individuals buy and sell currencies.

According to Mansell (1996), a currency is a currency freely converted into another in the forex market; the exchange rate is determined by the law of supply and demand in this same market. Once purchasing a product is required to manage risk, the appropriate one is sought in the derivatives market. The international derivatives market can obtain contracts to manage risk, which and the way in which they are organized, either Over the counter OTC (without regulation) or, in the case of Mexico, in the Mexican Derivatives Market, which is regulated, and its products are futures and options contracts.

3 Methodology

According to Hernández Sampieri et al. (2014), the research design is the plan that will be followed to obtain the necessary information when solving the problem statement. This research was carried out under the design of a qualitative methodology in which the certainty of the hypotheses formulated is sought, for which a new proposal for a foreign exchange risk management model was used for the micro-industry that uses imported raw materials for its production processes, since in the literature, a model applied to this type of companies was not found. The proposed model is supported by the theoretical review addressed with the main influence on the model of Rupeika-Apoga (2005) and the IMEF model (2003). Using traditional risk management tools such as VaR and administrative methodology. Every administrative process begins with the planning and definition of goals and objectives that will glimpse the path throughout the process. Subsequently, the identification and analysis of the problems presented continues. The allocation of responsibilities, hierarchies, and functions at an early stage favors the development of the process.

For the implementation of the model, the approach scheme was followed, which includes data collection and analysis using traditional tools in the qualitative approach, which in turn will be complemented with econometric tools that integrate sentiment information, perspectives, ideas, feelings, and perceptions of the participants with quantitative data to achieve a holistic approach to the case study. As this is a case study, the methodology proposed by Yin (2009) was adopted, starting from the positivist method that starts from the theory to address the problem. To study the results of the interview, coding, categorization, and conceptual ordering for data analysis will be used, with the support of the Atlas.ti computer software.

The documentary analysis comprising two stages will resort to the support of the statistical software Rstudio and Risk simulator. At first, the internal and external quantitative data will be collected from the company. The financial information of the company corresponding to the purchase of cedar plywood in 15 mm presentation will be organized in a study period from January 1, 2014, to December 31, 2016.m External data was collected from the publications made by Banco de México corresponding to the series of the 48-hour interbank exchange rate of the American Dollar–Mexican peso in the 2014–2016 period in the currency option. In the second stage, with the data already organized, the correlation was performed by the Pearson method to determine if the variable "material price" is affected by the variable "exchange rate" and show the degree of incidence that exists between these two variables.

The most widely used risk management tool in this line of research is value at risk (VaR). To quantify the amount of money that the CarpiCal company may lose because of the exchange risk, the methodology proposed by Johnson (2001) will be used. For the development of management strategies, the reduction of exchange risk is considered by contracting futures and options in the market. The valuation model proposed by González-Aréchiga et al. (2001) and the method of Black and Sholes (1973) will be used.

As for monitoring the performance of risk management, a Monte Carlo simulation was performed to determine if risk management through futures and options contracts reduces the exchange risk for the company under study; and if the implementation of this strategy would be effective modeling for the period from January 1 to December 31, 2017. The Monte Carlo simulation model is a collection of techniques for solving mathematical problems through repeated random tests and was used through Risk Simulator software. To carry out this research, a semi-structured interview was conducted to learn the perspective of the company administrator regarding the impacts that the exchange rate has on the process of purchasing materials, which of its inputs represents the greatest fluctuations due to the exchange rate and the strategies that CarpiCal implements within the company to manage the risk due to the exchange rate.

3.1 Documentary Analysis

The documents are a source of valuable information in qualitative research (Hernández Sampieri et al., 2014). In this case, all invoices for the purchase of materials from the company CarpiCal will be analyzed in the period between January 1, 2015, and December 31, 2017. The company's financial statements will serve to relate the effect of the exchange rate on cash flows. The maximum prices for the peso/dollar interbank exchange rate in the same period of time, available on the Banco de México page, will also be used. To establish whether there is a relationship between these two phenomena and the way in which they affect the research variables.

This chapter aims to expose the data collected with the research tools mentioned in the methodological section. In order to achieve the objectives established at the beginning, the information data was collected for analysis and interpretation using the Atlas.ti, Rstudio, and Risk Simulator software for a better understanding of the results obtained and then the contrast with the theories found. In the qualitative analysis of the data provided by the informant, a negative relationship was identified between the exchange rate risk and the change in the price of the materials observable. The changes in the price of cedar plywood are constant and are on the rise, in addition to not presenting a significant decrease in them that help restore the flows expected by the company.

In the words of Krugman, Olney, and Wells "people's expectations of consumption can increase or decrease the demand for a good." By lowering consumers' expectations of purchasing products made from cedar plywood, their supply is reduced and to offset this decrease in the interest of CarpiCal customers, the company offers products based on inexpensive materials to try to keep its sales. The company experiences a state of uncertainty derived from the foreign exchange risk caused by the rise in the inputs used in the transformation of final products which could be reduced due to the possibility of importing the materials by setting the price of the dollar and also potentiating the increase in the quality of the material used.

Table 1 Regression results

Variable	Coefficient	Error std.	*T*-statistic	Prob.
Material price	193.034	45.046	4.285	0.000142***
Exchange rate	51.47	2.799	18.391	<2e-16***
R-squared	0.9087			
R-adjusted square	0.906			

*** Significant at 1%

According to Kozikowski (2013), a correct use of hedges reduces the variability of the company's cash flows, which reduces the possibilities of closing the business.

According to Allayannis and Ofek (2001), the movements of the exchange rate affect the expected cash flows and, therefore, the expected income. By changing the value of the local currency, foreign income, or costs, the conditions of competition change, both for large multinationals and for small exporters or importers. The determination of the exchange risk exposure was made in two sections. On the one hand, a simple linear regression was performed to correlate the two variables and verify that, in effect, the exchange rate affects the company. In addition to the correlation, the value at risk was used to determine the maximum amount of loss in CarpiCal purchases because of the exchange rate risk.

For the collection of documentary data from the CarpiCal company, all the fiscal receipts for the purchase of materials were requested from the personnel, only taking up the prices of 15 mm cedar plywood to record the purchase volume, the frequency, and quantity in the variation of prices. To subsequently correlate them with the interbank peso/dollar exchange rate series obtained from Banco de México from January 1, 2014, to December 30, 2016. The analysis of the exchange rate data was carried out through the Rstudio software. The second variable studied is the independent variable (exchange rate). In total, 1095 Banco de México data corresponding to the interbank exchange rate published in the DOF were downloaded from January 1, 2014, to December 31, 2016. Subsequently, the monthly average of the series type was calculated by matching the data type and proceeding to the relationship analysis between the two variables.

The statistical results of the linear regression (Table 1) indicate that the exchange rate explains 90% of the price of the material, this is observed both in the squared *r* and in the adjusted *r*-squared. Knowing this, the company can forecast increases in the price of the material before the supplier makes them and make decisions about it. To know the degree of correlation between both variables, the Pearson, Spearman, and Kendall correlation models were used, obtaining confirmation of the positive correlation in the three methods.

A positive correlation of 95% is verified by the Pearson method, between the two variables studied, the peso/dollar exchange rate and the purchase price of material per unit. When the price of the dollar increases, then the price of the cedar that is sold in Culiacán also increases. Continuing with the methodological design, the study calculates the value at risk of the study unit in relation to the purchase of the 15 mm cedar plywood material, which turns out to be the main input in its production processes. To estimate the maximum amount that the company can lose through this purchase process, the monthly amounts for the 2014–2016 period were calculated, obtaining the results, where the maximum monthly purchase amount. It is close to 30,000 pesos, and that the company sometimes does not purchase said input. The maximum volume was recorded between the exchange rate close to $18.00 and the price at $1200. At the same time, the purchase minimums are presented with prices of $13.50 (exchange rate) and $780 (material).

3.2 Evaluation of Hedging Strategies with Monte Carlo Simulation

The qualitative analysis of the study shows the insecurity that the company faces in the face of price variations as a consequence of the exchange rate risk that prevails in the industrial sector of manufacturing of complete kitchens as consumers of raw materials for transformation. The statistical results of the simulation indicate that the highest probability of occurrence is between 15.00 and 20.00 pesos per dollar, corroborated by the third percentile that groups values from $0 to $18.06 pesos. As a result of the findings in the literature, the H1 research hypothesis was proposed, which deals with "Risk management through the use of derivative instruments facilitates the process of designing strategies for purchasing decisions in microenterprises that they acquire quality imported raw materials in the city of Culiacán, Sinaloa." Hedging against foreign exchange risk through instruments of this type are adequate for companies, which was verified in this investigation, and coincides with what is stated by NAFIN (2017), Allayannis and Ofek (2001), Scholes (1996), González-Aréchiga et al. (2001), Diaz and Venegas-Martínez (2001).

Therefore, the H1 is accepted, the coverage against the movements of the exchange rate facilitates the process of designing strategies for purchasing materials in the microenterprise. The final decision to buy or not the hedges will depend on the risk aversion, the objectives, and the characteristics of the decision-maker. In the words of Gitman and Zutter (2012), when it comes to choosing between two investments, a risk-averse trader will reject the one that creates the most insecure, thereby sacrificing the possibility of generating a strategic advantage or a higher return. As for the H2, "The identification of the exchange risks to which the industrial microenterprise is exposed allows them to be managed efficiently through the design of appropriate strategies for the company," it is validated because it is necessary to check whether the company is actually being affected by currency risk. Using the correlation between the exchange rate and the price of materials, it was possible to identify such a relationship and measure the degree to which the movements of the exchange rate affect the price of imported cedar plywood, finding through the correlation model that the *r*-squared explains in 90% the increases in the price of the material due to the exchange rate.

He agrees with Toro Díaz and Palomo Zurdo (2014) that it is necessary to identify the risks that affect micro-enterprises in order to safeguard them, since they are an essential part of the Mexican economy. These statements made by Toro Díaz and Palomo Zurdo (2014) are related to the following hypothesis, H3 "The determination of the impact of foreign exchange risk management facilitates the decision-making process for purchases of imported raw materials in industrial companies that manufacture integral kitchens," It is also validated because the information collected in the risk management process will allow the entrepreneur to act early. Knowing the exchange rate forecasts will guide the entrepreneur in the prices of raw materials. Knowing how much the input will cost in the future ensures an advantage over others who do not have such information. The implementation of measures such as those suggested by Meulbroek (2002), modifying operations,

1. Adjust the capital structure and
2. Use hedging instruments (derivatives)

Those contributed by Berk and DeMarzo (2008). The first focuses on vertical integration where the supplier agrees to maintain prices even if the trend is upward. The second strategy is to increase investment in inventories to ensure the supply of materials, anticipating increases in prices. On the other hand, for the test of hypothesis H4 "the hedging instruments offered by the international currency market such as futures and options contracts are adequate to face the exchange risk for micro-sized companies in the acquisition of materials premiums in dollars," the Monte Carlo simulation method was used. According to Stover and Biafore (2014), it allows calculating the probabilistic values to generate forecasts, which indicated that micro-companies have the option of contracting financial derivative instruments in order to "insure" against the movements of the exchange rate. This would allow them to set the price of the dollar at a certain amount and take advantage of those dollars to acquire a large quantity of material at the international market price. The final decision on whether to purchase coverage will depend on the company's strategy and the profile of the entrepreneur in assuming premium payment commitments in exchange for setting the price of the international currency.

4 Discussion

Once the hypotheses that guided this research have been verified, the alternative of creating a consumer cooperative is left to the discussion as it is considered an opportunity to reduce the obligations of premium payments of coverage contracts by sharing responsibility through the legal figure called consumer cooperative society. Or, this figure would serve as a bridge to acquire imported material at a preferential price, paying the import costs as a whole. The capital that each partner contributes to the accumulated purchase of the material is collected, and the goods are subsequently distributed in relation to each contribution made.

5 Conclusion and Recommendations

The exhaustive review of the literature showed that foreign exchange risk is studied in large international companies, leaving aside micro-, small-, and medium-sized companies, so it was necessary to retake the management models of global companies and adapt it to micro-companies., which are generators of economic well-being in Mexico, contributing 39.8% of formal jobs and representing 95.4% of companies throughout the country. It was verified that there is a high impact between the peso/ dollar exchange rate and the main product that the studied company consumes, with a Pearson correlation level of 95%, thus demonstrating that the Sinaloa micro-industry that buys imported products is susceptible to currency risk. With the analyzed results, it can be concluded that importation is a strategy of purchasing quality materials that is achievable for the micro-industry that already purchases imported inputs, generating the possibility of accessing preferential prices for volume of purchases and raising the quality of the materials it uses in their production processes.

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Interplay Among Strategic Macroeconomic Variables in Selected Competitive Economies: Insights from Dynamic Panel Studies

Ramesh Chandra Das and Amit Chatterjee

Abstract The interrelationships among the macroeconomic variables have been amply examined in the available literature; however, there exists a gap when it comes to the impact of technological shock coupled with other macroeconomic variables such as real exchange rate, Inflation, Broad Money, Research and Development, and Net Foreign Inflows on economic growth. The study examines how these macroeconomic variables are interlinked in the long run and how they behave in the short-run dynamic adjustment processes. A panel of ten highly competitive economies over 1996–2017 has been analyzed in a dynamic framework using the VECM. The results show that the six macroeconomic indicators maintain a long-run relation and GDP growth rate and inflation rate are caused by the other five variables in the panel. In the short run, the GDP growth rate is influenced by all the five remaining variables. The results indicate significant insights for identifying the possible causes of the appearances of ups and downs in the business cycle. Hence, it is recommended that the control and management of these macro indicators should be the priority agendas of the countries considered in the dynamic panel study.

1 Introduction

Policymakers all-round the globe involve themselves in dealing with the interplay between the strategic macroeconomic variables to tackle multi-dimensional aspects like economic growth, unemployment, human capital, and sustainable development, and fluctuations of the business cycle in general. The study of cause-and-effect relationship of the macroeconomic variables has been enigmatic and inexplicable in this increasingly globalized world. Today, the economies are more dependent on each other than ever before, which thereby make their fiscal and monetary policies

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interlinked, since these economies must tackle the increasing threat of high recession and slowdowns permeability linked with globalization. Economic growth, on the one hand, is evident in terms of competitive markets with high-quality products, increased revenues due to low labor costs, rise in the living standards among poor countries, and efficient flow of technology. On the contrast, the increase in unemployment in the developed countries, greater probability to exposed financial crises and spill-over effects to other nations, Balance of Payment disequilibrium makes the conscious study of macroeconomic variables a need of the hour. The integrated and highly functional financial markets for service and manufacturing sectors have acted as a catalyst in easy mobility of capital, research and development, international policy coordination and its transmission, along with international business cycles, which further necessitates the study of the World's macroeconomic conditions. The structural shifts in the World's major economies have been a part of the development process in terms of the level of output and of output capacity, raised standards of living, greater inflows of foreign currencies, which has further integrated the fiscal and the monetary policies of these nations. This in turn has been influenced by the degree of political openness and regulatory bandwidth, which further become comprehensive for analyzing the economic and technological development of these nations.

The present study is a nascent step to address the menace and magnitude of the distorted interplay between macroeconomic variables such as GDP growth and other strategic variables such as Research and Development (R&D), Inflation, Real Effective Exchange Rate (REER), Broad Money, and Net Foreign Inflows (NFI) in ten major economies viz. Brazil, China, Germany, France, India, Japan, Saudi Arabia, South Korea, UK, and the USA for the time period 1998–2017. These economies have been major players during the last two decades accounting for more than 65% of the World's economy and around 47% of the World's exports. The study considers the GDP growth rates as a dependent variable, while R&D as a percentage of economy's GDP has been considered as a proxy measure for technological shocks. The other variables, such as REER and Net Foreign Inflows, indicate the impact of economic openness. The other exogenous variables, Board Money supply and Inflation rates have been included, which synergies the cumulative impacts on GDP growth.

The present chapter aims at examining interrelationships among six macroeconomic indicators, GDP growth rate, broad money, inflation, net foreign inflow, real effective exchange rate, and research and development, in both long and short runs in a panel of ten highly competitive economies in today's world.

2 Review of Literature

Till date a plethora of studies has been there in the literature on the roles of different macroeconomic indicators in deciding their values and explaining booms and recessions in the business cycles at local and global levels. The present study reviews some of them and points out the remaining in Table 1 indicating their major contributions. In a pioneering study, Hendry (1986) analyzed macroeconomic time series data and examined their cointegrations. It was a resolution to the earlier studies which proposed differencing for making a series stationary. Faria and Carenerio (2001) investigated the relationship between inflation and output in the context of an economy facing persistent high inflation, Brazil, and found that inflation did not influence real output in the long run, but in the short run. The result supports the proposition of Fischer (1979). Agenor, McDermott, and Prasad (1999) investigated the impacts of different macro variables in a list of developing countries and compared with the industrial countries and observed that the results are similar between the two groups in the areas of procyclical fluctuations in wage rates, government expenditures, and monetary aggregates.

In the recent past, the study by Bhuiyan and Chowdhury (2020) supports that there exists an asymmetric relationship between the macroeconomic variables and stock market indices in US and Canada markets where the stock market indices become sensitive to the stock return, an effective investment strategy for the long-term investors. But analysis shows that the financial crisis has altered macroeconomic strategies and relationships, but US Money supply and interest rate have a positive relation with Canadian indices against the oil and energy sectors, transforming the US manufacturing economy into service-based economy; the structural shift is evident. Khalfaoui, Padhan, Tiwari, and Hammoudeh (2020) illustrated with different empirical observations stating pronounced macroeconomic variables like GDP, Exchange rate, CPI Inflation, Interest rate, oil prices affecting money demand of Indian economy in longer time horizons recommending macroprudential policies, portfolio diversification enhancing risk management power by formulating asset allocation strategies in long-term stock holding periods. But the minimal frequency of Indian authorities on the macroeconomic agents provides higher sustenance and connectivity with money demand. The details of the analysis are given in Table 1.

3 Data and Empirical Methodology

The principal source of the data that the study has used is the World Bank (www.worldbankindicators.org). There are six strategic macroeconomic variables in the study, which are usually interlinked to justify growth and fluctuations of income and employment of a nation. They are Growth of GDP (termed GDP), ratio of broad money to GDP (termed Broad M), inflation rate (Inf), net inflow of foreign capital (NFI), real exchange rate (REER), and research and development to GDP ratio (R&D). The period of study is 1996–2017, and the number of competitive economies in the today's world is taken to be 10. The present study selects the variables on the basis of the studies available in the literature, such as Fischer (1979), Agenor et al. (1999), Hendry (1986), Faria and Carenerio (2001), Chatterjee, Dash, Das, and Sen (2019), Christou, Gabauer, and Gupta (2019), Colombo and Paccagnini (2020),

Table 1 Literature review

Authors	Time period	Nations	Model	Variables	Observations/Results
Goh, McNown, and Wong (2020)	1960–2015	Japan	Cointegration Test and Augmented ARDL	Population Age: Young, Working and Old; Gross Domestic: Savings, Product, Fixed Capital Formation; Cash Surplus Deficit, Inflation, and Real Interest Rate	Emphasizing the Demographic dividend of Japan, the effects of demographic transition (population aging) on macroeconomic variables are statistically significant, contributing to strong economic growth and high rates of private saving with the decline in fertility rate. Also, different age responds to different determinants of macrovariables with the long-run relationship with Japan’s economic growth but with slow demographic ratios evolution, as fall in GDP due to more elderly dependency. Population projections determine reduced fiscal deficits but high fertility after 2025 can be a great variant for savings and fiscal balance.
Colombo and Paccagnini (2020)	1973–2018	United States of America	Smooth Transition VAR, Markov-Chain Monte Carlo Simulation, Variance Decomposition, and Impulse Response Forecasting	CPI inflation, Employment rate, Manufacturing-industrial production growth, Excess Bond Premium Indicator, Cumulated value-	The study contributes that credit supply shock, explaining excess bond premiums has asymmetric effects on the price, output,

				weighted total stock market return, Nominal 10-year, and 1-year-old Treasury yield.	and employment levels. It validates negative macroeconomic fluctuations, redundant risk-bearing capacity of financial sectors in recession and normal times by adopting the expansionary monetary policy. Hence reactions and variation in monetary variables affecting cash flow, credit supply, and employment.
Kim and Oh (2020)	2003–2019	South Korea	VAR, Cholesky Variance Decomposition, and Impulse Responses	Loan-to-value (LTV), Debt-to-income (DTI), Consumer Price Index (CPI), Industrial production (IP), Price House, Household Bank Loan, Call Rate, and Intermediate Material Price (PPIM), Jeonse Price and New Construction Orders	LTV and DTI policies have a significant effect on stabilizing housing markets with remarkable effects by CPI and IP coverage and intensity on prices and bank loans. Hence LTV and DTI appraise more financial stability during recessionary pressure by stimulating the economy and reducing bad debts with an accommodative asset creation structure in Korea.
Christina Christou, David Gabauer, Rangan Gupta	1855–2016 (150 YEARS)	United Kingdom	Time-varying parameter vector autoregressive (TVP-VAR) and GARCH	Unemployment rate, WPI monthly-Inflation, the Bank rate, Exchange rate returns, Corporate bond spread, and Stock market volatility	Monetary policy decisions evaluate the nature, impact, and strength of uncertainty shock on inflation, interest rate, unemployment rate,

(continued)

Table 1 (continued)

Authors	Time period	Nations	Model	Variables	Observations/Results
					and exchange rate, mainly the macroeconomic variables from the stock market volatility and corporate bond spread.
Walid Mensi, Shawkat Hammoudeh, Aviral Kumar Tiwari, Khamis, and Hamed Al-Yahyaee	1994–2018	16 Islamic Countries (MENA and NON-MENA)	Wald Test, Pseudo Likelihood Ratio Test, Fisher Test, Panel Smooth Transition (PSTR), and Dynamic Panel Quantile	GDP Per Capita Growth, Islamic Banks: total asset-to-GDP ratio, deposits-to-GDP ratio, loans-to-GDP ratio, net loans-to-GDP ratio; FDI, Government consumption, Education, Trade openness, Rule of law, Terms of trade, Oil production and CPI Inflation	Encouraging more FDI, adopting domestic financing in the intermediate regime contribute to positive economic growth stating a strong Islamic banking sector. It indicates financial development promotes government consumption for better human capital index with significant terms of trade, returns from oil-importing economies but insignificant from oil-exporting nations. Hence Islamic banking variables have insignificant relation during high regimes (strong financial development).
Trlaković, Despotović, and Ristić (2018)	2005–2015	Western Balkan areas—7 countries	Regression	GDP Per Capita16 export product categories	Those commodity groups produced by medium-low and low technology industries have the greatest effect

					on the change in the volume of GDP p/c in all WBCs
Datta (2019)	1978–2006 1983–2003	India	Hawkins-Simon conditions	Prices of sectoral final uses, GDP deflator	Technological progress changes a sector's relative share to the GDP without any change in the real output of the two sectors as the sectoral GDP is proportional to the sectoral employment.
Chu, Yang, Ha, and Ahn (2018)	1993–2014	US and China	Agent-Based Model, Simultaneous Equations, Bayesian Estimation, Forced damped pendulum	Analytical Model, quarterly growth rates of the real GDP, and the business cycle indicators of the US and China	The Chinese economy is more volatile and less persistent than the US economy: China has a shorter average duration of business cycles and recovers faster from external shocks, and the two countries move synchronously.
Chatterjee, A., Dash, D., Das, R., Sen, S.	1980–2017	India and China	Comparative Regression Analysis with Interaction Effect	Economic Growth, FDI, Gross Fixed Capital Formation, Remittances, Inflation, Rail Density, Air Transport, Human Capital (labor force), Gross Savings	FDI inflows to China are comparatively higher than India with every 1% increase in FDI inflows there is 0.24% to 0.4% growth in India, while it leads to 0.4% to 0.9% growth in China annually. For China, every 1% increase in domestic investment (gross fixed capital) has led to 0.5%–0.6% economic growth,

(continued)

Table 1 (continued)

Authors	Time period	Nations	Model	Variables	Observations/Results
					while it leads to more than 1.2% growth in India during this period.
Kisswani, Kein, and Shetty (2015)	1994 Q1–2013 Q2	Estonia	Cointegration test by both Engel Granger process and Johannsen cointegration ADF VECM	GDP, FDI	Real GDP and FDI series are cointegrated, and therefore are related in the long run; FDI Granges causes GDP, but only in the long run, and not short run
Mohey-ud-Din and Siddiqui (2016)	1980–2010	Bangladesh, India, Nepal, Pakistan, and Sri Lanka	Cross-Section Dependence Test, Second Generation Unit Root Test, Panel Cointegration (Pedroni), GM-FMOLS	GDP of the capita, reliance on foreign aid, aid, financial development, price volatility, and Political Stability	Aid dependence, trade openness, volatility in the price level, reliance on agriculture, and political stability are the key determinants of GDP fluctuations
Maroney, Naka, and Wansi (2004)	1996–1998	South East Asia	Linear regression, Logit, Wald's test, Likelihood ratio, GMM, J-Statistics test, Cusum and Cusum of squares, LM-test, Chow's test	Equity market return, exchange rates, PE ratio, PB ratio, MSCI World Index	Volatilities in South East Asian countries increased by fivefold, PB ratios decreased to 1.740, PE ratios dropped as well. Clear signs of capital flight were seen.
Cerra and Saxena (2002)	1991	India	Random walk, ECM, Granger Causality, Granger and Gonzalo method, Dynamic and static forecasting, Hodrick Prescott Filter	Government expenditure, terms of trade, investment and GDP ratio, technical productivity, exchange control, parallel economy, capital control, domestic credit, political confidence.	The crisis was caused by high fiscal deficits, the loss of confidence in the government, and mounting current account deficits; Indian rupee was overvalued at the time of the crisis.

Mensi, Hammoudeh, Tiwari, and Al-Yahyaee (2020), among others. The countries and their significance for the inclusion in the study are given in Table 2.

The study thus uses 22-year points for the cross-section of ten competitive economies leading to 220 panel data. Since time series analysis for the individual countries with 22-year points may not produce robust results, the study thus has focused on dynamic panel data analysis for investigations of the proposed hypotheses.

3.1 Panel Unit Roots

A panel data analysis overcomes the problem of spurious and low-power econometric results that would happen in an individual country-specific time series analysis. The present study has, therefore, concentrated on the panel data analysis. But time series data for most of the macroeconomic indicators are usually non-stationary in nature and thus they suffer from unit roots problem. Hence, to work upon time series data, we need to test whether the series are stationary or not. If not, we have to convert them into stationary by means of differencing in most of the cases.

For a data set of a variable "*y*" ($y_{i,t}$, $i = 1, 2, \ldots, N$ (here $N = 10$) and $t = 1, 2, \ldots,$ T (here $T = 22$), where *t* denotes time, let us consider the following linear regression model for panel unit root test in line with the ADF(p) (1979) regression–viz.,

$$\Delta y_{i,t} = (\rho_i - 1)y_{i,t-1} + \sum\nolimits_{j=1}^{p}\gamma_j \Delta y_{i,t-j} + Z'_{i,t}\alpha_i + u_{i,t} \tag{1}$$

where Z_{it} represents the exogenous variables in the model, including any fixed effects or individual trends. The null hypothesis for this model is $\rho_i = 1$ against the alternative hypothesis $\rho_i < 1$. The above equation can be rewritten as-.

$$\Delta y_{i,t} = \delta_i y_{i,t-1} + \underset{j=1}{\overset{p}{\Sigma}}\gamma_j \Delta y_{i,t-j} + Z'_{i,t}\alpha_i + u_{i,t} \tag{2}$$

The null hypothesis for this model is $\delta_i = 0$ against the alternative hypothesis $\delta_i < 0$. The time series techniques offer two approaches of testing panel unit roots depending on homogeneity or heterogeneity of the regression coefficients. Testing techniques for panel unit roots where the coefficients (δ_is) are restricted to be homogeneous for all units of the panel are offered by Levin and Lin (1993) and Levin, Lin, and Chu (2002), and for the heterogeneous coefficients are by Im, Pesaran, and Shin (1997, 2003), ADF—Fisher Chi-square and PP—Fisher Chi-square of Maddala and Wu (1999). The assumption of homogeneity (δ_is $= \delta$, say) is clearly restrictive and subject to the possible homogeneity bias of the fixed

Table 2 Rationale for country selection

Countries	% Share in World Economy	% Share in World Exports	% Share of R&D in Country’s GDP (Two Decadal Average)	Other distinctive features of the economies
Brazil	2.21	1.14	1.05	Contribution of 45% to South America’s GDP
China	16.07	10.93	1.40	Rising superpower with OBOR
India	3.21	2.21	0.78	Fastest-growing major economy
France	3.28	3.58	2.15	1.97% share of FDI of the world
Germany	4.66	7.70	2.57	Biggest economy in EU
Japan	5.87	3.77	3.11	Major economic power in Asia after China
Saudi	0.93	1.29	0.27	Holds 16% of world’s oil reserves
South Korea	1.91	2.93	3.08	Influential exporter of finished goods
UK	3.37	3.53	1.64	Home of major financial services MNCs
USA	24.26	10.33	2.64	Most influential economy in the world

Source: World Bank

effect estimator. The Levin and Lin (1993) and Levin et al. (2002) models are captured by the following Eq. (3) where δ_is = δ:

$$\Delta y_{i,t} = \delta y_{i,t-1} + \sum_{j=1}^{p} \gamma_j \Delta y_{i,t-j} + Z'_{i,t}\alpha + u_{i,t} \tag{3}$$

The test statistics proposed by Maddala and Wu (1999), based on the suggestion of Fischer, is of the form.

$$\chi^2 = -2\sum\nolimits_{i=1}^{N} (\log\ p_i) \tag{4}$$

It follows chi square distribution under the null hypothesis of $p_i = 0$ for all the “i_s.” The simulation suggests that the Maddala and Wu’s Fisher test is more powerful than the Im, Pesaran, and Shin test, which is again more powerful than the Levin, Lin, and Chu test in a variety of situations.

3.2 Panel Cointegration Test

Existence of cointegration among the variables indicates that there are co-movements of the variables, and so they have equilibrium relations. Several test techniques are available from the literature to examine whether variables in individual or panel data are cointegrated. In a panel data, two tests are usually done for the purpose. The Pedroni (1999, 2004) and Kao (1999) tests are based on Engle and Granger (1987) two-step residual-based *cointegration* tests, and Fisher test is a combined Johansen test. We apply all three tests in our study. But, for the Kao test, with six selected variables of the study, the 22-year point is not sufficient. We thus omitted the Kao test but carried out the other two tests. The methodologies are as follows.

The Engle and Granger (1987) *cointegration* test is based on an examination of the residuals of a spurious regression performed using $I(1)$ variables. If the variables are *cointegrated* then the residuals capturing the linear combinations of both the variables should be $I(0)$ or first differenced stationary. Pedroni proposes several tests for *cointegration* that allow for heterogeneous intercepts and trend coefficients across cross-sections. Let us consider the following regression with no intercept constant and trends-

$$y_{i,t} = \delta_i x_{i,t} + u_{i,t} \tag{5}$$

For $t = 1, 2, \ldots, T$ and $i = 1, 2, \ldots, N$; where y and x are assumed to be integrated of order one. The common approach is to obtain residuals from Eq. (5) and then to test whether residuals are $I(1)$ by running the auxiliary regression for each cross-section as-

$$e_{i,t} = \rho_i e_{i,t-1} + \sum_{j=1}^{p_i} \gamma_{ij} \Delta e_{i,t-j} + \varepsilon_{i,t} \tag{6}$$

Pedroni describes various methods of constructing statistics for testing for the null hypothesis of no *cointegration* ($\rho_i = 1$) on the basis of the residuals derived from Eq. (6). There are two alternative hypotheses: the homogenous alternative, $(\rho_i = \rho) < 1$ for all i (which Pedroni terms the within-dimension test or *panel* statistics test), and the heterogeneous alternative, ($\rho_i < 1$) for all i (also referred to as the between-dimension or group statistics test). A total of 11 statistics with varying degree of properties (size and power for different N and T are generated).

In a different testing configuration, Johansen offers two different statistics, likelihood ratio trace statistics and maximum eigenvalue statistics, to determine the presence of cointegration vectors in the non-stationary time series. Using the Johansen test for cointegration, Maddala and Wu (1999) consider Fisher's (1932) suggestion to combine individuals tests, to propose an alternative to the previous tests, for testing for cointegration in the full panel by combining individual cross-sections tests for cointegration.

3.3 Vector Error Correction Mechanism

Once we establish that there are long-run equilibrium relations among the variables, we need to test whether the errors due to the short-run deviations from the equilibrium relations are corrected, and the series converges to the long-run relation. Vector error correction mechanism (VECM) captures this phenomenon. VECM is a restricted Vector Autoregressive (VAR) model and has cointegration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their cointegrating equilibrium relationships while allowing for short-run adjustment dynamics. The cointegration term is known as the *error correction* term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

To present the VECM, let us consider a two-variable system with one cointegrating equation therein and no lagged difference terms. The cointegrating equation for no intercept and trend is given by the following equation:

$$y_t = \delta x_t \tag{7}$$

The estimated error term in the first difference is given as-.

$$e_{t-1} = y_{t-1} - \delta x_{t-1} \tag{8}$$

Therefore, the corresponding VEC model is:

$$\begin{aligned} \Delta y_t &= \alpha_y (y_{t-1} - \delta x_{t-1}) + \varepsilon_y \\ \Delta x_t &= \alpha_x (x_{t-1} - \delta y_{t-1}) + \varepsilon_x \end{aligned} \tag{9}$$

In the simple model, the only right-hand side variable is the error correction (EC) term which is zero in the long-run equilibrium. However, if "*y*" and "*x*" deviate from the long-run equilibrium, the error correction term will be nonzero, and each variable adjusts to partially restore the equilibrium relation. The coefficient "α" measures the speed of adjustment of the *i*th endogenous variable towards the equilibrium. If the error correction term is derived as negative in sign and statistically significant, then we say that the short-term errors have been corrected, and the series is back to the long-run relation. Additionally, we say that there is long run causal influence from "*y*" to "*x*" or vice versa.

Finally, the short-run causality can be tested in this VECM set up by applying the Wald test for coefficient diagnosis. All the econometric exercise for the panel data has been done using Eviews 8.

4 Analysis of Results and Discussion

4.1 Panel Unit Roots Test Results

We have run panel unit root tests for common unit root process (LLC) and individual unit root process (IPS, MW) following Eq. (1)–(4) for the series of the six macro indicators, GDP, Broad M, Inf, NFI, R&D, REER, for the study period over 220-panel observations. The results of the panel unit roots test for all the series are presented in Table 1. Results with respect to the test condition of "with intercept" show that the series for GDP growth, Broad M ratio, Inf are stationary at their levels, but others are not (results not shown to avoid crowding of data presentation). To run the rest of the quantitative exercise for all the variables taking together, we need all of them to be in the same order of integration. Thus we have tested whether they are all $I(1)$. The test results from Table 3 that all the series in their first differences are highly significant under "common unit processes" and "individual unit root processes." This means the null hypothesis of "presence of panel unit roots" is rejected, and hence, all the series are stationary at their first differences. Hence, we move to the next step of our exercise.

4.2 Panel Cointegration Test Results

As mentioned, the primary criteria to run tests for cointegration is that both the series are to be integrated of order one, and that have been met, we now examine for the existence of long-run associations among all of the six indicators for the panel of countries. As mentioned in the methodology, we run the cointegration test under the three lines-Pedroni test and Johansen–Fisher test. The Pedroni (Engle-Granger-based) test has been done in three alternative criteria: no deterministic trend, deterministic intercept and trend, and no deterministic intercept and trend, and there are total 11 test statistics. The results are given in Table 4.

It is observed from the Pedroni test results that the existence of cointegration between the series is maximum observed under the criterion of "no deterministic trend and, deterministic intercept and trend." Out of total 11 statistics under these two criteria, 6 showed statistically significant results which support for the existence of cointegration. But the third criterion does not prove the existence of cointegration in the gross sense as there are less than half of the results are significant. The Fisher Johansen cointegration test result is presented in Table 5. The results show, based on the estimated values of trace statistics and maximum eigenvalue, that the panels of all the six indicators are cointegrated, and there are equilibrium relations. The too-low probability values allow us to reject the null hypothesis of no cointegration among the selected indicators.

Combining the panel cointegration results of the two methods as depicted in Tables 2 and 3 we can now conclude that the panels of the series on GDP, Broad M,

Table 3 Panel unit root test results for first differences

		Test statistics with intercept (Prob.)					
Method	Null hypothesis	GDP	Broad M	Inf	NFI	R&D	REER
Levin, Lin and Chu	Unit root (under common unit root process)	−13.41 (0.00)	−6.97 (0.00)	−8.05 (0.00)	−6.54 (0.00)	−5.75 (0.00)	−7.95 (0.00)
Im, Pesaran and Shin	Unit root (under individual unit root process)	−12.46 (0.00)	−7.63 (0.00)	9.58 (0.00)	−7.05 (0.00)	−5.55 (0.00)	−6.21 (0.00)
MW-ADF—Fisher Chi-square	Unit root (under individual unit root process)	156.86 (0.00)	97.28 (0.00)	118.27 (0.00)	86.46 (0.00)	67.41 (0.00)	75.41 (0.00)
MW-PP—Fisher Chi-square	Unit root (under individual unit root process)	1074.17 (0.00)	137.35 (0.00)	471.26 (0.00)	187.75 (0.00)	114.77 (0.00)	100.52 (0.00)

Note: Automatic lag length selection is based on AIC: 0 to 6. Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality. Results are shown for Test Statistics with Intercept only, the results for "without intercepts" are also statistically significant but not presented due to space problem

Table 4 Pedroni residual panel cointegration test

Trend Details	Hypothesis details		Statistic	Prob.	Weighted statistic	Prob.
No deterministic trend	Alternative hypothesis: common AR coefficients (within-dimension)	Panel v-Statistic	−2.6348	0.9958	−3.09162	0.999
		Panel rho-Statistic	0.162051	0.5644	0.741689	0.7709
		Panel PP-Statistic	−8.80777	0.00	−8.30672	0.00
		Panel ADF-Statistic	−3.51891	0.0002	−3.54066	0.0002
	Alternative hypothesis: individual AR coefficients (between-dimension)	Group rho-Statistic	1.965839	0.9753	–	
		Group PP-Statistic	−11.9693	0.00	–	
		Group ADF-Statistic	−3.42148	0.0003	–	
Deterministic intercept and trend	Alternative hypothesis: common AR coefficients (within-dimension)	Panel v-Statistic	−3.98977	1	−4.42573	1
		Panel rho-Statistic	1.094734	0.8632	1.643388	0.9498
		Panel PP-Statistic	−10.2868	0.00	−10.8086	0.00
		Panel ADF-Statistic	−3.33514	0.0004	−3.77772	0.0001
	Alternative hypothesis: individual AR coefficients (between-dimension)	Group rho-Statistic	2.772129	0.9972	–	
		Group PP-Statistic	−18.932	0.00	–	
		Group ADF-Statistic	−4.2208	0.00	–	
No deterministic intercept and trend	Alternative hypothesis: common AR coefficients (within-dimension)	Panel v-Statistic	−2.20577	0.9863	−3.02699	0.9988
		Panel rho-Statistic	−0.08396	0.4665	0.492121	0.6887
		Panel PP-Statistic	−6.95325	0.00	−3.44737	0.0003
		Panel ADF-Statistic	−3.5904	0.0002	−0.02387	0.4905
	Alternative hypothesis: individual AR coefficients (between-dimension)	Group rho-Statistic	1.345968	0.9108	–	
		Group PP-Statistic	−9.39664	0.00	–	
		Group ADF-Statistic	−3.75996	0.0001	–	

Table 5 Fisher Johansen cointegration test

Details	Fisher Stat. (from trace test)	Prob.	Fisher Stat. (from max-eigen test)	Prob.
None	522.8	0.00	301.1	0.00
At most 1	292	0.00	193.6	0.00
At most 2	139.6	0.00	89.94	0.00
At most 3	67.28	0.00	54.32	0.0001

Table 6 VECM results

Dependent variables	EC terms	Probability	Whether errors corrected	Remarks
D(GDP)	−0.375	0.00	Yes	Long-run causality from all 5 to GDP growth
D(Broad M)	0.123	0.25	No	No long-run causality from all 5 to broad M
D(Inf)	−0.28	0.05	Yes	Long-run causality from all 5 to inflation
D(NFI)	0.22	0.19	No	No long-run causality from all 5 to NFI
D(R&D)	0.008	0.00	No	No long-run causality from all 5 to R&D
D(REER)	0.40	0.05	No	No long-run causality from all 5 to REER

Inf, NFI, R&D, and REER of the panel of selected countries are cointegrated, and they have equilibrium relations in the long run in gross sense. There are three cointegrating equations.

4.3 VECM Test Results

As we have established that there are long-run associations among the variables, in the next step, we need to test whether the errors that might happen in the short-run dynamics are corrected, and the series converges to the long-run relations. VECM captures this phenomenon. Using the set of Eqs. (7)–(9), we have derived the estimated values of the error correction terms. It is required to have negative and statistically significant error correction terms to justify that the series converges to the equilibrium relation and there is long-run causality from any five of the exogenous variables to either of the endogenous variables out of six. The optimum lag for the VAR structure is derived to be 1 based on SIC and HQ criteria. Each of the six variables is used as the dependent endogenous variable, and the rest five variables are used as independent endogenous variables. The VECM results are given in Table 6.

Table 7 Short-run causality through Wald test

Dependent variable	Chi-square	Probability	Remarks
D(GDP)	33.30	0.00	All 5 → GDP Growth
D(Broad M)	8.56	0.12	No all 5 → Broad M
D(Inf)	0.83	0.97	No all 5 → Inflation
D(NFI)	1.90	0.86	No all 5 → NFI
D(R&D)	1.19	0.94	No all 5 → R&D
D(REER)	3.91	0.56	No all 5 → REER

It is observed from the table that the error correction terms for two regression results (with GDP and Inf as the endogenous variables) are statistically significant (shown in bold marks) as their signs are negative and probability values are less than 0.05. This means short run deviations from the equilibrium relations are brought back, and the errors are corrected when GDP and Inf are the dependent endogenous variables. There are 3.7% and 2.8% rates of corrections annually respectively for GDP and inflation as the dependent variable. This further induces us to conclude that there are long-run causations from all the remaining 5 variables to GDP (with respect to Broad M, Inf, NFI, R&D, and REER) and inflation rates (with respect to GDP, Broad M, NFI, R&D, and REER). This means, along with long-run relations, there are causal interplays for the panel of countries for the selected period. Hence, there are interrelationships among the selected macro variables for the today's competitive economies as considered in the study. Now what about the short-run causal interplays among the variables? The respective Wald test results for the said purpose are given in Table 7. Wald test results are confirmed by the values and corresponding probability in Chi-square statistics.

We observe from the table that the values of Chi-square statistics are too high in only one situation when GDP growth rate is the endogenous dependent variable and all other five are independent. This means Broad M, Inf, NFI, R&D, and REER make a cause to GDP growth for the panel of competitive economies in the short run like that in the long run. This reveals that the growth of GDP of these countries is very much interconnected to all the remaining macro variables in long and short runs. Hence, the growth and fluctuations of GDP of these countries may be caused by the growth and fluctuations of all the five variables, Broad M, Inf, NFI, R&D, and REER. But, in no other cases, there are short-run causal interplays among the selected variables as we could not reject the null hypothesis of "no panel causality" for them.

The theoretical macroeconomics posits that money supply has positive impacts upon the growth of income, inflation has negative impacts upon growth of income, net foreign inflow of capital has positive impacts upon GDP, R&D may not be positive (as established by Das & Mukherjee, 2019; Das, 2020) and REER has positive impacts under normal conditions, upon growth of GDP. These networking channels may explain ups and downs of an economy. The present study has exhibited some of the stylized facts on the interrelationships among the selected variables and has added empirical values to the existing literature. Hence, it is recommended that the control and management of these macro indicators should be the priority agendas of the countries considered in the dynamic panel study.

5 Conclusions and Recommendations

The empirical study that we carried out on the interlinkages among selected strategic macro variables in a panel of competitive economies is now in a position to conclude. Long-run stable relations in the equilibrium among the selected variables are established in an unambiguous manner with two significant error correction results for GDP growth and Inflation as the endogenous dependent variables. This further concludes that there are long-run causations from all the remaining five variables to GDP (with respect to Broad M, Inf, NFI, R&D, and REER) and inflation rates (with respect to GDP, Broad M, NFI, R&D, and REER). Further, in the short-run dynamics only one case is observed for GDP as the dependent variable producing significant causal interplays. Specifically, Broad M, Inf, NFI, R&D, and REER make a cause to GDP growth for the panel of competitive economies in the short run like that in the long run. This reveals that the growth of GDP of these countries is very much interconnected to all the remaining macro variables in long and short runs. Hence, the growth and fluctuations of GDP of these countries may be caused by the growth and fluctuations of all the five variables, Broad M, Inf, NFI, R&D, and REER. Hence, it is recommended that the control and management of these macro indicators should be the priority agendas of the countries considered in the dynamic panel study.

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Defining Appropriate Government Strategies to Reduce Unemployment During COVID-19 Pandemics

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Abstract The unemployment problem became more significant, especially after COVID-19 pandemics. This situation affected both developing and developed countries in a negative manner. Hence, the policies implemented by the states to prevent unemployment were also carefully considered during this process. Within this scope, various suggestions of ILO and OECD institutions have been made regarding these strategies. This study aims to identify the significant strategies countries should develop to reduce unemployment. For this purpose, 10 basic strategies offered by OECD to reduce the unemployment problem are considered. Moreover, an evaluation has been carried out by considering fuzzy DEMATEL methodology. The findings demonstrate that ensuring adequate income protection is the most appropriate criterion to minimize the unemployment problem in the COVID-19 process. During the pandemic period, economic rescue packages were announced by many governments and institutions. Despite all this support, millions of people lost their jobs in this process. Considering the analysis results obtained in this study, it would be appropriate for governments to focus primarily on the unemployed. In this framework, the implementation of strategies that will prevent citizens from being unemployed will contribute to the solution of this problem. Despite all these efforts, there may still be people losing their jobs in this process. Therefore, income-generating policies should be implemented especially for these people. For this purpose, the duration of unemployment benefits may be extended. In this way, it will be easier to combat the unemployment problem caused by the COVID-19 pandemic.

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1 Introduction

After the 2008 global crisis, the world economy could not achieve the desired recovery period. In addition, as of 2010, the economic slowdown has increased its severity worldwide. While this slowdown trend continues, the resulting COVID-19 epidemic has led to an increase in the problems in the economy. During this epidemic, many measures had to be taken by countries. However, these actions have caused problems in many sectors such as transportation and tourism. In this process, significant declines occurred in the manufacturing industry and services sector in the developed countries between February and May 2020. Along with these developments, important organizations in the world have negatively changed their predictions about economic growth. In the estimation of the IMF, it is stated that the world economy will shrink by 3% by 2020. According to the forecast of Consensus Forecasts, the world economy is expected to shrink by −2.1% in 2020. The World Trade Organization declared that the global trade volume will decrease by 13% in 2020 (Consensus Economics, 2020; IMF, 2020; WTO, 2020).

This epidemic also led to an increase in the unemployment problem worldwide. According to the latest analysis of the International Labor Organization (ILO) on the effects of the global pandemic on working life, COVID-19 pandemics has caused significant losses in working hours. This situation has led to important decreases in labor incomes in every corner of the world. The ILO stated that global labor incomes in the world decreased by 10.7% in the first three quarters of 2020 compared to the same periods of the previous year. In addition, it was claimed that the highest impact on labor income was in the Americas with −12.1%. On the other hand, according to this report, it was defined that one out of every six young people lost their job during the pandemic process (ILO, 2020). Moreover, the OECD report identified that the pandemic will have the greatest impact on unemployment. In this report, it was stated that the unemployment rate in member countries could rise to 9.4% at the end of the year. As a result of the realization of this rate, it is estimated that the highest unemployment rates after the economic crisis that was effective in the 1930s could be reached. Moreover, it is estimated that unemployment will remain at its peak until the third quarter of 2021 (OECD, 2020a, 2020b, 2020c, 2020d).

Unemployment is among the major macroeconomic problems that every country must manage to survive economically. The high rate of unemployment can adversely affect economic growth in the long run (Kalkavan & Ersin, 2019). High unemployment rates are an indicator of the idle use of resources in society. In addition, this problem may also cause a decrease in demand and negatively affect the production capacity in the long run (Eti, Kalkavan, Dinçer, & Yüksel, 2020; Kopuk, 2020). Furthermore, high unemployment rates and tax losses occur in the public sector. On the other hand, the increase in social aid expenditures due to unemployment also causes a budget deficit. The phenomenon of unemployment affects not only economically but also the sociocultural lives of countries negatively (Akay, Aklan, & Çınar, 2016; Ceylan & Şahin, 2010). According to Kawohl and Nordt (2020), there is a linear relationship between unemployment and suicide rates. These researchers also emphasized that this relationship may be higher during the epidemic process. For this reason, it is important for countries to be able to effectively implement unemployment-reducing policies.

Today, when the global slowdown is getting deeper with the COVID-19 pandemic, employment policies are of vital importance among the macroeconomic policies of countries. In order to overcome both economic and social problems, countries need to produce important strategies to reduce unemployment. In this context, the ILO has developed many different strategies, such as supporting collective agreements and increasing quality-enhancing training programs. Similar strategies have been determined by the OECD in this regard. Within this context, general issues, such as increasing social dialog, providing financial support to companies for non-working hours, and providing career guidance services have been proposed (OECD, 2020a). The important point in this process is to determine the policies to be implemented correctly. Inappropriate policies may increase the financial burden of countries rapidly, as well as deepen the economic contraction. Therefore, it is vital that employment policies are carefully determined. Due to this delicate situation, this study focuses on what strategies countries should develop to reduce unemployment. In this context, ten basic strategies offered by OECD to reduce unemployment have been taken into consideration. In order to determine which of these criteria are more important, an analysis has been carried out with the fuzzy DEMATEL approach.

2 Theoretical Background

The COVID-19 pandemic has been the trigger of an unprecedented economic crisis in the world. Because restrictions and measures created a profound employment shock. It has been determined that this epidemic caused the worst global crisis since the Second World War. Due to the measures taken during the epidemic process, working hours decreased, and large employment losses occurred (ESCAP, 2020). This problem has been most effective among low-income workers (Chetty, Friedman, Hendren, & Stepner, 2020). In the USA, especially young people between the ages of 21–24 and Hispanic workers have been affected by this crisis to a greater extent. In this context, it is suggested that constructive policies should be developed, especially for this group during the epidemic process (Montenovo et al., 2020).

It is estimated that the negative effects of this economic crisis caused by the epidemic will last long. In this framework, some measures have been implemented by many countries, especially the USA and many countries in Europe, to compensate for the losses of the crisis. These policies are generally aimed at increasing trade and protecting the income of employees (Costa Dias, Joyce, Postel-Vinay, & Xu, 2020). For example, the job retention scheme program has been put into practice in Germany to increase employment. In addition, there has been assistance to companies across Europe. In the USA, grants were provided to households below a certain income level. In addition, it has gone to a practice in the form of unemployment benefits for the laid off (Blanchard, Philippon, & Pisani-Ferry, 2020).

As can be seen from the examples mentioned above, the measures taken to combat the negative effects of the epidemic may differ based on countries. One of the main factors determining this difference is the economic power of countries. In other words, countries with high economic performance have been able to implement more comprehensive measures (Özdemir, 2010; Pierson, 1998). Initially, the market, family, and state were given important roles in how to achieve the welfare state (Esping-Andersen, Gallie, Hemerijck, & Myles, 2002). After the Second World War, states started to act in cooperation with the family, civil society, and the market by assuming a central role in the understanding of social welfare (Aysan, 2020).

The welfare state understanding emerged to counter the effects of the 1929 economic crisis. This understanding was initially classified as liberal/Anglo-Saxon welfare, conservative/continental Europe, Scandinavian/Social democrat (Esping-Andersen, 1990). Later, the concept of the Southern European welfare model was included in this classification (Ferrera, 1996). Before the Second World War, the concept of the welfare state was changing the attitude towards the social insurance system and citizenship with a deeper understanding. On the other hand, this concept was also used to represent a new state role (Briggs, 1961). In the background of this situation, capitalism has caused many economic and political crises. At this point, full employment, social security, and social consumption have been important elements of the process until the early 1970s (Özdemir, 2009). In this context, one of the most important points in the development of the role of the welfare state is the 1942 Beveridge Plan. This plan has changed the role of the state and the dimension of the relationship between citizens in terms of its structure. In this framework, there has been an expansion of citizenship rights towards economic and social fields. This expansion is interpreted as the increase in the responsibility area of the state (Benassi, 2010).

After 1970, the efficiency of global capitalism has increased in the world. In this process, it was observed that global capital mobility weakened state institutions. In this context, there has been an increase in the level of competition in almost all sectors. This situation caused a decrease in public expenditures and the deregulation of the markets. Due to the negativities caused by these mentioned issues, the development of Keynes welfare state understanding has become necessary (Ellison, 2006). After the 1970s, there are economic and social changes. Accordingly, Scandinavian countries implemented a policy of increasing employment in the public sector until the 1990s. Britain, New Zealand, and the United States adopted a strategy of deregulation of wages and the labor market after the disruption of the welfare state. On the other hand, countries such as France, Germany, and Italy aimed to reduce the labor supply. As can be understood here, the welfare state understanding of countries may include different applications (Esping-Andersen, 1994). In this context, the unemployment problem has emerged. Especially the high wage cost caused an increase in unemployment (Esping-Andersen, 1994).

On the other hand, social investment policies, which are a new form of the welfare state, are particularly oriented towards the labor market. In this context, it aims to maximize the returns of social expenditures with active employment, social participation, and social cohesion policies. In this way, it is aimed to solve the employment problem that is affected first in crisis periods in this way (Van Kersbergen, Vis, & Hemerijck, 2014). In the OECD report, a new paradigm change is mentioned in the definition of the welfare state. Accordingly, market deregulation and social contraction, which are among the most important codes of global capitalism, have been replaced by the capacity approach. In this context, it predicts a result in which family, poverty, education, and employment services are enabled with this approach and inequalities are reduced (Hemerijck, 2018; OECD, 2017).

In this context, the COVID-19 outbreak has created many new problems worldwide. Especially, the decrease in weekly working hours caused an increase in job loss in countries. During this epidemic period, the supply and demand balance of the products were disrupted. For example, a 32% reduction in weekly working hours and a 15% decrease in employment was detected between February and April in Canada (Lemieux, Milligan, Schirle, & Skuterud, 2020). In another study conducted in Canada, it was determined that at least one of the household members had a change in the employment status. In addition, it was determined that people participating in the survey study lost an average of 810 USD per month (Achou et al., 2020). On the supply side, it was observed that the number of ordinary companies decreased by 10.1% and the number of joint stock companies by 14.8% in Canada (Beland, Fakorede, & Mikola, 2020). In this direction, some measures have been put into practice to reduce the effects of the epidemic (Aysan, 2020). For this purpose, the measures taken by the states are included in the OECD report (OECD, 2020a, 2020b, 2020c, 2020d). Details of the measures in the report are given below.

- Ensuring worker’s safety
- Maintaining adequate paid sick leave
- Upholding support for workers with caring needs
- Adapting job retention schemes
- Ensuring adequate income protection
- Expanding employment services and training for jobseekers and workers
- Giving young people support they need
- Liquidity relief for firms
- Limiting economic dismissals and protecting workers against unfair dismissal
- Supporting essential production and services

The theoretical basis of this study is the criteria obtained from these titles. As a result of the analysis, it can be determined which of these factors will be more important in solving the problem.

3 Literature Review

This study explores government-based strategies to reduce the negative impact of the COVID-19 pandemic process on employment. But, if the literature is reviewed, different types of applications for the different crises are mostly discussed, unlike pandemic conditions. However, studies dealing with the pandemic process as a whole are very limited, except for the OECD (2020a, 2020b, 2020c, 2020d) report, as it is a process that is currently being experienced. In this context, relevant factors have been allocated and applied from the content of this report. The evaluation of these state-based strategies as a whole and their application with the fuzzy DEMATEL method distinguishes this study in terms of both theoretical soundness and methodological originality. Hence, it is thought to make a significant contribution to the literature in this respect.

3.1 Ensuring Workers' Safety (C1)

Ensuring the safety of employees, both in terms of health and psychological well-being, must be paramount to the government. Only in this way can the spread of the virus be controlled, and a suitable environment can be provided for employees to work safely and efficiently. In this context, the possibility of working from home without being physically present at the workplace is an important alternative way of working for certain types of work. In this way, the risk of transmission of the epidemic both through transportation and in the workplace is eliminated. The government can establish social dialog on this issue and make new legal arrangements with the consensus of the parties (OECD, 2020a, 2020b, 2020c, 2020d). There have been many studies on working from home. According to these researches, it is possible to potentially increase the number of works from home (Brynjolfsson et al., 2020; Hensvik, Le Barbanchon, & Rathelot, 2020). Furthermore, according to Dingel and Neiman (2020), 37% of all jobs in the USA can be conducted at home, thus reducing the risk of infection.

3.2 Maintaining Adequate Paid Sick Leave (C2)

In order to prevent sick employees from going to the workplace and, accordingly, the spread of the virus, it is first necessary to give sick employees paid leave. Paid sick leave is vital in reducing the impact of the spread of the virus and preventing it from being transmitted to colleagues in the workplace from the very beginning, it also plays an important role in maintaining workers' income during illness and protecting their jobs and health. The economic cost of paid sick leave is very small compared to the spread of the virus to society. On this occasion, the spread of the virus to society is prevented and saved from greater financial, health, and moral costs (OECD, 2020a, 2020b, 2020c, 2020d). In this context, Kim (2017) stated that paid sick leave positively affects the reduction in deaths and public health. According to Vazquez et al. (2020), if a sufficiently paid sick leave is not provided, especially during the pandemic period, it will cause serious problems in terms of both the families of the patients and beyond for the whole public health.

3.3 Upholding Support for Workers with Caring Needs (C3)

Although schools and preschools are reopening in many countries, family care support should continue, as children can attend school part-time. In this context, governments should even offer employees options such as working from home and flexible working hours. In this respect, primary support can go to healthcare workers and those who do not have access to flexible work. Furthermore, depending on the future course of the pandemic, emergency family care leave may need to be initiated again during a potential second wave of infection (OECD, 2020a, 2020b, 2020c, 2020d). The role of children in the spread of the COVID-19 pandemic has been widely discussed since the outbreak. Some countries have started to reopen schools that they had closed for a long time. According to some scientists, if the virus is spreading through children, infections will likely increase in the coming period (Mallapaty, 2020). In a study conducted in this context, Zhang, Litvinova, et al. (2020) found that school closures did not prevent the pandemic by itself, but helped reduce it seriously, and stated that the most effective solution was to ensure that households have limited contact with the outside. Additionally, Skokauskas et al. (2020) emphasized that healthcare professionals' children should be provided with care and psychological assistance.

3.4 Adapting Job Retention Schemes (C4)

Job retention plans have been an important social policy tool implemented by governments against mass layoffs due to economic recession during the pandemic process. For companies experiencing a decrease in their income due to the decrease in production, it has been possible to reduce working hours in order to reduce labor costs. States support and subsidize employees who receive partial salaries within business retention plans with short-time work allowances. Sudden increases in unemployment have been avoided in some countries through business retention plans and state-funded short-time work allowances. However, these systems should also include regulations for employees to do more appropriate jobs after companies withdraw from business retention plans (OECD, 2020a, 2020b, 2020c, 2020d). In a study on this subject, Hijzen and Venn (2011) investigated the impact of short-term work programs during the 2008–2009 crisis (OECD, 2009). According to the results of the study covering 19 OECD countries, short-time work allowance programs played an important role in preventing the unnecessary dismissal of many workers during the 2008–2009 economic crisis in some countries, especially Germany and Japan.

3.5 Ensuring Adequate Income Protection (C5)

Millions of people around the world and in OECD countries have lost their jobs, despite the government's encouragement of business maintenance programs, providing short-time work allowances, and emergency liquidity support to firms. In the USA alone, 40 million people applied for unemployment insurance. Apart from this, many people have become financially troubled by reducing their working hours, although they do not register as unemployed. In addition, the business actions of those who do their own business have been damaged, their livelihoods have become difficult. Unemployment benefits are like a lifeline for the people who live through all these difficulties during the pandemic crisis, and in this context, it is critical to implement the strategies "improving access to and coverage of unemployment benefits; extending unemployment benefit durations, and raising unemployment benefit generosity" for the recovery of the country's economy (OECD, 2020a, 2020b, 2020c, 2020d). In a study examining effects of COVID-19 on household income and food security in Kenya and Uganda, Kansiime et al. (2021) found that more than two-thirds of households experienced income shocks and that food security in this segment has been also deteriorating. Additionally, food security has deteriorated among poor earners and labor workers. Furthermore, according to the data of the US Census Bureau, 38 million people (11.8% of the population) in the USA were living in poverty in 2018. In this respect, in a study conducted by Benfer and Wiley (2020) examining poverty during pandemic, it has been specified that people with poor economic conditions and low income have poor access to basic necessities and health services, and the risk of infection and death increases as much. As a result of the research report, the risk of pandemics is seen mostly among low-income, colorful, disabled, and elderly people.

3.6 Expanding Employment Services and Training for Jobseekers and Workers (C6)

Employees who lost their jobs due to the crisis during the pandemic period needed unemployment benefits and adequate income support; however, these people are looking for long-term employment opportunities during and after the pandemic. As the lockdown process eases in the countries, the support of the state will start to decrease, and a large crowd that has lost their jobs will start looking for a job to earn regular income. In this context, governments should create new jobs and provide retraining opportunities for specific professional groups that are needed. In this respect, the current crisis is also an important opportunity for both job seekers and idle workers to increase their vocational qualifications or to learn new vocational skills. Many training programs are offered in many OECD countries, particularly in the form of e-learning (OECD, 2020a, 2020b, 2020c, 2020d). In this sense, Card, Kluve, and Weber (2018), who examined more than 200 studies on active labor market programs, have found that these programs had a positive impact on recession. Similarly, thanks to the recruitment support policies implemented by many OECD countries during the global financial crisis, job opportunities increased, and thus savings could be made in social support assistance. As a result, recruitment subsidies have a positive impact on both employment and economic well-being (OECD, 2010).

3.7 Giving Young People Support They Need (C7)

In order to mitigate the devastating impact of the pandemic crisis on young people, governments need to take a proactive role and develop comprehensive strategies for young workers in the labor market, particularly young university graduates. A number of negativities such as the closure of schools, the transition of universities to online education, and the cancelation of internship programs created great uncertainties regarding the employment of young people. In this context, incentive packages for companies that offer job opportunities to young people in times of crisis are an effective tool for employment. For example, Australia and Denmark provided wage support for companies to continue their apprenticeship program, while Germany provided subsidies for companies that employed apprentices who were laid off during the pandemic (OECD, 2020a, 2020b, 2020c, 2020d). In the studies conducted by Carcillo, Fernández, Königs, and Minea (2015) and OECD (2016), it has been emphasized that the problems caused by persistent youth unemployment in the aftermath of the financial crisis damage the connection between young people with the labor market. Similarly, in the COVID-19 pandemic crisis, this situation may turn into social inefficiency by causing forward-looking young people to lose their professional skills by moving away from employment and into an idle position.

3.8 Liquidity Relief for Firms (C8)

Quarantine and mandatory work restrictions during the pandemic period left companies in an inconvenient situation. Moreover, with practices such as curfews that limit the mobility of people, sales have dropped significantly. As a result of all these difficulties, companies have been experiencing serious financial difficulties in paying their debts to suppliers, financial institutions, and even the government (OECD, 2020a, 2020b, 2020c, 2020d). In a study, examining how the state distributes financial support to firms, Kahn and Wagner (2020) notified that traditionally support through banks provides an informational advantage, while direct liquid flow can cause externalities. Furthermore, Bosio, Djankov, Galiano, and Reyes (2020) state that governments around the world will benefit millions of companies struggling during the epidemic process by paying their pledged debts quickly, otherwise most companies that cannot meet their fixed costs without liquid support will have to close within 2–5 months from the pandemic process.

3.9 Limiting Economic Dismissals and Protecting Workers Against Unfair Dismissal (C9)

Preventing employees from being fired in such crisis periods is of great importance in terms of protecting families who will have difficulty in making a living. Moreover, the opportunism of employers who take advantage of the pandemic and try to fire their workers is thus limited (OECD, 2020a, 2020b, 2020c, 2020d). In a different study that is examining ILO's workforce policy during the COVID-19 outbreak, Selberg (2020) stated that one of the most important issues in dealing with the socioeconomic crisis that emerged after the epidemic is to make workforce regulations, deal with the humanitarian treatment of employees, and legally secure them with social protection. In another aspect, Collins (2018), who examines the legal rights of employees in the private sector against unfair termination by the employer, emphasizes that legal regulations are not sufficient in these cases due to the narrow scope of personal protection and inconsistent standards of the courts.

3.10 Supporting Essential Production and Services (C10)

When a large part of the economy was shut down in many countries during the period when the pandemic increased its impact, sectors such as health, agriculture, food production, retail, and logistics had to continue. However, the absence of sick or quarantined employees has led to a contraction in these sectors. In order to ensure that basic consumer products and services are not interrupted, OECD countries have taken a number of measures to enable labor mobility: various work incentives for the unemployed and the readjustment of the working hours of employees (OECD, 2020a, 2020b, 2020c, 2020d). In a study, Kumar, Luthra, Mangla, and Kazançoğlu (2020), who investigated the production and distribution mechanisms during the pandemic, stated that production shifted to basic foodstuffs and service to the health sector due to the pandemic. To this end, most of the company executives and policymakers tried to develop new strategies to meet consumer demands. In another study, Emmanuel Awucha et al. (2020) researched the impact of the COVID-19 outbreak on end users' access to essential drugs in Nigeria. According to the results of the research, the isolation caused by the closure of the borders and the travel ban led to a decrease in both the number of drugs coming from abroad and the drug supply in the country, thus making it difficult for consumers in need to access drugs. In addition to medicines, the prices of products such as gloves, masks, and protective equipment have also increased considerably.

4 An Evaluation to Minimize Unemployment Problem in COVID-19 Process

In this title, it is aimed to generate appropriate strategies to overcome the unemployment problem during the pandemics process. For this purpose, an evaluation has been conducted by using fuzzy DEMATEL methodology. Therefore, in this section, firstly, general information is provided for the criteria. After that, the process of collecting experts' opinions is identified. Thirdly, the fuzzy DEMATEL approach is defined. Finally, analysis results will be shared.

4.1 Defining Criteria

Similar studies in the literature are evaluated to understand the main strategies to cope with unemployment. In this framework, the OECD report in this regard is also examined. It is defined that the literature review and OECD report provide similar criteria for this situation. While making a detailed analysis, ten different criteria are defined for this situation. They are detailed in Table 1.

Table 1 The list of the criteria

Criteria
Ensuring workers' safety (C1)
Maintaining adequate paid sick leave (C2)
Upholding support for workers with caring needs (C3)
Adapting job retention schemes (C4)
Ensuring adequate income protection (C5)
Expanding employment services and training for jobseekers and workers (C6)
Giving young people support they need (C7)
Liquidity relief for firms (C8)
Limiting economic dismissals and protecting workers against unfair dismissal (C9)
Supporting essential production and services (C10)

4.2 Collecting the Evaluations of the Experts

In order to understand, which criteria are more significant to minimize the unemployment problem that occurred in COVID-19 pandemics, the opinions of three experts are taken into consideration. The details of these experts are given in Table 2.

Table 2 indicates that all experts have the relevant qualification to evaluate the criteria.

4.3 Fuzzy DEMATEL Methodology

DEMATEL method is taken into consideration for determining the most important criteria among the different criteria that affect a subject. As can be understood from the definition, the DEMATEL method is one of the multi-criteria decision-making methods considered in the weighting of factors (Zhang, Zhou, et al., 2020; Zhong, Hu, Yüksel, Dincer, & Ubay, 2020). However, there are many different techniques used for this purpose in the literature, such as AHP and ANP. However, the DEMATEL method has some advantages over these approaches. In the analysis using the DEMATEL method, an impact relationship map of variables can be created (Delen, Dorokhov, Dorokhova, Dinçer, & Yüksel, 2020; Yuan, Zhang, Yüksel, & Dinçer, 2020). In this way, it will be possible to determine the direction of the causality relationship between factors (Korsakienė, Raišienė, Dinçer, Yüksel, & Aleksejevec, 2020; Qiu, Dinçer, Yüksel, & Ubay, 2020). In this study, the DEMATEL approach is considered with fuzzy logic. In this way, it is aimed to minimize the uncertainties that may arise. In this context, the expert opinions provided are first translated into fuzzy numbers (Zhou, Zhou, Yüksel, Dinçer, & Uluer, 2020). After that, the direct relationship matrix is obtained by taking the average value of the evaluations of the experts (Wang, Ha, Kalkavan, Yüksel, & Dinçer, 2020). In the later process, this matrix is normalized to perform the analysis more effectively. Finally, the total relationship matrix is created by applying the defuzzification process (Zhu et al., 2020). Considering the values in this matrix, the importance weights of the criteria can be calculated.

Table 2 The details of experts

Experts	Education level	Degree	Years of experience	Expertise areas
Expert 1	Ph.D.	Prof.	20	Finance, economics, energy investment
Expert 2	Ph.D.	Assoc. Prof.	14	Finance, macroeconomics, energy economics
Expert 3	Ph.D.	Assist. Prof.	16	Macroeconomics, economic equality

4.4 Analysis Results

The evaluations obtained from the experts are first translated into fuzzy numbers. Then, the processes specified in the previous title of the study are applied to these numbers. As a result, criterion weights are determined. Analysis results are given in Table 3.

Table 3 states that ensuring adequate income protection is the most appropriate criterion to minimize the unemployment problem in the COVID-19 process. Similarly, expanding employment services and training for jobseekers and workers and giving young people the support they need are other important strategies that can be implemented to cope with this problem. In addition to them, maintaining adequate paid sick leave, ensuring adequate income protection, ensuring workers' safety, and limiting economic dismissals, and protecting workers against unfair dismissal have medium importance. On the other side, it is also concluded that supporting essential production and services, adapting job retention schemes, and liquidity relief for firms are on the last ranks.

5 Conclusion

The global epidemic of COVID-19 has been effective in all countries of the world. This epidemic has led to economic and social problems in countries. The COVID-19 epidemic, which is particularly effective in macroeconomic indicators, made itself felt in developed and developing countries in the first periods of 2020 with economic contraction. During the epidemic, where the industry and services sector was deeply affected, the problem of unemployment also emerged. Unemployment, which was an important problem with the global slowdown trend before COVID-19, became a

Table 3 The weights of the criteria

Criteria	Weights	Ranking results
Ensuring workers' safety (C1)	0.096	6
Maintaining adequate paid sick leave (C2)	0.101	4
Upholding support for workers with caring needs (C3)	0.100	5
Adapting job retention schemes (C4)	0.089	9
Ensuring adequate income protection (C5)	0.120	1
Expanding employment services and training for jobseekers and workers (C6)	0.117	2
Giving young people support they need (C7)	0.113	3
Liquidity relief for firms (C8)	0.076	10
Limiting economic dismissals and protecting workers against unfair dismissal (C9)	0.095	7
Supporting essential production and services (C10)	0.093	8

deeper problem with serious increases during the epidemic process. The policies implemented by the states to prevent unemployment were also carefully considered during the epidemic process. These employment policies generally consist of short-term financial supports for the working segment who are victims of unemployment. As a result of these policies, states were deprived of tax revenues during the epidemic process. This situation caused states to face important problems such as budget deficit and current account deficit. Therefore, active employment policies and strategies of states to reduce unemployment have become important for sustainable growth. As a matter of fact, various suggestions of ILO and OECD institutions have been made regarding these strategies.

In this study, it is aimed to define what strategies countries should develop to reduce unemployment. Within this framework, ten basic strategies offered by OECD to reduce the unemployment problem are considered. In order to determine which of these criteria are more significant, an analysis has been performed by using the fuzzy DEMATEL approach. It is concluded that ensuring adequate income protection is the most appropriate criterion to minimize the unemployment problem in the COVID-19 process. Similarly, expanding employment services and training for jobseekers and workers and giving young people the support they need are other important strategies that can be implemented to cope with this problem. On the other hand, maintaining adequate paid sick leave, ensuring adequate income protection, ensuring workers' safety, and limiting economic dismissals, and protecting workers against unfair dismissal have medium importance.

Considering the analysis results obtained, it would be appropriate to develop strategies for people who were unemployed during this period. In this context, the scope of unemployment benefits should be expanded. On the other hand, it should be ensured that more people can access these aids. In addition to these issues, the duration of unemployment benefits should also be extended. Despite all the actions taken so far, the COVID-19 pandemic has led to an increase in the unemployment problem in countries. Most of the countries also have a budget deficit problem. As can be understood from here, it is of vital importance for countries to make use of their limited economic resources effectively. Based on the results of this study, it would be appropriate to use these resources specially to support the unemployed. In this way, it will be easier to effectively combat the unemployment problem, which is even more important after the epidemic.

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Generating Innovative Financial Strategies for Turkish Deposit Banks

Fahrettin Özdemirci

Abstract The time cost of money is the most important issue in the financial sector. Reducing this cost is one of the most significant goals of the real sector, economy, and public. In terms of bank capitalists, maximizing profitability and increasing the value of the bank company is the primary goal. In this sense, factors affecting profitability are important. While banks are developing innovative strategies, it is vital to determine which ones have a direct impact on profitability. The study focused on the variables affecting the profitability of bank deposits in Turkey. For this purpose, 17 commercial banks operating in Turkey are evaluated. In this study, the panel regression analysis method was used. Thanks to the analysis results to be obtained, innovative strategies have been determined in order to increase the profitability of the banks. The findings indicate that Turkish banks are mainly subject to interest rate risks. For this purpose, loans with flexible interest rates can be an appropriate innovative strategy for these banks. With the help of this implementation, banks can get the opportunity to increase interest income when there is an increase in the interest rate.

1 Introduction

The banking sector is vital for the country's economy. Thanks to the loans granted by banks, the amount of investment in the country may increase. This contributes to the macroeconomic stability of countries in many different ways. Primarily, the country's economy is growing thanks to increased investments. This situation increases the image of the country in the international market. In this way, it will be possible for new investments to come to the country. Second, increased investments provide new job opportunities. This helps to reduce unemployment rates in countries (Fontana & Scheicher, 2016).

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As can be understood from the above-mentioned issues, the high performance of the banking sector is important for the sustainable economic development of the country. In this framework, banks are required to take actions to increase their profitability. In other words, efficient and innovative strategies should be developed, and the banks' performance should be increased (Black, Correa, Huang, & Zhou, 2016). The important point in this process is to determine which innovative strategies should be given priority. The main reason for this is that due to financial deficiencies, it is not possible to implement all strategies at the same time (Yüksel, Dinçer, & Emir, 2017).

As in every company, stakeholders have an expectation of profit in the banking sector. One reason for this profit expectation is the prevention of the self-consumption of capital due to inflation caused by the expenses such as personnel, workplace, and the costs incurred by irreversible loans. The second reason is that the real return of capital is at the expected level. This request inevitably affects the pricing of banking transactions directly. Profits above the break-even point where capital protects itself in real terms is the return of the capital put by the stakeholders. The factors affecting capital profitability will be investigated in this study by using the panel regression analysis method. The results of the analysis will help develop effective innovative strategies for deposit banks (Dinçer, Hacıoğlu, & Yüksel, 2017).

The purpose of this study is to determine the factors affecting the profitability of banks. In this context, a detailed literature review was made, and 24 different variables that affect the profitability of banks were determined. On the other hand, the 17 commercial banks operating in Turkey were analyzed. In addition to the issues mentioned, the panel regression model was used to achieve this goal. As a result of the analysis, it can be understood which variables are more effective on the profitability of banks. In this way, it will be possible to propose suitable innovative policies towards banks.

There are five different sections in this study. In the first part, general information about banking, innovative strategies, and profitability will be shared. Additionally, in the second part of the study, information about the variables that affect the profitability of banks will be given. In this context, similar studies in the literature will be explained. In the third part of the study, information about innovative strategies that can be applied in banking will be given. Moreover, the fourth part of the study includes panel regression analysis for Turkish deposit banks. In the last part of the study, strategy suggestions will be shared.

2 Factors that Affect the Profitability for the Banking Industry

The banking sector regulates the circulation of money that travels through the veins of the economy. The liquidity of money is provided by banks today. The level of technology has now reduced cash usage, allowing online transactions to circulate money in virtual environments. Whether it is cash or online, the payment, withdrawal, deposit, sending, storage, evaluation, and utilization of the money constitute the main activity of the banking sector (Dang, Li, & Yang, 2018). In general, banks are classified as trade and investment and development banks and deposit and participation banks according to whether they determine the time value of money with interest or non-interest methods. In addition, public, private, and foreign banks can be classified according to their capital structures. Central banks, on the other hand, represent the public authority with the function of protecting the value of money and regulating the market (Dinçer et al., 2019, b).

The positive difference between the revenues obtained by the company as a result of its one-year activity and the costs it incurs to obtain this revenue is called profit. The real profit is reached as a result of the nominal profit being adjusted for inflation. If real profit is negative, the capital of the enterprise seems to be increasing numerically, but it has decreased in real terms. Enterprises must keep their capital profitability ratios high by keeping their real profits above a positive and reasonable level. Enterprises that fail to meet these conditions will not be able to maintain their capital and continue their lives in the long run. These issues, which we said about profitability, are also valid for banks (Rahman, 2020).

The strong banking sector is closely related to the profitability rates of this sector. Profit is the most important auto financing source of enterprises, and the strengthening of the capital structure depends on this. While profitability is an indicator of the competitiveness and management quality of banks in the sector, it is also a determinant of the risk-bearing capacity (Hirtle, Kovner, Vickery, & Bhanot, 2016; Kalkavan & Ersin, 2019). According to international standards, while 8 units of equity are accepted as the minimum condition for 100 units of risk, this ratio is recommended to be 12 units with a prudent approach. Profitability is the ratio obtained by dividing the profit of the enterprise by the amount of capital within a certain period. Within this framework, return on equity is found by dividing net profit to equity (Dinçer & Yüksel, 2018).

There are many published studies on the analysis of profitability performance. While some of these studies are about the banking system of a single country, some of them are studies that examine the profitability performance of banking systems of many countries. Pehlivan (2018) aimed to evaluate the performance of banks by using financial ratios. It is concluded that AHP can be used in the performance evaluation process of banks, and the results are comparable. Koç (2018) analyzed the financial data of participation banks and deposit banks operating in Turkey. As a result, it has been found that there is a significant relationship between the changes in market interest rates and the profitability of participation banks.

On the other hand, Acar-Balaylar and Özdemir (2018) concluded that there is a significant and positive relationship between capital adequacy and profitability in foreign deposit banks. In addition, Uludağ and Ece (2018) calculated the proximity coefficients that reflect the performances of deposit banks for each year, and the banks were analyzed comparatively according to these coefficients. Özşuca (2018) claimed that bank capital buffers act cyclically against business cycles. However, this finding does not apply to investment and development banks. On the other hand, according to the panel regression results regarding bank-specific features, size, profitability and risk emerge as significant determinants of the capital buffers of commercial banks.

Çalışır and Bengisu (2018) determined that participation banks have low efficiency but more resistant to crises. Işık, Yalman, and Koşaroğlu (2017) found that bank profitability was negatively affected by credit risk and liquidity management variables. However, they found that profitability was positively affected by variables such as bank capital, interest income, and non-interest income. Bora and Arslan (2017) stated that banks with foreign capital are much more successful than others. Çetin (2018) used regression analysis in his study. According to the analysis results obtained, there is no statistically significant difference between participation and conventional banks. Isik (2017) stated that income diversification positively and significantly affects profitability both in all banks and in private and foreign banks.

Okuyan and Karataş (2017) found that equity adequacy, the size of deposits, excessive personnel expenses, high main operating income, asset size, and gross domestic product positively affect profitability. On the other hand, Yurttadur and Demirbaş (2017) determined that participation banks are very successful compared to deposit banks. Çatıkkaş, Yatbaz, and Duramaz (2017) stated that the increase in loans had a positive effect on the income of participation banks and the banking sector.

Bikker and Vervliet (2018) could not find clear evidence that banks increase their risk situations in their search for efficiency. Similarly, Claessens, Coleman, and Donnelly (2018) concluded that low-interest rates have a significant and greater impact on net interest margin and profitability. In addition, Küçükbay (2017) determined that small banks provide more active profitability and net interest margin than large banks. Moreover, Asadullah (2017) concludes that liquidity has a positive and important relationship with the profitability of Islamic banks. Hunjra et al. (2017) showed that operating cost is an important factor affecting profit margins. On the other hand, Chattha and Alhabshi (2017) concluded that low-interest rates can help lower bank funding costs and increase assets. Delis and Kouretas (2011) revealed that there is a strong negative relationship between banks' risk taking and interest rates.

In the literature review, it was determined that there are many different issues that can affect the profitability of banks. While some of these issues are bank-based factors, some are macroeconomic issues that are independent of the bank. When micro-based factors are analyzed, it is seen that banks' interest income has an effect on bank profitability. In this context, there is a positive correlation between interest income collected from loans given to customers by banks and profitability. In this context, the volume of loans provided by banks is also important (Tunay, Yüksel, & Tunay, 2019). On the other hand, it is not possible to say that there is always a direct proportion between banks' loan volume and their profitability. The main reason for this is that some loans cannot be paid on time by customers. If customers are unable to pay their loan debts, banks' costs will increase. This situation will affect the bank's profitability negatively. Therefore, in order to increase the profitability of banks, the loans should be paid by customers on time (Yüksel, Canöz, & Özsarı, 2017). In summary, while the ratio of non-performing loans affects the profitability of the bank negatively, high-interest incomes have a positive effect.

In addition to these issues, non-interest income also positively affects bank profitability. Banks offer customers many services such as safe deposit boxes and money transfers. For these services offered, customers are required to pay some payment (Isshaq, Amoah, & Appiah-Gyamerah, 2019). These payments are also called non-interest income. The more banks increase these revenues, the more their profitability will increase. The important point here is that the fees for these services are not very high. If banks increase their service fees to increase non-interest income, this leads to customer dissatisfaction (Burke, Warfield, & Wieland, 2020). This will cause banks to lose customers. In other words, the profitability of the banks will decrease as fewer customers prefer the bank.

The high expenses of banks also affect the profitability of banks negatively. The most important issue here is interest expenses (Kusi, Agbloyor, Gyeke-Dako, & Asongu, 2020). Banks, by their nature, collect savings from those who have excess funds. This money they collect give loans to those who need funds. Banks pay interest to customers from whom they have collected their savings. This situation is called the interest expense of the banks (Yung & Root, 2019). The more interest banks pay, the lower their profitability. Another point to be considered here is that there are maturity differences between deposits and loans. Deposits have a much lower maturity than loans (Ambrose, Fuerst, Mansley, & Wang, 2019). If this situation cannot be managed effectively, an increase may occur in the interest expenses of banks.

In addition, the bank's operational costs also reduce profitability. In this context, high electricity and water consumption negatively affect bank profitability (Elamer, Ntim, Abdou, & Pyke, 2019). In this context, it would be appropriate to prefer equipment that consumes less electricity. In addition, it is essential to take measures that can save water within the bank. On the other hand, personnel salaries are also an important cost item for the bank (Home-Ortiz, Vargas, Macedo, & Romero, 2019). Banks take measures to reduce these costs. In this process, the most preferred strategy is to recruit some staff. However, this strategy has some disadvantages. The dismissal of the personnel negatively affects the image of the bank in the market (Sukmana, Ajija, Salama, & Hudaifah, 2020). This situation leads to a decrease in customer satisfaction.

In addition to these, macroeconomic factors also affect the profitability of banks. These factors are the ones that the bank cannot intervene. In other words, banks cannot prevent macroeconomic factors from occurring. On the other hand, banks are expected to take the necessary measures to minimize macroeconomic problems. For example, an increase in the interest rate negatively affects the profitability of banks (Yüksel & Kavak, 2019). As stated before, the maturity of deposits is much shorter than the maturity of loans. Therefore, if the interest rate increases, this will decrease the profitability of the banks (Yüksel, Dinçer, & Kıyak, 2020). The main reason for this is that the deposits that are due are paid with increasing interest. On the other hand, no interest increase can be made for fixed rate and long-term loans (Kalkavan & Ersin, 2019).

Inflation rate is another macroeconomic factor that has an impact on banks' profitability. By definition, inflation refers to the increase in the general price level of products. The fact that the general level of prices is in a continuous increasing trend increases the uncertainty in the market. The main reason for this is that the costs of the products constantly change due to the constantly increasing raw material prices. In such an environment, companies will be reluctant to invest. Businesses that do not invest do not need loans either. Less credit also means less interest income for the bank. As a result, when inflation is high, the profitability of banks will decrease as the investment volume in the country will shrink (Mızrak & Yüksel, 2019).

Another factor that will adversely affect the profitability of banks is the unemployment rate. As a result of the increasing unemployment rate, there will be many people in the country without regular income. People who do not have a steady income will have difficulty repaying their current debt (Molyneux, Reghezza, & Xie, 2019). A significant number of these people may have previously borrowed from the bank. People whose loan payments continue will not be able to pay their debts to banks if they are unemployed. If the problem loans of banks increase, their losses will also increase. This will cause a decrease in the profit volume of the banks. In summary, the high unemployment rate in the country is considered to be one of the most important macroeconomic factors that reduce the profitability of banks (Karkowska, 2020).

3 The Significance of Innovative Financial Strategies for Banking Industry

Banks collect these savings from those who have excess funds in a country. They pay interest to the savings holders for the funds they collect. In other words, savings owners earn income through banks. In addition to these issues, banks lend these funds to companies as loans. In this way, opportunities can be obtained for companies to make new investments. This contributes to increasing the macroeconomic performance of the country. Thanks to the increasing investments, the economy in the country can grow. In addition, companies that increase their investments will employ new staff. This will help reduce the unemployment rate in the country (Gong, Huizinga, & Laeven, 2018).

As can be understood from these issues, it is vital for the macroeconomic stability of the country that the banking system can operate effectively. In this context, both the state and banks have a big role. In order for the efficiency of the banking system to increase, the state should make the necessary legal regulations. On the other hand, it is very important to carry out the necessary controls in this sector with regular auditing activities. Thanks to the inspections to be made, the negative issues in the banking sector can be detected early. In this way, it will be possible to take action in time for the solution of problems (Cornett, Erhemjamts, & Tehranian, 2016).

In addition to the mentioned issue, banks also play a major role in this process. Banks should reach an effective level of performance through effective risk management. In this context, it is important for banks not to take risks that they cannot manage. First of all, banks should pay attention to the creditworthiness of customers while giving credit. In this framework, customers' past payment performances should be taken into consideration. In addition to the aforementioned issue, banks should not give too high a loan to a single customer. Diversifying the sectors, they will lend is one of the most important innovative strategies of banks (Hasan, Jackowicz, Kowalewski, & Kozłowski, 2017).

Banks should also develop innovative strategies for market risks. Interest rate risk is an important risk type that stands out in this process. While banks collect deposits with short term due to their structure, they give loans with long term. In this process, a possible rate hike will adversely affect banks' profit margin. Therefore, one of the important innovative strategies that banks can develop in this process is floating-rate loans. Thus, in case of a possible interest increase, the amount of interest collected from customers may also increase (Eti, Kalkavan, Dinçer, & Yüksel, 2020).

Exchange rate risk is another type of risk that threatens the profitability of banks. In some cases, banks may prefer to use foreign currency loans. The main reason for this is that interest rates on foreign currency loans may be lower. However, this mentioned issue causes banks to take the foreign exchange risk. In cases where banks' foreign currency debt is higher than foreign currency receivables, an increase in a possible exchange rate may cause serious losses to banks. In this context, minimizing this risk with financial derivative products can be considered as an important innovative strategy for banks.

Banks can also produce innovative strategies by making changes in their products. In this context, issues such as the possibility of installments on credit cards or giving excess bonuses may attract the attention of customers. On the other hand, establishing an effective customer solution center is an important innovative strategy that will contribute to increasing customer satisfaction. Investing in technology can also make a significant contribution to banks' ability to develop innovative strategies. In this way, banks can offer their customers a more effective internet banking service (Dinçer & Mengir, 2020). This situation can both increase customer satisfaction and decrease the density in bank branches. In addition, it will be possible for banks to increase their sales volumes as customers can reach the banks through an easier channel (Yüksel & Dinçer, 2020).

4 An Application on Turkish Banking Industry

In this study, it is aimed to determine the factors that affect the profitability of banks. In this context, 17 commercial banks operating in Turkey are evaluated. Following the determination of the most important factors affecting the profitability of banks, it is aimed to identify innovative strategies to increase the efficiency of this sector. In this context, the rates accepted in the literature are taken into consideration while

Table 1 The list of the variables

Variables	Initials
Average return on equity	ROE
Capital adequacy ratio	X1
Equity asset rate	X2
Net equity ratio	X3
Equity liability rate	X4
Deposit asset rate	X5
Loans taken asset rate	X6
Credit asset rate	X7
Credit deposit rate	X8
Loans in follow-up	X9
Fixed asset rate	X10
Consumer loans rate	X11
Net interest income asset rate	X12
Net interest income Total operating income ratio	X13
Other revenues asset rate	X14
Other income other operating expenses rate	X15
Ratio of personnel expenses to other operating expenses	X16
Ratio of other operating expenses to Total assets	X17
GNP increase rate (nominal)	X18
Inflation (CPI = 2003)	X19
Deposit interest rate	X20
Credit interest rate	X21
Interest margin	X22
GNP increase rate (real) $	X23
GNP increase rate (real)	X24

determining the variables. In order to understand the significant indicators of profitability in the banking industry, 24 different variables are selected based on the literature review. They are detailed in Table 1.

In the analysis process, return on equity is selected as dependent variable. On the other side, other 24 indicators are defined as explanatory variables. Before the analysis results were reported, F test, Hausman, and Likelihood tests were performed in order to determine the most appropriate estimator for the model to be estimated. In line with the relevant test results, the fixed effects estimator was used to estimate the profitability model parameters. After testing the presence of variance and autocorrelation in the established model, standard errors resistant to variance and autocorrelation were reported. Analysis results are given in Table 2.

According to the panel regression analysis above, we can explain the factors affecting return on equity as follows.

- The rate of CAR (X1) has a positive relationship with return on equity.
- As the ratio of equity in liability (X4) increases, this affects profitability negatively.

Table 2 Analysis results

Variables	Coefficients	Standard error	*t*-statistics	Probability
C	22.30791	4.023378	5.544571	0.0000
X1	0.143238	0.062251	2.300969	0.0224
X4	−0.675660	0.122728	−5.505363	0.0000
X6	−0.182007	0.047747	−3.811953	0.0002
X9	−0.640623	0.128378	−4.990141	0.0000
X12	4.834281	0.386373	12.51197	0.0000
X14	3.709761	0.340727	10.88777	0.0000
X16	−0.127359	0.048010	−2.652784	0.0086
X17	−3.244947	0.324843	−9.989267	0.0000
X19	−0.175688	0.169376	−1.037268	0.3008
X20	1.472708	0.302495	4.868530	0.0000
X21	−1.440938	0.332806	−4.329663	0.0000
X24	−0.163474	0.070739	−2.310964	0.0218
X25	0.033668	0.020324	1.656584	0.0991
R-square	0.737167	Average dependent variance	5.769053	
Adjusted *R*-square	0.720661	Standard dependent variance	6.352497	
Regression standard error	3.357455	Total of remaining squares	2333.408	
F-statistic	44.65952	Durbin–Watson statistics	1.407556	
P value *F*-statistic	0.000000			

- We can say that as the ratio of loans taken in assets (X6) increases, profitability is influenced negatively.
- There is a positive relationship between the net interest income asset ratio (X12) and return on equity.
- As the other income asset rate (X14) increases, return on equity is positively affected.
- As the ratio of personnel expenses to other operating expenses (X16) increases, return on equity decreases.
- As the ratio of other operating expenses to total assets (X17) increases, return on equity is adversely affected.
- The increase in deposit interest rates (X20) positively affects the return on equity.
- The increase in loan interest rates (X21) decreases return on equity.

5 Conclusion

Return on equity shows the profitability of the capital that shareholders put into the bank. In this study, 17 commercial banks operating in Turkey were analyzed with panel data regression methods, and factors affecting the return on equity is considered individually. It is observed that there is a correlation between loan interest rates and deposit interest rates and inflation. It can be said that the difference between loan interest rates and deposit interest rates closed during crisis periods and opened during the stabilization periods of the economy. The high ratio of total loans to total deposits is a ratio that shows that banks are dealing with real business.

In terms of banking, it is desired to have a high ratio of total deposits to assets. This ratio has been observed to be at the same level in recent years. However, the relationship between the change in deposits and profitability has not been revealed. Rapid increases in loans to follow-up are the indicator of crises in the economy. The ratio of personnel expenses to other expenses now has a negative impact on profitability for deposit banks. While the loans under follow-up and the provisions allocated are expected to have a negative impact on profitability, it was observed that the deposit banks had a reverse course. The reason for this is that during periods when the economy is stable, analyzes are made on the possibility of dividing some of the profit as a return, and in cases where the economy is deteriorating, profit planning can be made by transferring these provisions again.

According to the results, it is determined that the increase in deposit interest rates positively affects the return on equity. On the other side, it is also identified that the increase in loan interest rates decreases return on equity. This situation gives information that banks are mainly subject to interest rate risk. The maturity of the deposits is much lower than the maturity of the loans. Because of this situation, when there is increase in the interest rates, banks have to pay higher interest amount to the depositors. However, in order to get higher interest income, banks must wait for a long time since the interest rate of the loans is usually fixed. Hence, the banks should implement innovative strategies to minimize this risk. Within this framework, loans with flexible interest rates can be very helpful to manage this risk. In this process, in case of the fact that there is increase in the interest rate, the interest income of the banks can increase as well.

The most important limitation of this study is focusing only on the Turkish banking sector. Other countries and country groups may be taken into consideration in the new studies to be carried out. This will enable comparative analysis. On the other hand, only deposit banks were examined in this study. In new studies, it would be appropriate to include Islamic banks in the analysis. On the other hand, it is possible to increase the methodological originality of the study by using different analysis techniques. In this framework, fuzzy logic and considering the MARS technique will give a different perspective to this issue.

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Strategic Social Media Marketing and Data Privacy

Kevser Zeynep Meral

Abstract Internet, digital and social media has changed the roles in advertising. Social media has enabled customers via negative or positive electronic word-of-mouth comments may affect other customers. Digital and social media marketing used in various sectors can be cheaper, viral, easy for circulation and affect relationships between customers and the company via interaction. This study aims to define digital marketing and social media marketing, advantages for the customers and the marketers along with the potential risks for the customers and marketers. As a result of the literature review of the keywords, it is found that for the customers' data privacy is an important risk as the private data of the users collected by the social media platforms might be used improperly, and for the marketers, the negative electronic word-of-mouth about the product or services might have negative outcomes for the company.

1 Introduction

Social media users are increasing day by day and nearly half of the population is using social media globally, in the USA majority of adults use Facebook for news (Matsa & Shearer, 2018), which is the most used social media platform with active users exceeding 2.6 billion monthly as of first quarter of 2020 (Statista.com, 2020a, 2020b, 2020c, 2020d) and according to the same site Facebook has earned 69.66 billion US dollars from advertisements revenues in 2019 (Statista.com, 2020a, 2020b, 2020c, 2020d). Social media user's behavior is important for organizations and society therefore scientists have researched about different aspects of social media users from their digital footmarks like; different demographic groups (Hinds & Joinson, 2018), personality characteristics prediction (Azucar, Marengo, & Settanni, 2018; Tskhay & Rule, 2014).

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Although people might use digital marketing and social media marketing instead of each other, and they think that if they participate in social media platforms, it is digital marketing, social media marketing is only a part of digital marketing as digital marketing covers both online and offline services and products. However, social media marketing (e.g., Facebook, Instagram, Twitter) is of the tools digital marketing (Breitwieser, 2020). The literature shows that both digital marketing and social media marketing are used intertwined with each other.

2 Digital Marketing

Digital marketing literature is fragmented (Lamberton & Stephen, 2016) because the internet system itself is complex (Hewett, Rand, Rust, & Van Heerde, 2016). There is a link between consumer behavior and marketing actions which is affected by the technical structure of the social media platform, which is considered as an external factor (Yadav, Gastine, Christensen, & Duarte, 2013). Digital marketing research show that customer and company relationship is stronger due to interaction between the company and the employees (Lambe, Wittmann, & Spekman, 2001). Dynamics of viral marketing strategies have been investigated by Berger and Milkman (2012). Viral campaigns researches show that highly connected people, i.e., hubs spread the messages, as hubs participate and are active in viral campaigns (Goldenberg, Han, Lehmann, & Hong, 2009; Hinz, Skiera, Barrot, & Becker, 2011). However, sometimes viral conversations might reach so many people that it might be out of control of the companies (Mangold & Faulds, 2009).

Digital marketing also facilitates the circulation of value (Figueiredo & Scaraboto, 2016) and management of back office/offline work (Harvey, Smith, & Golightly, 2017). Digital marketing's low-cost advantage is used in the financial advice industry (Varadarajan & Yadav, 2002; Wind and Mahajan, 2001). Digital marketing and advertising cover social media marketing along with search engine advertising, banner advertising, video advertising, and rich media advertising. Worldwide internet advertising income has increased 100 billion dollars in 2012 (Statista.com, 2012). Global digital advertising is expected to exceed 355.7 billion dollars in 2020, and the number one ranking segment is "Search Advertising" with 158.9 billion dollars expectation in digital marketing as of 2020 (Statista.com, 2020a, 2020b, 2020c, 2020d).

Advertising globally via tv, radio, cinema, outdoor, television, mobile, and digital has been increasing since 2010 and it is forecasted as 548 billion US$ in 2017. Although television was the most important tool for all media advertising in 2016 with 35.5%, followed with 18.9% desktop internet and 15.2% mobile internet. Digital advertising expenditure in 2016, including desktop and laptop computers and mobile devices, was estimated as 194.6 billion dollars in 2016, which has increased to 335 billion $ in 2020. Mobile internet, which is a sub-sector of digital advertising spending, is expected to increase from 109 billion $ in 2016 to 247 billion $ in 2020. While mobile advertising expenditure nearly doubled between 2015 and

2019. The first ranking global advertising companies are Samsung Electronics spending 11.2 billion $ in 2017, surpassing Procter and Gamble spending 10.5 billion and L'Oreal, Unilever, and Nestle sharing the first five ranks in global advertising (Statista.com, 2019).

3 Social Media Marketing

Social media marketing is defined by various academicians in social media literature. Tuten and Solomon (2017) define social media as "the utilization of social media technologies, channels, and software to create, communicate, deliver, and exchange offerings that have value for an organization's stakeholders." The findings of Kapoor et al. (2018), show that social media is accepted as a medium in marketing.

Social media is used in communicating for promoting and selling products in private sector whereas in the public sector is used for information sharing and motivating tool for engagement (Gruzd, Haythornthwaite, Paulin, Gilbert, & Del Valle, 2018; Royle & Laing, 2014). Social media is also used as a medium for communication not only for building and sustaining professional and social relationships with friends and family, and it is also used for business communication as well. For marketing purposes, marketing strategies via social media are for long-term relationships between key parties, along with customers (Kamboj, Sarmah, Gupta, & Dwivedi, 2018; Kang & Kim, 2017; Murphy, Laczniak, & Wood, 2007).

Different researchers about various aspects of social media marketing have been investigated. Performance (Dwivedi et al., 2018; Kapoor et al., 2018) and advertising (Alalwan, 2018), interactivity (Jiang, Chan, Tan, & Chua, 2010), relevance (Jung, 2017), usefulness (Chang, Hung, Cheng, & Wu, 2015), and organizational reputation (Boateng & Okoe, 2015) and behavioral attitudes (Eppler & Mengis, 2004) are found for social media marketing. Alalwan (2018) suggests that consumers who want to buy the advertised product are more likely to find social media advertising more advantageous. Social media is used in individualized marketing, because via social media communication with their customers, corporates can offer individual solutions and answers to their customers and collect personal data specific to that customer (Royle & Laing, 2014; Simmons, 2008). Therefore, corporates can use social media to offer personal message and presentations to their target group of customers for marketing purposes (Sterne, 2010).

According to Cochrane, personal offers specific to customers can increase sales by more than 10%, in terms of marketing expenses return on investment (Cochrane, 2018). The main goal of marketing is to have a strong relationship with the customers (Soler-Labajos & Jiménez-Zarco, 2016), social media can be used as a tool with the content which is created by the user, and by using online two-way interaction, the customers can be attracted and by building relationship with other members, to keep customers (Wang & Fesenmaier, 2004).

Social media is social as its name is self-explanatory. Social media provides a platform for socializing and interaction and is related with extravert characteristics

(Seidman, 2013) like enthusiasm, assertiveness (DeYoung, Quilty, & Peterson, 2007). Social media is actually conversion of Word-of-Mouth (WOM) traditional marketing (Kozinets, De Valck, Wojnicki, & Wilner, 2010), which can be described as specifically designed messages for network members who can share the designed content and motivate sharing communication like traditional WOM communication (Swani, Milne, Brown, Assaf, & Donthu, 2017) converted to digital communication via social media platforms.

With the digital transformation, the marketing industry has been transformed as well with Web 2.0, which enabled two-way online communication and interaction with customers via social media (Lacka & Chong, 2016). According to Statistica (2020), social media users increased to 3.6 billion users globally in 2020, and it will increase to 4.41 billion in 2025. Social media usage has increased with mobile devices, although it depends on the country, for example, Americans spend nearly 2 h per day on social media in the Philippines, the time spent can increase to 4 h. Among social media platforms, Facebook is number one with one billion registered accounts and with 2.5 billion active users per month, where Instagram with one billion active accounts per month. Additionally, the most downloaded application as of June 2019 is WhatsApp and Facebook Messenger messaging apps.

Social media has changed people's way of living (Quan-Haase & Young, 2010), and way of connecting with each other (van Dijck, 2012), way of learning (Gruzd & Hernández-García, 2018), for example, during the Covid19 pandemic, the distance education was enabled via social media tools as well like zoom, MS teams. Social media has empowered consumers (Barrutia & Echebarria, 2005), and consumers use social data to share their experiences with their network, i.e., friends, companies, and even more by posting, tweeting, sharing, likes and reviews on their online communities (Bailey, Bonifield, & Arias, 2018; Dimitriu & Guesalaga, 2017; Martín-Consuegra, Díaz, Gómez, & Molina, 2018). Social media is used in various sectors, from designing retailer to who combines social media with predicting analytics to gather ideas on potential new products (Amato-McCoy, 2018) to travel companies to offer specialized offers to people from social media mining unstructured data (Western Digital, 2018). Social media is used in the sea transportation sector, for example, Maersk Case, in the shipping industry, to have a closer relationship with customers has launched its social media strategy in 2011 and had 400,000 followers in Facebook in less than a year. They have focused on brand awareness, not direct sales however they have started using social media for sales as well (Katona & Sarvary, 2014).

However, in another study in Turkey with container shipping companies show that shipping companies do not prefer social media and do not use generally accepted social media strategies. The result shows that although emotional messages increase engagement level however decrease direct-calls-to-purchase decreases. Video content messages increase viral, and better video and photo content better interaction. Although the Facebook follower numbers do not affect the interaction percent of Facebook posts rate, they recommend social media advertising (Bitiktas & Tuna, 2020).

4 Data Privacy

Data privacy is one of the top issues of digital marketing. Private data covers sensitive personal information, including health, medical data along with credit cards and social security data, it is a very important aspect of the digital world. If privacy of personal data cannot be provided, then the results include identity theft, fraud transactions resulting with the overpayment, and identity theft, fraud overpayment, advanced-fee payment, and non-delivery of merchandise are among internet scams as per the Department of Justice. One of the greatest risks is that both the consumer and the companies being relaxed to protect data and privacy (Ferrell, 2017), whereas it is found that the typical cyber fraud is slightly under two hundred thousand dollars (Romanosky, 2016). Privacy has been defined in literature various definitions (Adams, 2017). Westin (1968) has defined it as the person's decision to which personal information is to be shared with people who are selected by the person himself. It is at the same controlling the use and distribution of personal demographic and online activity information (Foxman & Kilcoyne, 1993). Raschke, Krishen, and Kachroo (2014) divide digital information privacy into four groups as (1) collection of data, (2) using data without authorization, (3) accessing data improperly, and (4) misrepresentation of data.

To protect digital data privacy, countries have their national privacy laws and regulations, which are locally acceptable practices in their culture (Leonard, 2014). It is found that in countries where strict privacy regulations are applied, there are few privacy problems; however, as the control increases, it lowers advertising effects and other marketing outputs (Martin & Murphy, 2017). Although people are frustrated with privacy notices, the higher perceived control on privacy, nearly double the click on personal advertisements (Tucker, 2014). The Internet of Things (IoTs) also has high risk of private data to be shared via connected devices like smartphones to monitor homes (Adams, 2017). Although IoTs can create many opportunities for users however at the same brings risks in terms of personal date (Walker, 2016; Weinberg, Milne, Andonova, & Hajjat, 2015).

It is not easy to control big data, which has several privacy issues like persons whose data has not even been collected (Raschke et al., 2014). Legislation is not up to date with the market because of the market advances, unclear and overload information, and the speed of data exchange (Walker, 2016). Therefore, the users must be aware of the potential risks, and digital marketing must increase awareness of users about the use of their personal data like e-mails, phone numbers, demographic information, etc. (Lee & Trimi, 2018). Likewise, perceived digital information control methods via self-protection, industry self-regulation, and legal/governmental issues decrease people's privacy anxieties (Xu, Teo, Tan, & Agarwal, 2012). It is also found that controlling while suppressing data privacy issues may increase trust and reduce emotional violation. On the other hand, it might lead people to disclose too much private information, in greater control perception, which might cause them to be in a vulnerable position (Brandimarte & Acquisti, 2012). To protect data privacy, along with legislation to control personal data, digital marketers must themselves be in compliance with ethical norms, Bloom and Orme (1994) suggested marketers two key aspects to take into consideration, the first one is whether or not they must be allowed to keep personal data without people's knowledge or consent and secondly whether or not they would share this information with other parties without their consent. It depends on the organization whether data privacy is their top priority, including to provide resources and policies to protect customers (Maignan & Ferrell, 2004). Instead, marketers presumed as if they had permission to share, and have access to personal data, they shared, sold their customers' data to third parties (Singer, 2012).

5 Data and Social Media

Social media platforms like Facebook, Instagram etc., are free, that is, they provide services like opening accounts free however, these platforms collect the data of the users. The online platform advertisements have increased as well with the increase of users, for example, Instagram's advertisement income has increased to 70.7 billion dollars in 2019 and is more than Youtube, which has ad income of 15.5 billion dollars and Facebook's income in 2019 (Ekonomist.com, 2020). These platforms provide personalized advertising to users, gathered from users' behavioral data, and display specific targeted advertisements accordingly. Therefore, companies use data in their online services like Google, Amazon, and Facebook. Social media is cheaper, advantageous for marketing as well for example, Facebook advertisements (Ainin, Parveen, Moghavvemi, Jaafar, & Shuib, 2015) cheaper with an average of $1.26 (Statistica, 2018) and Google $2.8 (Pratskevich, 2018) compared with newspapers advertisement are $32, and magazine advertisements are $20 (Levesque, Flannagan, & Lauritano, 2015).

As social media advertising is the most commonly used type of digital advertising, which covers social media platforms like Facebook, Twitter, LinkedIn, etc. and with the social media advertising cost advantages, social media advertisement has increased tremendously reached a global income of 92.9 billion dollars in 2019 and is expected to increase to 132.2 billion dollars in 2024. These advertisements are posted on social networks as "sponsored posts." Memberships, subscriptions fees are not included in social media advertising (Statista.com, 2020a, 2020b, 2020c, 2020d).

Social media enables companies to access target groups with their characteristics like Facebook user activities, age group, gender, and location (Kapp, Peters, & Oliver, 2013). Data is an enormous data for researchers, for example, data is controlled by players like Wechat (Wechat.com, 2020) and Taobao in China (Taobao.com, 2020) are taking into consideration social listening for their marketing strategies and tools (Misirlis & Vlachopoulou, 2018; Schweidel & Moe, 2014). They are especially interested in about their customers and public's opinions about their business (Tuten & Solomon, 2017). Collected data enables machine behavior and their impacts on human being (Rahwan et al., 2019), for example, the routes are followed and daily routes to work and home traffic time are automatically calculated by smartphones, the web sites which have been visited are automatically popped up to the user afterwards. Zhang, Shen, and Li (2019) has suggested to use both techniques like customers' wearables with products-associated radio frequency identification (RFID). Some schools are even trying to test whether the students are focusing on lessons in class (Dans, 2018). Even exercising data might be exchanged with each other for motivation purposes, as Shen et al. (2018) have mentioned in their study that two close person exchange data with each other.

However, although social media listening is very valuable for marketers to understand their customers' and public's opinion about their products or services (Lee, 2018; Paniagua & Sapena, 2014). On the other, not everybody might not be happy with these practices (Akar & Topçu, 2011; Dubois, Gruzd, & Jacobson, 2018). There have been opportunistic data sharing between networks as well (Wang, McKee, Torbica, & Stuckler, 2019). When users are not happy with marketers' way of using data, then it might have a negative effect and they may react negatively, which may end up losing trust and worse relationship between the company and the consumer (Adjei, Noble, & Noble, 2010; Arnold, 2018; Goldfarb & Tucker, 2013). Data breach/abuse of such techniques in China were mentioned in a research (Shi, Hu, & Peng, 2018). Furthermore, Facebook's data breach that is misusing secretly millions of users is another recent example (New York Times, 2018). Such examples of abuse and misuse of data increased users' privacy concerns (Cochrane, 2018).

An insurance company in UK, posted car insurance prices however, in return, received a negative publicity about their practices (Ruddick, 2016). Jiang et al. (2018) suggested that data privacy is very important, and in data sharing, people themselves must decide data utilization level (Jiang et al., 2018). It is not only the Cambridge Analytica scandal about Facebook misuse of users' data in China as well were also given by Browne and O'Flaherty in their studies about common practices about collected data abuse in China about massive data leakages and related ethical and legal issues (Browne, 2019; O'Flaherty, 2019). Followed with Chinese central government's forcing social media platforms to be very cautious about outsider's collaboration and with tighter precautions for securing data (Zhang et al., 2019).

6 Conclusion

With billions of social media platform users and the low cost of digital advertisement and social media advertisements comparing to traditional advertisements, the volume of digital advertisements and using social media tools for advertisement has increased tremendously. Especially with the interaction of consumers and social media listening of companies about users' comments play an important role in digital marketing. While especially negative (e-WOM) marketing is the main concern of companies, data abuse or misuse is the main concern of social media platform users. Private data protection is an important issue not only for the social media users, it is a data security issue that has consequences like fraud id, etc. therefore not only the users themselves, the governmental precautions also must be taken to protect mass data of users. The social media platforms must act ethically and must avoid abusing/misusing the mass data of which they have collected via social media platforms. This issue is such an important issue that it cannot be left to the social media platforms, only the controlling units, governmental bodies must also have new regulations for such data breaches and controlling systems for data abuses.

Especially after the Cambridge Analytica scandal followed with the precautions taken by like EU the new European Union's General Data Protection Regulation must be used by all countries with amendments if necessary. For future researchers, it is recommended to take into consideration of cultural differences and make necessary amendments in taking precautions for users' data privacy of social media platform users. After Facebook's Cambridge Analytica scandal, Facebook has changed its privacy setting, but other social media platforms settings can be investigated as well. Literacy of people and how they can be aware of the potential risks-including identity theft, fraud transactions, etc.—private data not only used in social media and via connected devices in the Internet of Things (IoT) also might be future researcher's subjects. Cambridge Analytica scandal showed that data protection is very important and cannot be solely left to the companies therefore, new legislations, how to control is another subject for future researchers, as European Union has started "General Data Protection Regulation" in Social Media accounts after the scandal.

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Digital Transformation and Changing Marketing Dynamics in the World

Funda Kara

Abstract With the development of technology, the changes experienced in consumers' expectations have directed especially marketing world to new searches. Starting to take place in the literature and featuring the digital marketing because of that the traditional marketing approach for companies is not able to adequately meet the needs of our age, SAVE marketing mix consists of solution (S), access (A), value (V) and education (E) elements. The starting point of this new mix is customer focus, which is now at the forefront. It is an approach that creates value for the customer, tries to find quick solutions to possible problems of the customer by communicating with them constantly, provides convenience to the customer regarding access to the product, and that can educate its employees by raising awareness on these issues. The aim of this study is to examine the SAVE marketing approach, which is one of the marketing dynamics being changed along with the process created by the digital transformation in the world. Surely, it is possible that various changes or additions would also be experienced in this marketing mix over time. However, it is an undeniable fact that the sense of marketing of the future will be shaped by carrying SAVE marketing mix.

1 Introduction

Today, international competition conditions, which are increasing depending on globalization and rapid developments in technology and communication reshapes the goals and strategies of the companies. Companies intending to become ahead of their competitors try to adapt to these new conditions. One of the most important ways to achieve this is also that companies can manage their marketing strategies in the more correct way. Marketing is a dynamic process that begins before producing the product and continues after its sale. The important role of this process in

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increasing the profit of the companies is also remarkable. Considering the advantages of using it correctly and effectively, it has become an indispensable tool for companies, especially in our age. Marketing, merely focused on increasing sales in the past, provides many benefits such as increasing the profit and market share of companies, reducing costs, creating customer value and loyalty in an intensely competitive environment.

Companies which prioritize customer-focused sales, customer needs, and expectations are now more likely to survive. As required of these new conditions, the traditional marketing approaches used for years have started to lose their effectiveness significantly since they are insufficient now. As a result of this, one of the new marketing approaches that emerged recently and have started to take place in the literature is also SAVE (Solution, Access, Value, Education) marketing mix.

SAVE marketing approach consists of remarkable elements of the digital age such as solution, access, value, and education. It is a model that can guide in better adapting to the issues of marketing. Customer relations are important, and it is important that communication with the customer is effective. Trying to find solutions to the customer's problems, the existence of reliable communication channels, offering products with high added value are the basis to this marketing mix. In addition to them, there is guiding the customer in being able to easily access the product by educating them that is by raising awareness.

It is a fact that traditional marketing can be no longer sufficient in our age in which the importance of information and communication has increased and being fast and practical is necessary. It is thought that this new approach may be effective in providing a more sustainable relationship with the consumer, that companies which adopt this approach that focuses on the customer and, which act in this direction, can be more profitable in all aspects under current conditions. An important way to ensure customer satisfaction is this marketing approach, which quickly responds to the needs of the digital age by using technology, makes the customer feel valuable, and always offers information in the right communication. Accordingly, in this study, the concept and development of marketing will be briefly mentioned first, and the marketing dynamics that is changing due to today's conditions will be dwelled on. Then, for companies, the transition process from the traditional marketing approach to SAVE marketing mix, and the variables that form this mix will be discussed.

2 Concept of Marketing and Development of Marketing

According to the first marketing definition of the American Marketing Association (AMA), which makes various definitions of marketing in line with its development over the years; Marketing is the business activities that ensure the flow of goods and services from producers to consumers (Gundlach, 2007; Sanclemente-Téllez, 2017). It then stated the marketing in detail as institutions, activities, and processes that play a role in creating, communicating, delivering, and exchanging valuable proposals for customers, partners, and society (AMA, 2007).

Marketing is the process of designing products and services to meet the needs of customers, promoting these designed products and services effectively, offering them at the right time and place for consumption or use (Sallis, 1996). Briefly, marketing can be defined as the homework of your company to understand what people need and what they must be offered (Kotler, 2011). Marketing allows the customer to access the product by bringing together the producer and the consumer. This is the property benefit provided by marketing. It also creates time benefits by ensuring that customers can find the product at any time required. Enabling consumers to access the products at the market, marketing provides place benefits. While one of the benefits of marketing is creating value for customers, this method creates profit for companies. Companies and individuals serving the society in various sectors mostly concentrate on marketing activities to increase demand. These activities can now be encountered in nearly every part of our lives.

We can consider the sense of marketing that has changed in society over time as sense of production, sense of product, sense of sale, sense of modern marketing, and sense of social marketing. It is seen that the marketing approaches which previously acted with the sense of I would sell whatever I produce have started to focus on the sense of how I can sell over the years. In other words, marketing was considered as the activity of businesses to sell products and services for profit in the past, but it has now become a more comprehensive branch. Over time, companies have started to consider the demands and needs of the customer and take customer satisfaction as a basis.

In retrospect, it is possible to say that many marketing theories based on a customer-focused perspective have been asserted since the emergences of the marketing philosophy. For example, Kotler and Keller (2006, 2009, 2012, 2016) consider the recent marketing philosophies in which customer focus has started to be adopted as marketing and holistic marketing philosophies. Briefly, it can be stated that marketing philosophies are historically divided into pre-customer-focused period and customer-focused period. In this direction, various marketing types have started to be accepted in the literature, and new marketing dimensions have emerged especially in recent years.

In the process of rapid change and transformation in the world, the emergence of these new dimensions is certainly inevitable. In this context, the main factors that support the development of marketing can be listed as follows: (Odabaşı, 1998).

- Technological developments with the increase in production
- Increase in population
- Rapid improvements in education
- Increase in income per capita
- Increase in the size of existing markets
- Developments in social and political conditions

3 Today's Changing Marketing Dynamics

Marketing is very important for companies in terms of predicting the needs through information which they can obtain from the market and being able to provide a solution for this. Although today's intense competition environment makes it necessary to make a difference, the similarity of many products makes it difficult. With the aim of making success sustainable, companies head toward using customer relationship management (CRM). At the core of customer relationship management is to understand how the customers' differences are. It is important for business to determine the strategy about how it should behave towards each customer regarding these differences. Here, not only marketing but all activities of the business focus on the customer differences. To be successful in CRM, it is essential to reach the right customer with the right cost, in the right way, and through the right channel (Aktepe, Baş, & Tolon, 2018). Additionally, the methods of digitalized marketing have been diversified along with the rapidly growing mobile internet market, which is very effective in reaching customers.

Gamification,[1] which is one of the rising trends of digital marketing,[2] appears in a variety of ways, such as e-marketing, word-of-mouth marketing, impressive marketing, experiential marketing, content marketing. The basis of these dimensions is focused on the ways that create loyal customers by especially keeping the existing customer and that develop brands. Therefore, they are also successful in creating brand value through brand recall, perceived quality, brand awareness, and brand loyalty aspects. Moreover, each of them can significantly affect the perception, behavior, and purchasing decisions of consumers.

Digital transformation is among the challenges facing contemporary businesses. There is a need to use digital technology to develop and implement new business models. Firms to evaluate existing capabilities, structures, and culture to identify what technologies are relevant and how they will be enacted in organizational processes and business offerings (Saarikko, Westergren, & Blomquis, 2020). Thanks to digital platforms and digital channels, businesses can reach larger customer audiences at less cost. It better introduces the products and services they produce and provides after-sales service opportunities to its consumers in a fast and easy way to recycle (Ryan, 2016). Brands that realize the reflections of technological development on consumers have directed their marketing communication and strategies towards digitalization. Marketers are now aware of the importance of digital marketing and are investing in the development of their applications in this area (Tiago & Veríssimo, 2014).

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[1] Gamification attracts the attention of consumers of all ages by bringing together the elements of the game and the concepts that are not related to the game. Individuals who make their consumption by playing games are both entertaining and establish an emotional connection with the business. For details, see Hofacker, Ruyter, Lurie, Manchanda, and Donaldson (2016), Tobon, Ruiz-Alba, and García-Madariaga (2020).

[2] Digital marketing for details, see Dumitriu and Popescu (2020).

Table 1 Comparison between traditional and digital marketing

Traditional marketing	Digital marketing
Traditional marketing includes print, broadcast, direct mail, and telephone	Digital marketing includes online advertising, email marketing, social media, text messaging, affiliate marketing, search engine optimization, pay per click
Traditional marketing is an expensive and time-consuming process	Digital marketing is reasonably cheap and rapid way to promote the product or services
Results and effectiveness are difficult to measure	Results and effectiveness are, to a great extent, easy to measure
Interaction with the local audience	Interaction with the global audience
Advertising campaigns are planned over a long period of time	Advertising campaigns are planned over short period of time
It includes one-way conversation	It includes two ways conversation
Responses can only occur during work hours	Response or feedback can occur anytime
Limited reach to the customer due to limited number of customer technology	Wider reach to the customer because of the use of various customers technology

Source: Tiwari (2020)

The digital transformation of companies has become mandatory in terms of marketing activities. The most proper way to reach the consumer, who is in such close relationship with the internet, faster is digital marketing (Akgun, 2019). The use of the internet and social media has changed consumer behavior and how companies conduct their business. Social and digital marketing offers significant opportunities to organizations through lower costs, improved brand awareness, and increased sales. However, significant challenges exist from negative electronic word-of-mouth as well as intrusive and irritating online brand presence (Dwivedi et al., 2020). Furthermore, it is seen that the share of budget allocated to digital marketing has significantly increased all over the world. Table 1 shows some of the differences between traditional and digital marketing. In this direction, it is important for companies to choose and implement the right marketing method. Although it is difficult to make the right marketing decision, it should be evaluated according to its positive results.

Changes in consumer behavior are also an important element that affects the marketing strategies of firms. With the increasing use of digital media by consumers, more and more companies are using digital marketing to reach their target markets (Smith, 2011). Considering the advantages digital marketing will provide, it should be taken into account that acting insistently in the 4P model will pose a risk for companies. The marketing mix, which has determined the basic dynamics of marketing for almost 60 years, has now take on a completely different dimension by losing its effect as required today's changing conditions. One of these new and salient dimensions is the SAVE marketing mix.

4 Transition from Traditional Marketing to SAVE Marketing Mix

The company and its decision have been in the forefront of McCarthy’s focus who said the product determined by the company can take place in the market with the price, distribution conditions, and promotion activities determined again by the authorities of the same company. Although 4P has undergone various changes over time and increased in number, the role of customers has been stayed in the background in the success of company. The concept of 4C has already started to gain importance in this process. 4C consists of customer value, customer cost, customer convenience, and customer communication. The customer is always in focus. It is possible to say that the customer-focused marketing approach has developed accordingly. Because especially the dizzying speed of the digital age was insufficient to respond to needs, the 4C rule has been replaced by SAVE started to take place in the literature**.** Elements of the SAVE marketing mix, modeled by Eduardo Conrado from Motorola Solutions, are expressed as solution instead of product, access instead of location, value instead of price, and education instead of promotion.

It is especially seen in B2B[3] (business to business) markets that this mix changes the way of doing business today. Most B2B companies, such as especially engineering or technology-focused companies, find it difficult to produce technologically superior products, to go beyond thinking in terms of services, and to obtain a customer-focused perspective instead (Ettenson, Conrado, & Knowles, 2013). Harvard Business Review published an article titled “Rethinking the 4P’s” in 2013, addressing the need to re-evaluate the framework. In a 5-year study covering customers and a large B2B industry, more than 500 executives from many countries asserted that the 4P model weakened B2B marketers in three ways: (Wani, 2013).

- Directing the marketing and sales of the teams to emphasize the product technology and quality.
- Putting less emphasis on the need to create a solid situation for the superior value of its solutions.
- As reliable sources, taking away from strengthening the advantages of diagnosis, suggestions and solving problem.

The SAVE model is an improved version of the SIVA model (solutions, information, value, and access) proposed by Dev and Schultz (2005). In the SAVE model, education is a substitute for information, and in fact, this is the only difference between SIVA and SAVE. The information side on the SIVA model is a one-way route while learning in SAVE means giving and receiving and ending with customer feedback and suggestions (Inanloo, Zarei, & Zeinolabedini, 2018).

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[3] B2B (Business to Business) is the sale of a company’s product or service to another company. For details, see Brennan, Canning, and McDowell (2020), Cortez and Johnston (2018), Lankova, Davies, Archer-Brown, Marder, and Yau (2019).

At the core of this marketing mix, there is an approach to try to solve the problems of the consumer, to have reliable and effective communication channels, to offer high value-added products to the consumer. It also includes educating the consumer and guiding them to reach the product easily. In today's world where the importance of information and communication has increased considerably, and it is necessary to be faster and more practical, it is seen that traditional marketing is no longer sufficient and effective.

While 4P has served consumer markets for more than half a century, it is commented for this mix in the corporate marketing world that it produces product-focused strategies, which are facing the obligation to offer more solutions, and whose efficiency is decreasing. In this direction, one of the marketing developments that are more suitable to serve digital companies and consumers today is the SAVE framework. Like the 4 P's, the SAVE Framework consists of four central elements that should make up a marketing plan. However, whereas the 4 P's focus only on the product or service a business sells, the SAVE framework broadens the focus to include the needs of the customer.

The SAVE marketing model guides company owners and marketers in concentrating on marketing issues surrounding ideas regarding our time, such as solution, access, value, and education. While this structure produces valuable and shareable content for the customer, it helps attract potential customers with a customer-focused approach. The SAVE marketing mix also prioritizes customer relationships by acting with a customer-focused approach. It draws attention to the issue of finding solutions to customer problems quickly, providing easy access to the product for the customer, creating customer value as well as product value, and educating the customer, and providing the correct information flow. Therefore, the customer is the focus. Therefore, this approach can be effective in providing a more sustainable relationship with the consumer. Those who adopt this understanding and act in this direction are more profitable in all respects in the current conditions.

Whatever solutions, access, value, and training be better, more and more relationships are formed between the two sides, marketers and customers. Today's customers are not looking for products, but they are looking for solutions that offer these products, and if the value product is promised, the price is no longer an important issue. Hence, the SAVE model seems to be a suitable fit for relational marketing (Wani, 2013).

4.1 Solution Instead of Product

The product refers to an offering of a business that satisfies the needs. The benefit provided by the potential customer with their pleasure is again important in the formation of the product idea. This benefit of the product is also important for the customer. Therefore, a robust physical product should contain helpful instructions, useful packaging, and reliable warranty, as well as positive opinions from customers based on past experience (Perreault, Cannon, & McCarthy, 2013). Consumers generally prefer the right product they need. This may be an existing product or an adaptation of an existing product, or a recently developed product. The right price is as important as the right product. If the price level is set too low, it may decrease the trust level of the consumers for the quality of the product. On the other hand, if it is set too high, it may be difficult for the consumers to obtain the product. It is important to match the product with the demands and needs of the customers. Moreover, most companies tend to opt for solution-oriented models today. Generally, companies can be excessively focused on the features and functions of a product as well as how to make it dominate against competitors. Currently, customers care more about solving problems in a short time.

Companies are no longer manufacturers of a product, but a solution provider to solve the problems of customers and meet their needs. It is the task of the marketing unit to understand the needs of customers and offer what is suitable (Inanloo et al., 2018). It is seen that a customer-focused marketing approach has developed with the transition from traditional to modern marketing. Customer focus basically brings along a solution-focused approach. Developed according to this approach, SAVE marketing approach is also customer focused and aims to be able to provide the fastest solution to the problems that the customer may face rather than the product. Accordingly, finding solutions to the problems of customers is also the subject of customer-focused marketing.

The conditions in today's digital age, where marketing activities are mainly done through the internet, are shaped according to what the product offers to the customer, whether it meets the need, whether the problems experienced are solved in a short time. Today, with the increasing importance of being human-oriented, the need to consider human desires and needs has emerged. Therefore, providing rational solutions for possible problems by giving a sense of trust in people is very important in the process of creating customer value along with customer loyalty and brand preference. Digital marketing will benefit from highlighting the solutions to your products or services provided to your customers. This style of marketing caters much better to the Internet searcher's need for instant gratification. By meeting them where they are at, a solution-focused approach is much more likely to convert them into customers.

4.2 Access Instead of Location

With the spread of communication and the transformation of the world into an integrated market, customers' expectations have changed, and the marketing approach has become customer focused. Being one of the main dynamics of marketing, the location aims to provide customers with access to the product. Although there are many ways to achieve this, its difficulties may also come into question. The important thing is to reach more consumers by choosing the right and effective one among these ways. The process experienced in today's internet age has made it more important to deliver the product to the consumer at the time, and in the way, the customer wants rather than the location of the product. In conjunction with easy accessibility, fast communication, interaction, reaching an unlimited market, and increasing competition, the trade of goods and services through digital media has brought about changes in the way companies do their business. Companies, individuals, and the state, which find the opportunity of electronic commerce in the digital environment, continue their activities in a more dynamic structure (Yeşil, 2008).

Networks that provide access opportunity between countries by eliminating the problem of distance shape the equivalence of the basic business. Through the internet businesses, electronic networks provide easier access to works in the product, service, labor, and education fields. It is possible for companies to communicate with their consumers through various channels. Being the most common among these channels, the internet has become indispensable because of the advantages it provides, such as its speed, cost, and global access (Aksoy, 2006). At the same time, the internet has reduced the cost of people's access to each other. It is also important to quickly resolve the consumers' possible complaints during or after ordering the shopping through e-commerce sites. There is a need to access many channels such as real-time easy-access chat screen, email, fax, telephone in order to get in touch with the company quickly. It is now a requirement for companies to present this need to consumers in the most effective way (Hou, 2005).

4.3 Value Instead of Price

In pricing, which is one of the decisions made about the marketing mix, it is important that the customer believes that the price paid for the desired product is worth it. The price of the product can give various messages about the value it provides to the customer, and it can also be an indicator of the quality of the product (Çatı, 2016). It has often been a priority for the customer in decision making for the price, purchasing of goods or services. Your customers will want to know how much your services cost. So, businesses should establish pricing when developing their marketing plans. However, focusing solely on price is rarely a good selling point for a product or service. It is possible to come across studies suggesting that the intangible elements in the form of time, energy, and effort can be much more important than price. For example, Lin, Tseng, Hung, and Yen (2009) stated that customer value can be examined with four basic dimensions such as functional, social, emotional, and sacrificial.

It can be said that the price does not reflect the true value of a product. Therefore, brand value gains more importance than pricing as required today's digital transformation. It is also possible to say that a global approach based on value beyond price has been formed over time, and consumers' expectations of feeling valuable have increased. This has been very effective in bringing value to the forefront instead of price in the marketing world. Values such as goods, services, personnel, and image are presented to the customers by the companies. Acquiring these values and comparing them with other companies, customers evaluate their total expenses and can decide whether buying the product. Against its competitors, it is important for the company to act with the right strategy to be attractive for the potential customer or to exert efforts not to lose its existing customers.

Especially in developed countries, there are studies emphasizing that finding a new customer can be much more costly than keeping an existing customer. It can be said that the reasons for this are that existing customers know the products of the company, brand awareness, and their satisfaction with the performance of the products. Therefore, marketing managers should focus on the customer relationship and its value, relating to create customer value for a lifetime (Mucuk, 2017). The customer may differ in two ways for the company. The first one is that the value of each customer for the company may be different, and the second one is the difference in expectations of each customer from the company. For this reason, the process towards differentiation should be developed by sorting according to the "value" provided by the customers to the company and differentiating them according to their needs (Aktepe et al., 2018). The SAVE Framework suggests going beyond price by emphasizing the value that the product will bring to customers' lives.

4.4 Education Instead of Promotion

The fact that it has become necessary for companies to introduce new products to the market more frequently nowadays has led to a shortened life span for most of the products. This situation is related to the rapid developments in technology as well as the subject of that the current product variety and the high-profit margins cannot be offered in the long term. Companies are supposed to distribute the lifetimes of their products in a balanced manner. In order to keep new products placed on the market and to prolong their life span, the following suggestions can be taken into consideration: (Paksoy, 2017)

- First of all, to determine the right need and the fact that the product may be suitable for the customer.
- Being able to use the right material and human resources.
- Properly managed production process based on high technology.
- Being able to deliver the product to consumers through accurate measurement of consumer perception and right marketing channels.
- To enable consumers to access the product faster.
- The fact that e-commerce can be done effectively.

Effective promotion is primarily possible through having effective communication. However, it is possible to say that it is not enough to provide the information. In other words, if the current behavior of the consumer is as desired, providing the customer with information about the products strengthens this situation. However, this is not the case, the aim of trying to change it towards the desired direction comes to the forefront. The way companies can inform the customer and persuade them to behave in the way they want is related to an effective communication process (Mucuk, 2017). Additionally, the presence of a customer-oriented information center and communication channels will enable communication to be more sustainable. Thus, despite the cost of promotion activities to the company, effective and continuous information flow, communication, interaction with the customer, and orient them have now become forefront matters in increasing efficiency and ensuring customer satisfaction.

In cases where the institution does not educate their customers sufficiently, there may be differences between the service provided and the service promised. A disappointment may be experienced for the customer who does not have enough information about how the service will be offered, what their role will be in the presentation, and how to evaluate the services they have not used before. In this case, they will hold the business more responsible than themselves. There are studies stating that one third of the causes of complaints by customers are related to them. Businesses should feel obligated to provide the necessary education to the customer, who can prefer another company even if the problem is caused by them (Aktepe et al., 2018).

5 Conclusion

In our age, the phenomenon of sales has now become associated with the value it created rather than price. Value-focused sales have replaced the price-based sales and marketing approach. Creating product and customer value has become prominent in meeting the constantly changing needs. Customers now want faster solutions for any problem encountered during the purchasing process. It has become important to provide fast and proper solutions to the customer during or after the purchase of goods or services. The fact that reassuring approaches develop along with mutual communication increases the customers' loyalty to the brand. Certainly, at this point, the ability of the customer to procure the product without any problems and the continuity of the information exchange is also effective at this point.

All of these have now required to focus on elements such as solution, access, value, and education that took digital marketing to the forefront by replacing traditional marketing. These elements are salient elements in fields such as sales, purchasing, and marketing. Basing on solution, access, value, and education, SAVE mix is customer-focused prominent approach because of the traditional approach is not able to meet needs in marketing literature. In present time in which the traditional marketing framework is insufficient, consumers prefer to access the product more easily they want to buy, to find quickly solutions to their potential problems, to feel valuable, and the existence of an effective flow of information. Ensuring these conditions also affects the brand preference of consumers.

Today's increasing competitive conditions have made it mandatory for companies to have a properly planned and effective marketing plan. Companies that fail to manage their strategies will face significant customer losses as well as revenue losses. Having a good marketing plan and setting the right goals will lead to increased benefits and long-term goals. Failure to have such a program or to determine the goals and strategies will lead to loss of customers. At this point, the fact that customer-focused SAVE approach is active in the strategies of the companies can minimize this loss. In our age in which information is spread rapidly with the increase of information and communication resources, companies' relationship with their customers has started to change. Customers' ideas, problems, expectations, feedback, and suggestions are becoming increasingly important. Therefore, the success chart and market shares of the companies that care about their customers to this end are growing; and this growing creates opportunities for companies on gaining competitive advantage. Long-term use of this competitive advantage by benefiting from new marketing strategies can be recommended, especially for ensuring customer loyalty.

Moreover, implementation of SAVE approach not only in B2B marketing but also in personal marketing will be able to be effective in ensuring brand awareness and loyalty**.** In summary, rather than 4P now, SAVE approach that responds to the needs of digital age quickly, that be able to provide information and suggestion to their customers by making themselves feel valuable, is remarkable in terms of customer satisfaction.

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The Need and Importance of Financial Innovation in City Marketing

Abdullah Eravcı

Abstract Responding to consumer expectations financially due to continually changing needs has become an increasingly important problem. The financial problem affects city marketing, which has become a branch of marketing science. Cities provide Finance from central governments, but they also must generate resources to develop and grow. Each city has an original side and a potential source that can reveal it. It has existing resources that the city can develop. However, some cities cannot use their resources due to the lack of financial innovation and cannot develop. This study aims to research the contribution of financial innovation with urban marketing and to contribute academically to cities facing financial problems. Therefore, the information on city marketing, innovation, and Finance has been analyzed from the literature and data obtained under two main concepts: need and importance of financial innovation in the scope of city marketing. This study will attract and inform academicians and city managers and contribute to city marketing.

1 Introduction

The needs and expectations of cities are continually changing, thus leading manufacturers to find new innovative methods in developing their cities. Within this infrastructure of advancing change are individuals like managers and citizens who are a central element of this development. Improving the quality-of-life innovation in the city and improving the city is in line with the innovative approach (Rosenthal & Capper, 2006). This study aims to draw attention to the relationship between city marketing and financial innovation. First and foremost, it is vital to state that most city marketing initiatives have failed to achieve their desired goals/success. The second issue that affects city market failure is due to financing. The approach that will contribute to solving both the problems mentioned above is the innovative

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approach. Within the framework of an innovative approach, three key issues must be addressed in city marketing, financing, and innovation.

City marketing is an effort to generate benefits for city residents and other audiences of the city. The target audiences of city marketing are city residents, visitors, investors, students, and other audiences. With city marketing, the goal is to market the city to the audience. City marketers prefer qualified members such as high-level investors and educated individuals to settle in their cities. To attract these individuals, they assure them that their cities have a quality of fresh air, clean water, green areas, and financial resources, all of which make their cities a livable place (Han, de Jong, & Jiang, 2019).

Finance is a function of business where economic developments depend. The word describes goods, money, and other financial affairs. As a concept, obtaining funds that the financial business needs render into managing them in the most appropriate and effective manner (Kurt, 2020). Finance in terms of city marketing is funds that are found and used most efficiently. It restricts the availability of resources in city marketing, and in this way, financial innovation comes to mind to overcome financial constraints.

Innovation is defined as a new product of invention with economical use and value and licensed imitation or application (Arnaboldi & Rossignoli, 2010). According to Arnaboldi and Rossignoli, financial innovation is understood as a tool or resource that reduces risks and costs, enables the development of products, services, and vehicles, but there is no consensus on it. Innovation is a holistic method to provide consumers with better products than existing products. Furthermore, it is producing new services in consideration of the consumer needs, to market effectively, to ensure continuity in profitability and growth.

The city must have production and market management, such as a business. Some cities are built as private sectors, to market the city. These cities resort to innovation to make profitability and growth sustainability. Innovation needs the support of a cultural environment, in other words, the cooperation of the city's managers and stakeholders. Innovation also can create benefits and solve problems (Can, 2012). This feature allows innovation to come to the forefront for the need for financial innovation to solve problems in a wide range of areas. This study aims to draw attention to the contribution of innovation to city marketing and to look for a different approach in finding solutions to city marketing problems. The study is produced through closely analyzing literature and research on city marketing, finance, and innovation. The literature on city marketing and financial innovation has been analyzed without going into much detail on areas that can be innovated, and the information obtained from existing research and studies is modified onto city marketing instead of any business.

2 City Marketing

City marketing consists of two things: the city and marketing concepts. The city is an event area for a geographical region, an economic organization, an enterprise structure, and events (Williams, 2012). The word city is defined differently depending on the discipline. For example, the esthetic structure stands out compared to architects, while marketers have product positioning and market planning. According to social scientists, the city is where the planning and providing of biological and social development of the people are made (Akimoto, 2009). It invites the concept of development and growth marketing. There are also different definitions of the concept of marketing. According to The American Marketing Association, marketing is “the planning and execution process of developing, pricing, holding and distributing goods, services and ideas to carry out changes that will enable access to individual and organizational purposes” (Mucuk, 2017).

The city and its marketing definitions draw attention to two relative features. The first is planning, and the second is the application. Planning and implementation are essential for city planners and architects, as well as planning and implementation for marketers. Planning and implementation require strategy. The “individual and organizational purposes” contained in the definition of marketing is a “purposes of the business” in businesses (Mucuk, 2017). In city marketing, it is an examination of “the purposes of the city.” Accordingly, city marketing is the planning and execution process for the development, pricing, retention, and distribution of goods, services, and ideas, in order to carry out changes that will enable the city to achieve its goals.

The purpose of the city is to create a living space that satisfies the physiological, emotional, and symbolic expectations of its residents, visitors, investors, students, and other target audiences. In city marketing, the product is the city itself. A city is a right place where the audience consumes as consumers (İnce & Dinçer, 2017). The concepts that are objectively stated in the definition of city marketing are goods, services, and ideas. The concept of goods: Although it conceives the nature, heritage, products produced by the public and businesses, it is all things that can be sold, including infrastructure and superstructure marketing tools. Service is an abstract concept and is often sold in a time and place where the manufacturer and consumer are simultaneously together. According to The American Marketing Association, when ideas are conceptualized in the form of money, they are then placed into the marketing definition (Ringold & Weitz, 2007). The expression of “development” of goods, services, and ideas in definition draws innovation into the subject. Later, the issue of innovation will be discussed more greatly. The definition outlines other products of the marketing mix after the development of goods, services, and ideas. In other words, the first 4P of marketing, called the marketing mix, is the product; pricing, stopping, and distribution after the product.

Since city marketing is also marketing, the marketing mix is valid. The product is priced in accordance with supply and demand, and holding is essential for the development, promotion, and efficiency of marketing (Ringold & Weitz, 2007). The consumer perceives distribution as a factor that adds value to the product.

Therefore, distribution channels are also developed and renewed. The extensive research on marketing description by Ringold and Weitz (2007) mentions three specific issues. As mentioned above, the first is "development," the second is "clinging," and the third is support. In marketing science, knowledge, education, practice, relationship building, and finance are all required when discussing the city. It is evident that the definition of city marketing also points to financial innovation in marketing.

Some studies support the need for financial innovation in city marketing. A study on Munich highlighted Finance among the problems encountered in city marketing (Jarvisalo, 2012). In another study by Kurtoğlu, finding resources and orientation toward innovation were considered among the factors that will contribute to city marketing (Kurtoğlu, 2017). The OECD (2014) addressed the innovation issue in a meeting on the needs of rural areas. The use of regional resources, among other resources, creates significant opportunities, examining the innovation knowledge and skills of businesses located in the region. Innovation-driven management, production, and marketing processes can be facilitating city marketing. The development of new products, the production of quality services, lowering costs, and lower prices are essential expectations seen in rural areas. Existing and potential products in regions can be marketed to the target audiences of city marketing. Some cities choose a particular area as a marketing strategy. Prilenska chose human capital to improve the local economy in Florida, USA (Prilenska, 2012). According to Prilenska, innovative and creative centers make special efforts to attract creative people to these centers. They give creative people a variety of opportunities, and because of this, they become centers of innovation and technology.

In certain cities around the world, innovation models are being created to develop cities. The Smarty expertise talks about four factors, clustering, entrepreneurship ecosystem, new business areas and business facilitator, investor, and information extraction system. Accordingly, the city of South Moravian (Czech Republic) used innovative management to determine the vision of becoming an innovative city. They relied on excellence in science, innovative enterprises, education, and image to build the city. This vision structure is called "5 key horizon policies." In this context, the fundamental values of discipline, trust environment, leadership, ethics, openness, entrepreneurship, promotion, and cooperation are determined (Rivas, 2018). According to Rivas' study, four target audiences are targeted in the strategy of Ostrava, a district in the Czech Republic. These are qualified workforces, innovation researchers, excellent students, and creative classes. Innovative architectural studios in the Netherlands are also remarkable. To be in the global IT competition, Porto aims to target the international ecosystem and build an innovative ecosystem in the city. Differently, Brisbane (Australia) has put local firms on the agenda to grow local firms. In some countries, mayors act like ambassadors and work regionally.

Strategies and policies are to improve cities' image or create a better image of the city. These policies are determined in the form of innovative management, science, innovative enterprises. In some cities, there are some developments on how to evaluate potential products and innovations in existing products. Local governments are involved in food, agriculture, forestry, education, health, and edible energy

(OECD, 2014). Likewise, there are innovations in the service sector. Decision-makers notice the advantages of educating employees in food, agriculture, food and beverage services, and other service areas. Public, private sector and university collaborations and regional incentive programs set strategies to strengthen the service sector.

Supply in city marketing is also an essential factor. Within this study's scope, the source of some of the products marketed in Sinop province was investigated, and some products were purchased from other remote cities even though it was possible to produce them locally. Product supply from remote cities creates greater costs. In terms of supply, the revitalization of local potential in urban marketing will bring the supply closer and makes it easier to find new sources in terms of competition.

Two competitive issues stand out between cities according to other competitive elements: Finance and the second is human resources. The first element of competition is that cities are starting to care about introverted investments. The second element of competition focuses on human resources to attract tourists and investors to the city (Prilenska, 2012). However, in terms of business innovation, two things need improving; the first is the development of the cities, and the second is the sustainability of growth. In terms of business, every city requires innovation development of cities and the sustainability of growth. Therefore, financial innovation is needed to avoid falling behind in the city marketing competition.

As we move on to financial innovation, innovation comes before financial innovation. Innovation is a prominent issue because it depends on money, resources, and market management in city marketing and develops them or innovations to invade innovation.

3 The Importance of Types and Resources of Innovation

This section will explain the importance of innovation after innovation is defined as word sand concepts. Then the barriers to innovation and the types of innovation will be examined.

3.1 The Importance of Innovation

Innovation is a concept where different disciplines such as economics, technology, and social sciences are subject to different definitions according to disciplines. Innovation as a word is derived from Latin (innovatus) and refers to innovation in its methods (Can, 2012). In its basic form, innovation is doing something new and tracking a different path. This narrow meaning is a new method, processes, innovations that support enterprise new models, environmental regulations, actions, design, production, and marketing policies (OECD, 2014).

However, the production, marketing, and use of new information in a new and useful product is defined as innovation. At the core of the concept is the ability to be *new* and *useful.* An invention, which uses existing tools in a new way, changing the working order and introducing a new working order, is evaluated within the scope of innovation. Innovation is new ideas, new physical tools, and new steps to make it easier innovation to do. Adding new products or new features to the existing product is innovation.

It is worth looking at the concepts that innovation is associated with to understand better. Grimpe (2007) states that creativity, invention, and patent concepts are closely related to innovation. A study was completed by Kogabayev and Maziliauskas (2017), and the innovation–entrepreneurial relationship was mentioned. There is a need for R&D to include several processes and to require an interdisciplinary approach.

Accordingly, innovation is also associated with R&D. New inventions and innovation in existing inventions is an R&D mission. R&D; management, manufacturing, marketing, finance, accounting, human resources, and public relations are functions of the business. The R&D innovation relationship benefits all other functions of the business. Competition in the global market is fierce, and the business has to be driven by innovation while performing its functions.

With the holistic/holistic feature of innovation, the search for and applying new methods from production to marketing leads to innovative motivation. The philosophy of establishing common beliefs on product and market development in businesses and putting them into business life draws attention to research on what is or is not innovative orientation.

Innovative orientation is defined by Worren, Moore, and Cardona as the organizational climate in which new ideas are encouraged and shared among employees on the strategy of entering new markets by developing new products (Worren, Moore, & Cardona, 2002). Furthermore, according to Kundu and Katz, intent should be driven by innovation (Siguaw, Simpson, & Enz, 2006). The most critical components of innovative orientation are adding value to innovation and creativity, taking risks instead of protecting the current situation, stimulating employees' capacities, and pursuing aggressive policies for the future. Innovative ideas are widely adopted, and a shared mission is carried out.

An expression of Innovation orientation is in conjunction with technological superiority. Companies are spending their energy to produce new products and developing existing products. When examining successful businesses, we see several innovations in business models, products, services, processes, and channels.

Innovation is necessary to survive and grow continuously. Innovation in a single product is not enough for the business to survive for a long time. According to this approach, R&D units monitor using a holistic perspective, successive innovation orientation projects, and the management's innovation policies (Siguaw et al., 2006).

Innovation is a tool that increases efficiency in innovation, entrepreneurship, and marketing (Siguaw et al., 2006). However, it is necessary to create a climate of innovation in entrepreneurship and marketing. Openness to new ideas in the follow-up of innovation orientation policies is inclusive in the culture of the business. To create a system-in-system innovation culture, it should also look at the beliefs of the system (Siguaw et al., 2006). The belief that innovation is everything for the organization must prevail. Also, organizational entrepreneurship dynamism suitable for innovation can be created with this belief and climate.

Organizational entrepreneurship dynamism prepares the ground for innovation. Innovation is a means of competition. It is necessary to develop the current market, find a new market, and ensure continued marketing continuity. The pace of change in the markets, the continuous shortening of the product life course, the continuous increase in supply and distribution speed, rapid change in consumer demands and needs make innovation necessary and relevant. Innovation is important for businesses in terms of efficiency, competition, and growth.

3.1.1 The Importance of Innovation in Efficiency

Innovation requires work toward efficiency in processes ranging from production to marketing. Innovation is reflected in prices to reduce costs in production. Lowering prices is a necessary means of competition. The first two items in the marketing mix are products and prices. The other two are distribution (place) and hold (promotion). Innovating these elements, known as 4P of the marketing mix, brings with it consumer satisfaction and profitability.

3.1.2 The Importance of Innovation in Competition

Competition is significant, and it is worth taking a brief look at the marketing approach from past to present. Production-based competition is the subject of "whatever I produce" until the 1960s, "I will sell whatever I produce." The 1960s appear to compete to achieve cost superiority. In the 1980s, the competition turned into a quality product race. In the 1990s, competition gained a different dimension with production speed and lean production. In competition with the 2000s, the period of quality service generation has been transitioned.

Today, the fact that the service sector is the highest-earning sector reflects the race in this field. For this reason, quality and the importance of innovation in service production and presentation is key. We are witnessing that consumer expectations focus on service, and companies are innovating service delivery. In short, it is not like we are watching the competition shift to that area, whichever earns more than goods, services, and ideas.

3.1.3 The Importance of Innovation in Growth

The two most important purposes of businesses are profit and growth. Because improving growth is dependent on profit, businesses are turning to areas that provide profitability when they pay attention to the areas in which they resort to innovation.

According to research, businesses that innovate make successful sales and grow by creating a better and more recent consumer perception (Debruyne et al., 2002). Businesses with increased dividends and growing businesses contribute to increasing people's livelihood standards, ensuring welfare, and improving life quality. When the activities of developed and growing welfare societies are examined, innovations in marketing processes stand out.

3.2 Innovation Barriers

Many obstacles can occur in innovation projects; some obstacles make innovation more manageable, while others make it difficult (Saatçioğlu & Özmen, 2010). When the obstacles facing projects are analyzed, the financial barrier is the primary obstacle (Tuna & İsabetli, 2014). Some obstacles to innovation in terms of city marketing are:

- Management barriers
- Funding barriers
- Marketing barriers
- Personnel barriers
- Information barriers
- Cost barriers
- Risk barriers

According to academic studies, innovation barriers have been subjected to different categories. Other obstacles covered by the abovementioned innovation barriers are skills barriers, organizational barriers, legal hurdles, customer-focused marketing barriers, and marketing intelligence. In new products, project leaders, competitors, suppliers, resources, consumer expectations, business experiences, staff, and innovative work can create barriers in regulatory innovation (Saatçioğlu & Özmen, 2010).

To overcome the barriers and innovate in city marketing is to meet the need for financing naturally. The management hurdle can be avoided by hiring or tendering a good financial manager. Marketing, staff, knowledge, cost, and risk barriers are all seen as financially focused.

3.3 Types of Innovation

There are many different innovation classifications. An interdisciplinary approach is crucial to innovation (Karniouchina, Victorino, & Verma, 2006). While innovation targets one product, the other can target marketing, another organizational structure, and another. Consequently, it is possible to see different approaches to identifying types of innovation.

Kogabayev and Maziliauskas (2017) classify criteria on the application, innovation-resulting areas, innovation density, speed, scope, and efficiency. In this respect, management, organization, production, agriculture, technology, social fields, economy, fast, slow, regional, international small, medium, broad types of innovation are found.

According to consumer demands and needs, several observations and reviews and innovations are applied to designated areas. Examples such as cafes for those who are tired of shopping in large shopping malls, making playgrounds for children, presentations, and business models, providing services, and allowing the consumer to review products. This study entails, on city marketing, product, service, marketing, and process innovation.

3.3.1 Innovation in Product

The product is the general name of goods and services that benefit the user. As a commodity, the product has a shape, structure, and shape (Boess & Kanis, 2007). The service is an intangible product that cannot be touched or stored. Accordingly, the product is tangible and intangible tools and symbolic associations that benefit the user (Helfenstein, 2005). The product is either a physical object or service. It consists of a person, place, idea, or component of goods and services where they are presented as one. The development of a product or the emergence of a new product is now on the axis of ideas, goods, and services. In this study, the concept of "place" was considered as a product.

Innovation in the product includes changes in the product, product development, and the meaning of the product being modified or developed. Product replacement is according to seasons, the technologies used, the sectors, consumer needs, and the direction of competition. In addition to the products marketed by the public and equity sector in city marketing, the city itself is a product. Based on Can's (2012) work, the products that are the subject of innovation in city marketing may be:

- All new products: Completely new products that are not available in other cities and worldwide can be produced and released. Cities are unique and have new product potential.
- New products in the city: Introducing existing products from other cities to the city. The product is introduced to a city, and a consumer travels to that particular city to purchase that product.
- A new product on the existing product line: A new product applies to cities in the product line that applies to businesses, and there are opportunities for businesses. New products can be used in a destination where visitors come and go.
- Development of existing products: If vehicles and roads in cities increase transportation revenues, vehicles and roads are renewed or improved. With changing the method in presenting cultural heritage, the method is changed if cultural heritage attracts more attention and can be marketed. Other examples like this may be given.

- To move to a new positioning in the existing product: In addition to product positioning by giving the consumer different experiences, it can be made to better position the peasant market's place or environment by changing and presenting traditional products in a better environment.
- Reducing the cost of existing products: Reducing costs in products that will provide price appeal to consumers in city marketing is an element that will increase the number of consumers.

3.3.2 Innovation in the Supply Chain

In terms of the supply chain, some city marketing opportunities can be in and around the city, and newer opportunities could be attained with innovation. These are strategic collaborations, just-time production, and logistics approaches (Whipple & Gentry, 2000). Many collaborations are needed from the point of production of goods and services until it reaches its last user. Thanks to the marketing-oriented strategic collaborations to be carried out throughout the city, the on-site and just-in-time production of the goods needed in the city can be advantageous.

This advantage also falls in line with the logistics approach. The fact that supply rings are in the same region and close together is more effective in developing innovative ideas, scientific developments and more favorable for academic research (Chen & Paulraj, 2004). Logistics in the supply chain are essential in transporting products and providing services. The proximity and suitability of logistics services give businesses more production, technology utilization, and efficiency (Chapman, Soosay, & Kandampully, 2003).

Providing supply chain and logistics services within the city marketing scope gives individuals a chance to seize some opportunities locally. It is a relationship between manufacturer, supplier, logistics services, and consumer proximity that gives an individual this chance. The opportunities mentioned by Chapman and his friends (2003) are to increase productivity, increase consumer satisfaction, better strategic planning, flexibility, fast-track edits to market changes, rapid supply, and fast innovation qualifications. From this information provided, the reliability, proximity, and speed of the supply chain result from significantly easing innovation services.

3.3.3 Innovation in Service

In marketing, this service's description is "abstract tasks that meet the needs of consumers and industrial users" (Mucuk, 2017). In city marketing, services such as meeting individuals or groups' needs and providing consultancy services to visitors during their visits are concerned. City marketing should be satisfied with the city residents, visitors, tourists, students, investors, entrepreneurs, and target audiences who come from out of town and buy services such as health care.

According to the manufacturer, services produced by mechanics in the automotive industry, a doctor at the hospital, the officer at the bank, and the service at the hotel and restaurant are all a part of the service group. The service recipients are concerned with the classification of services produced during the time the buyer is present and the services produced without the presence of the buyer.

The first example is that recipients acknowledge the treatment service in the hospital. The second example is a power of attorney. Finally, there is a service produced in the context of the relationship between goods and services. The hotel service is sold depending on the category; for example, hairdressing falls under pure services.

The main thing in service innovation is to improve the service experience or provide a completely new service. For example, suppose an entrepreneur sees the elderly having difficulty getting out of their homes and going to the bakery or grocery store. In that case, it is a new situation and describes it as a necessity to sell this service for a specific fee if the service was never provided before. While transportation services are provided for the elderly, getting on and off municipal bus is more accessible now and gradually improving it. Improvement can come in the form of tools, methods, and new features.

Choosing service areas such as developing skills, professionalism, attitude and behavior development, flexibility, facilitating access and accessibility, continuous improvement, image development, and trust enhancement in city marketing may be appropriate in terms of service innovation (Bayuk, 2006). Carrying out innovation studies according to the city's needs and target audiences can make city marketing more efficient.

3.3.4 Innovation in the Process

Innovation in the process refers to the steps taken to increase investment by reducing costs, from manufacturing goods and services to marketing (Lambertini & Mantovani, 2009). Innovation development, improvement, and better marketing of the quality of goods and services produced reveal the difference in innovation. More importantly, the service in production and delivery on time is a priority to please the consumer. In this sense, it is clear that speed, quality, hardware, and more training and skills are required.

3.3.5 Innovation in Marketing

The goal of innovation in marketing is to sell more and generate more profits through innovations in goods and services. Innovation in the product includes changes and innovations in design, packaging, price, and distribution (Schubert, 2010). Innovation in service is a factor that significantly affects marketing, as explained previously. Innovation in marketing refers to the development of existing skills, the discovery of new talents and products, the discovery of new management, products, and tools, and the development of existing ones that cover the entire marketing mix.

Furthermore, Marketing refers to the relationship with the consumer as much as it is about production. Therefore, all efforts required to increase sales, including factors such as packaging, positioning, price, and promotion, can be selected for innovation. Inspiration for innovation is influenced by consumers' expectations, which depend on time and place, such as holiday destinations and seasons.

3.3.6 Innovation in Organization

The organization is a function of management, and management is a function of the business. Businesses need management to respond to and manage the innovation studies they can do within the scope of business functions and marketing mix. Management skills in the creation and management of business models, production, marketing, and other activity fields is a factor that increases efficiency in innovative activities. Under the management title, it comes before the organization's planning, execution, coordination, and supervision functions.

In other words, for planning, execution, coordination, and supervision functions, the organization needs to structure and update itself according to the needs arising primarily in marketing. Innovation in the organization is an expression of innovative motivation in the organizational sense. Over time, the structure of enterprises does not respond to needs. For example, when staff management was once employed in businesses, human resources replaced them.

Within the scope of city marketing, innovation in the organization suggests an organization that includes city marketing stakeholders. Restructuring is made to collect, process, and bring new suggestions to the city marketing organization—experts in these areas in cities that stand out with their natural, historical, and cultural heritage. In the same way, units associated with the production, quality development, and marketing professionals can be created. Innovation in the organization is a business.

According to the needs and objectives set, there is a wide range of teams, establishing models, determining strategy, authority and responsibilities, and centralization (Mohr, Sengupta, & Slater, 2010). An example of innovation today is the reduction of some companies' organizational structure, the out fielding of the production and marketing services targeted by the organization.

Specifically, there are studies in these organizations that count system approach, characteristics such as leadership and creativity among the determinants of innovation (Can, 2012). The system approach ensures innovation progresses without slowing down or interrupting the system established without depending on specific individuals in the business. Without disloyalty to management, there may be leaders or personals, leading innovation from management or employees. Creativity is a significant feature of innovation and is a need for businesses. Businesses with factors that have an impact on innovation are assumed to have a high awareness of the necessary resources.

4 Financial Innovation

It is not very easy to find a single definition of financial innovation. For this reason, systemic approaches are adopted to clarify the understanding of financial innovation. Blach (2011) sees financial systems as part of the social system. Accordingly, institutions, tools, markets, and regulations are part of the financial system. The financial system is part of the economic system. The economic system is also part of the social system (Blach, 2011).

Based on the features of successful financial innovation, funding should reduce risks in innovation, reduce costs, contribute to the development of products and services that businesses need (Arnaboldi & Rossignoli, 2010). R&D, production, supply, marketing, distribution and retention expenditures in projects require significant resources. Financial constraints create severe problems in innovative projects. Because asymmetrical information and incentives are crucial in innovative projects (Xiao & Zhao, 2011).

According to Xiao and Zhao (2011), an innovative idea's design and commercialization carry two risks. First, it is more difficult for investors than a known routine project. Second, half of the innovative projects' expenditures go to research development, the salaries of their employees, and additional fees. The financial system needs to be managed appropriately in the execution of innovative projects. Innovation projects are essential in macroeconomic applications and decision-makers to determine significant policies.

In innovation, businesses need support. Central governments provide support, but there are also things local governments can do. Realizing that the future is in innovation in development and growth, local managers have begun to look for funding remedies. Collaborating with local managers can facilitate many of the private sector's businesses. The private sector has transferred its own experience onto city marketing so that they could collaborate with city managers.

In this field, research highlights stakeholders' cooperation in innovative projects; governments can support and improve the capacities of citizens and contribute to communication between stakeholders in innovative projects (Treasury, H. M., 2014). Therefore, city managers must develop strategies that include businesses for city marketing. Public institutions and organizations have also contributed to benefiting city target audiences. In line with mutual interests, the development of cooperation between the public and private sectors rests on the axis of promoting and producing reliable services and support.

Some research highlights venture capital in financial innovations. When measuring risk factors in risk capital, it is evident that there is a risk of management for businesses, businesses have difficulty meeting technological risks, and marketing also poses a risk (Tuna & İsabetli, 2014). It is also possible for the product to be deprecated and behind consumer needs and demands. This study looks at the issue of outdated products within the scope of management risk. In this context, the study looks at what they can do about venture capital between local managers and private businesses in city marketing is evaluated below:

Management risk: Management function in business includes essential roles such as planning, organization, execution, coordination, and supervision. Many businesses do not have management function qualifications. Therefore, the need for management to make businesses easier done by an external party. In other words, professional managers must allocate resources for the management function of businesses that are aware of this situation and play an essential role in the success of businesses.

Local managers can use their legal powers to train business managers or to develop managerial skills. They can organize courses, seminars, and certification programs. By inviting famous executives to the city, the city's executives can organize programs to raise awareness. In addition to improving the management functions skills of business managers in these programs, awareness is advertised on the products' up-to-datedness or the fall in the form of outdated products. The research states that commissions are possible to develop managers locally and regionally, that consulting services can be purchased, and internal strategies can be identified (Treasury, H. M., 2014).

Technological risk: Small and medium businesses are not very well equipped to take on innovative projects and need technological support. The local managers can do two things for both their businesses and private businesses in terms of technology. First, it can lead to technological cooperation between sectors by using its influence on public opinion. Secondly, technological support can be self-provided by identifying the needs of businesses in technology.

Financing risk: Manufacturing marketing is a significant amount of financing needed for businesses. Cooperation between the public and private sectors is a significant method chosen in regional and country development through build, operate, and transfer. The target audiences that want to invest require infrastructure and superstructure demands/needs in the city. Likewise, the private sector has similar demands. In terms of city marketing, cooperation opportunities arise by evaluating similar demands or demands in the same field.

Marketing risk: Marketing risk is the financing risk encountered in marketing that businesses and city marketing are involved in. In other words, it is more than the businesses that the local authority can participate in.

5 Impact of Financial Innovation on City Marketing

Financial innovation is an essential tool for businesses to profit and grow and a crucial tool for the development and growth of cities. Finance is a function of the business (Pereira, Ferreira, & Lopes, 2020). Innovation is a means of invention that affects all business functions and processes, including management, production, marketing, accounting, public relations, human resources, and R&D. There is no sustainability for businesses that do not rely on innovation. Accordingly, it is impossible for a city that does not develop and grow to solve its financial problem.

In local governments, fiscal policies are mostly based on central governments sending them money and vehicles. However, with the introduction of the concept of city marketing in the 1970s, the approach that city managers can market to the public's interest in developing and growing their cities, paved the way for city marketing. City marketing needs financing to ensure its citizen's well-being. In this case, the impact of financial innovation on city marketing is rather significant. There is very little research worldwide on the impact of financial innovation on local, regional, or urban development. When examined, some financial methods are applied to grow the cities.

A study in China discussed whether regional domestic financing or foreign financing is more effective on financial growth (Bal, İşcan, Serin, & Kara, 2017). The debate concluded that regional financial resources were more positively sufficient from dental sources. Zhao (2016) completed a survey of 31 cities and concluded that China's financial growth favors innovation.

According to the study, regional financing is more flexible and safer, according to external financing. In monitoring regional inputs and outputs, internal financing in the regional sense was more useful. Furthermore, the participation of banks in mediating financing in the regions provides an advantage in this sense.

Financial innovation is significant for growing economies. A study covering 63 countries concluded that innovative studies would be interrupted if there is no financial support (Laeven, Levine, & Michalopoulos, 2014). According to the study, new financial instruments, the formation of monetary units in businesses, new financial reporting techniques, and technological innovations require new financial agreements.

In 1998, an 11-year study covering seven Asian countries, Indonesia, Japan, South Korea, Malaysia, Philippines, Singapore, and Thailand demonstrated that innovative studies accelerated the patenting process thanks to financial support (Tee, Low, Kew, & Ghazali, 2014). All variables were examined in skating applications, and it was concluded that financial supports had a positive effect on these variables.

A long-term study from 1974 to 2014 was conducted in Turkey, and the result was a positive relationship between financial development and innovation performance. The financial policies of the countries are naturally behind financial developments (Koçak, 2018).

According to the above information, finance is needed for cities to grow, and once finance is attained, innovation is created. Unless financial innovation is established, cities' growth will be jeopardized, especially in times of global and regional fluctuations and crises. The impact of financial innovation on city marketing is clear. Accordingly, in cities, financial units should be formed, and innovations are made to finance issues and areas where they are needed.

6 Conclusion

This study focused on the importance and need for financial innovation in city marketing. While there are many sources on city marketing, finance, and innovation, sources examining the relationship between city marketing and financial innovation are extremely rare. The study aims to contribute to the solution to the problem that most city marketing initiatives fail. One of the significant problems in marketing initiatives is finance. Cities want to develop and grow to ensure the welfare and satisfaction of the citizens and need financing for this. Businesses and cities also need financing to find innovation.

Each city is unique to its geographical structure, existing and potential resources, heritage, and human resources. In terms of authenticity and diversity, each city has its own set of marketing resources. Innovation is essential in all processes, from production to marketing, to lag in intercity competition, and all need financing. With this approach, the study focused on innovation. The meaning, importance, and types of innovation in city marketing are discussed. Also, financial innovation was included, and the effect of financial innovation on city marketing was investigated.

Overall, every city usually wants to thrive and grow, and the most critical problem in this direction is the need for financing. While businesses are more frequently resorting to innovation to meet the need for financing, the issue of financial innovation in city marketing has remained raw. The maturation of innovation in city marketing through research and operations can make significant contributions. This study is limited to literature analysis, and further fieldwork in the field can guide the type and method of financial innovation.

From a political point of view, financial innovation efforts should have legal grounds to support financial innovation on a macro and micro scale, as laws influence them, regulatory regulations, and policies. The creation of funds against unexpected risks and crises could be used as insurance against risks that would hinder cities' development.

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Robotic Process Automation (RPA) Applications in COVID-19

Özge Doğuç

Abstract The COVID-19 pandemic took the entire world by surprise. Governments and companies hastily implemented measures to protect public health as well as the countries' economies. Many companies had to close their offices and shut down their factories. Most white-collar employees had to start working from home and online communication tools became key components of their lives. While governments and companies were adapting to the new normal, sickness-resilient digital employees, the software robots, became more apparent. Robot Process Automation (RPA) introduced the ultra-performing and fast-learning software robots into our lives. These robots can work 24/7 in many areas, assisting human employees and helping customers. This chapter discusses different applications of RPA robots around the world and in Turkey during the COVID-19 pandemic. RPA became the new disruptive technology that offered innovation to the business world. It found application areas during COVID-19 in various sectors such as health care, education, and public sectors. Governments and companies got help from the RPA robots to track patients, optimize supply chain processes, assist students and teachers in online classes and respond to the increased demand in online shopping.

1 Introduction

The COVID-19 pandemic increased the adoption of automation technologies and reinforced the previously issued automation solutions. There are several factors that contribute to this comportment. Previous crises and epidemics showed that artificial intelligence, automation and modern communication techniques were very useful in relieving the impact on the economy and battling the immediate effect on the general public (Prettner & Strulik, 2017). Basically, these technologies allowed most skilled employees (i.e., white-collar) to continue their daily activities through remote

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channels and utilize software automation such as robotic process automation (RPA) to overcome the unforeseen changes in their work. Software automation also helped to deal with the sudden burst of volume in business transactions, especially in contact centers, online banking applications, and pharmaceutical supply chain operations. Another factor is that software robots and automation technologies offer resilient and nonstop monitoring services that can be employed for patient tracking, COVID-19 detection in certain sectors, and even routing the necessary material and services to the needed areas. These technologies offer no-contact solutions that become highly essential during the COVID-19 pandemic. Disruptions in travel and supply chain during the pandemic impact important sectors, such as the production of medical supplies and necessary material for assembling machinery. Empirical evidence on automation shows that redesigning the supply chain operations enhances robot adoption (Krenz, Prettner, & Strulik, 2020).

The last factor is more obvious than others: Unlike humans, the software robots are not vulnerable to organic pathogens that would impact the productivity of the human employees. Even in the worst pandemic or crisis periods, the robotic automations continue to provide services as before. Therefore, ever-increasing number of companies and governments felt the need to employ robotic automations to catch up with the lost man/days due to the pandemic. The robotic automations proved invaluable to fill up the gaps caused by sick employees and paused business lines (Bloom & Prettner, 2020).

In a survey for understanding both social and financial impact of COVID-19 on businesses, the responses show some common themes as below:

- Projects are being delayed, and face-to-face customer communication is limited, if remained at all.
- Working from home helped increase product inquiries as people have more time for online shopping. However, it is not clear if this will result in an increase in revenues since the overall economic impact and duration of the shutdown is unknown.
- The total number of orders were tripled since the beginning of COVID-19.
- COVID-19 is bringing new opportunities for companies with innovative solutions.
- Due to a reduced workforce at factories, manufacturing output was reduced drastically, causing pushouts for customer orders.
- New projects are delayed, and a majority of research and development has stopped (Robotics Online Marketing Team, 2020).

As an increasing number of markets arise and develop as part of the global economy, RPA found its way into new parts of the world and new business sectors as expected. This is especially the case in emerging markets such as Turkey, India, and Latin America. These markets are quickly moving toward more developed markets and adopting new technologies.

The next section shows several real-life scenarios where robotic process automation (RPA) has been utilized to deal with challenges brought by the COVID-19 pandemic. In the third chapter, RPA in emerging countries is discussed. The fourth chapter discusses several applications of RPA around the world during the pandemic. The fifth chapter shows a few examples from Turkey, especially from health care and public services. Finally, the Conclusion chapter summarizes the innovative solutions that RPA puts forward in various application areas during the COVID-19 pandemic.

2 Robotic Process Automation (RPA)

Robotic process automation (or RPA) is based on software robots (bots) and on artificial intelligence (AI) working together to perform routine, repetitive tasks. In traditional automation projects, a software developer designs an automation for an existing task which interacts with the application system using internal application programming interfaces (APIs) or dedicated scripting languages such as Java, C, Python etc. In contrast, RPA systems develop an action list by recording, while the user performs the tasks in the applications' graphical user interface (GUI), and then perform the automation by repeating those tasks directly in the GUI. This not only reduces the time and effort to develop the automations, it also produces resilient results by mimicking the user directly (Robotic Process Automation, 2020a, b). RPA robots can learn and perform rule-based office-type functions with high accuracy and speed. These functions are generally well defined and sequential, making them easy for the robots to learn and play. The RPA robots operate by mimicking the user and interacting the applications in the same way as the human operator do. Office work often requires the same sort of repetitive effort, and the RPA robots offer high resiliency, accuracy, and speed (Frankenfield, 2020). RPA systems also provide pre-built integrations for tasks that require backend processing, such as retrieving records from a database, executing scripts, calling web services, etc. Such complex tasks have often been associated with IT admins and technical personnel; and RPA made them easily available to all business units within the company.

RPA robots are best suited for processes with repeatable and easy-to-define interactions with applications. As the robots use the applications GUI to interact with them, no major transformations for the core systems are needed to enable RPA robots to work. Robots also do not require APIs to be implemented, which drastically reduces the time for the robots to start working on the business processes. An RPA robot can be deployed for a business process in a matter of days or in a couple of weeks for the large ones. RPA bots offer improvement in the efficiency of these processes and effectiveness of services without changing the underlining systems. Entire end-to-end processes can be performed by software robots with very little human interaction, typically needed to manage exceptions (Doguc, 2020). In summary, RPA can be used to automate processes that are:

- Repetitive
- Rule based

- Digital data
- High volume (Robotic Process Automation, 2020a, b)

Academic studies project that RPA, as well as other innovative technological solutions, are expected to bring significant productivity and efficiency gains in the global markets. An Oxford University study predicts that up to 35% of all jobs may have been automated by 2035 with great help from the RPA robots (Frey & Osborne, 2017; Willcocks & Lacity, 2015). RPA robots are not only going to change the cost model of the services industry by driving the price of products and services down but that they are likely to drive up service levels, quality of outcomes and increase opportunity for the personalization of services and goods. With "robot for every person" initiative, the RPA robots offer a positive effect on society by providing everyone their personal digital assistants that are capable of learning and automating mundane daily tasks. With the "take the robot out of the human" motto—many researchers project that RPA will bring increased job satisfaction and intellectual stimulation. This is aligned with the projection that robots will take over the mundane and repetitive portions of people's daily tasks, allowing them to be focused on more interpersonal roles or to concentrate on meaningful tasks, for the better portions of their days.

The enterprise RPA market is growing at a CAGR of 65%, from almost 0 in 2016 to $3 billion in 2021. By 2021, Forrester estimates there will be more than 4 million robots doing office and administrative work as well as sales and related tasks. (What is Robotic Process Automation? 2020a, b). The next section discusses how governments and companies across the globe employed the RPA robots to deal with the difficulties brought by the COVID-19 pandemic.

3 RPA in Emerging Countries

Despite the well-known benefits of RPA automation, there are often doubts about the impacts of automation, AI, and ML technologies in growing economies. As a result, economic experts suggest these worries should particularly concern businesses and employees in emerging markets (Ostdick, 2020). While automation and robotic technologies are typically not new in developed countries, markets, and businesses, they are often new developments for emerging markets, as these markets often lack the infrastructure to support changes that are proposed by RPA. Also, new technologies are confronted with resistance in the emerging markets due to several factors, which can be discussed under two topics:

- *Labor Costs:* Emerging markets have been profiting from their advantage as low cost of labor to attract foreign investment. RPA is seen as a challenge to this, as it offers enterprises a reduction in labor costs. On the other hand, in some emerging markets such as India and Brazil, average labor costs are still lower than RPA bot licenses. This dilemma forces the enterprises to categorize jobs as "RPA-worthy" and not, based on their costs compared to costs of RPA bots in terms of operations

and license. Therefore, in emerging markets jobs such as call center agents and HR onboarding personnel, are still very popular although these jobs are very suitable for RPA due to their repetitive and routine nature.
- *High-skilled labor:* Development of new technologies in emerging markets favors a high-skilled, educated workforce that can implement and maintain the technologies. Companies have been adopting new technologies such as AI, ML, blockchain, etc. at an increasing rate. RPA bots. The small pool of high-skill workers in the emerging markets must be utilized for these technologies. For these reasons, RPA will impact the low-skilled jobs, which entails most of the workforce in the emerging markets.

The rapid success of RPA is showing large impacts on economies; and emerging markets are negatively impacted, mainly because of the reduced low-skilled labor and increased costs for high-skilled labor. RPA could entirely remodel these emerging markets by replacing the need for these countries to provide low-cost labor to the global marketplace. RPA and automation technologies can deliver sustainable success to emerging market companies, especially in the IT and industrial sectors. In addition, RBC lists several ways that emerging markets can benefit from RPA in a report:

- *Reduced costs:* As mentioned earlier, labor costs have both adverse and positive effects on the introduction of RPA in the emerging markets. Over the last decade, in these economies, the cost of labor has increased about 10–15% on average due to reduced labor availability. Also, in China average cost of industrial robots has declined more than 29% since the early 2000s. This means that in emerging markets that are experiencing labor shortages, RPA is becoming increasingly attractive to reduce dependency in the workforce.
- *Competitive advantage:* Global companies have been utilizing RPA to streamline activities and drive positive business outcomes. With RPA, these companies reduce the lifetime of transactions, so that more activities can be executed more efficiently and quickly in order to keep up with the volume. Despite lower labor costs available in the emerging markets, companies in those countries have to employ RPA to be able to compete with the global companies.
- *Increased capabilities:* Rather than automating merely simple and easy tasks, RPA offers automation of more sophisticated activities within various industries, from healthcare to finance, manufacturing, and automotive. RPA has been successfully utilized in complex tasks such as order processing, fraud detection, regulatory compliance, data migration, and marketing (Enemaerke, 2014).

RPA has already been gaining momentum in emerging markets, and local companies in these markets use RPA as a key driver in increasing productivity and efficiency. Deploying RPA demonstrates initial challenges such as financial and labor investment, but these companies can take advantage of the benefits of RPA after overcoming these challenges. The adoption of RPA is becoming a necessity for companies within emerging markets, and this is especially true for companies that want to be competitive at a global level. Because companies within emerging markets have to rely on a limited number of skilled workers and can often utilize small capital for technology investment, RPA is often the most affordable and efficient option to increase business capacities and achieve long-term success (Ostdick, 2020).

4 RPA Use Cases by Sector

4.1 Government and Public Sector

4.1.1 Automating Collation of COVID-19 Patient Data for State Government

In United States, most state authorities have been carrying out vigorous COVID-19 testing of patients throughout on a large scale. The ground staff and healthcare workers collect data of patients being tested as well as past test samples. This patient data goes directly into the National Authority portal. With the State Government planning to ramp up the COVID-19 testing, it became a humongous task of collating State's data from the National Authority website and adding to the State Governments' database. As the number of patient testing increased beyond 2000 per day, collating the daily patient data after downloading it as an excel sheet from the National Authority portal became a time-consuming manual task.

The state authorities team wanted to have a quick process automation in place where the COVID-19 patient testing data would be downloaded from the National Authority portal and then collated on the State Government portal to the database in almost real time. The data collated in the State Government's database would then help the State Government to take quick real-time decisions and change the course of action depending on the patient's test results.

The tested patients' data could be downloaded from the National Authority website in the form of an excel sheet. The State Authority had created an online web form and an API to fill in the patient data, which included new patient data and old patient data to be updated. All the latest patient data needed to be collated multiple times in the day. The amount of patient data was proportional to the testing volume in the state.

The National Authority software team quickly created this process automation through which the software robot downloads the patient data from the National Authority portal, then picks up the records of tested patients and sends those patient data records to the respective State Government portal through an API. This helps State Authorities have updated data ready for actionable insights.

4.1.2 Timely Processing of Financial Support Applications from People Facing Income Shortages Due to the Effects Produced by the COVID-19 Pandemic

On March 18, 2020, the Government of Romania issued a Government Emergency Ordinance introducing unemployment benefits to support the citizens whose jobs and income have been affected by the state of emergency caused by COVID-19. The National Agency for Payments and Social Inspection (ANPIS) is managing the claims process for six categories of beneficiaries that are eligible for financial support. ANPIS had to carry out this urgent activity without additional staff, through its entire network of 41 county branches.

During the first 10 days of each month, impacted citizens were able to file their requests and the needed paperwork on an online portal. ANPIS employees had to verify every application, create a database, and send it to another department for due payments. In the first half of May, ANPIS has received 110,000 requests for financial support across Romania.

RPA robots were deployed at ANPIS for an unattended automation solution. In May, 38 county branches had the support of a software robot that performed the processing for four out of the six categories of beneficiaries. The robot verified the accuracy of the application—an intelligent PDF document—extracting the correct data into a database and creating individual folders with the accompanying documents (with the name and surname of each applicant). In case the application was denied, the robot also notified the applicants and requested additional documents.

4.1.3 COVID-19 Health Tracking and Alerting Automation for State Government

The District Authority (DA) has been carrying out vigorous healthcare monitoring of quarantined persons in the district. The DAs make outbound calls to the quarantined people and monitor their healthcare parameters. For the quarantined people who report COVID-19 symptoms, an immediate alert is raised to the concerned health care team. The respective health care team visits these people and carries out the necessary health check and takes subsequent steps as part of the COVID-19 response. This comprehensive "COVID-19 warrior team" is making a tremendous effort to provide essential response.

The DA team planned for a quick process automation where the alert for people reporting symptoms to the contact center team, could be raised to the concerned healthcare team. This could help reduce the critical response time. The DA created an online form, which was filled by the contact center team for every quarantined person. The healthcare parameters are collated in an online sheet. For people reporting any symptoms, instead of manually, RPS robots pick up the records of symptomatic people and send the alert to the appropriate health care team.

The DA software development team quickly created this process automation through which the software robot filters and picks up the records of the symptomatic people and sends those comprehensive records to the respective healthcare team and alerts them. This helps DA to respond swiftly and bring agility to the process (Robotic Process Automation, 2020a, b).

4.1.4 Timely Customization of COVID-19 Essential Medicine Reporting Template

The European Medicines Agency (EMA), working together with the pharmaceutical industry and the EU Member States, launched on April 17 the first phase of its enhanced monitoring system to prevent and mitigate supply shortages of crucial medicines used in hospital intensive care units (ICUs) across the EU for treating COVID-19 patients. At each pharmaceutical company, a single contact point reports to EMA all current and anticipated shortages of the essential ICUs medicines. Timely awareness of potential medicine shortages and a wide picture of what is available at the EU level facilitates better distribution, speeds up approvals for production capacities increase, and helps save lives. To assist with reporting, EMA has initially created a template report to be filled in by hundreds of companies producing and marketing ICUs medicines in the EEA/EU.

The RPA robot watches every pharmaceutical company that receives a customized template, prefills the template with only the subset of medicines that are tracked in the current phase of the project, and solely the medicines produced or marketed by the respective company. Next, the RPA robot collects the information provided by the single contact points to EMA and updates a master file. Additionally, it collects shortage notifications and uploads them into another master file.

4.1.5 Automated Decision-Making for Financial Support Requests

On March 13, 2020, the Flemish Government in Belgium launched the corona nuisance premium to support Flemish companies in financial difficulty due to the global pandemic. This was addressed to approximately 600,000 entrepreneurs that are active in the region and might have been in financial distress, so a safe and rapid process was essential. In a record of 10 working days, the Flemish Agency for Innovation and Entrepreneurship (VLAIO) built with their IT partner DXC a web application to register the requests. Within 6 days after the launch, the platform has already registered more than 70,000 applications for financial support, which created a significant backlog for VLAIO employees to verify validity, and then approve or reject the application.

At busy times about 800 users want to apply for their premium at the same time. The first day there was even a peak of 20,000 simultaneous users. A digital queue ensures that the system is not overloaded. Users in the queue know how long they must wait, and this is usually under 15 min.

Several days after the go-live of the web application, an RPA software robot has been added into production checking in various databases whether the applicant is entitled to the compensation by using the Flemish Access and User Management System and automating the approval or rejection of the requests (Robotic Process Automation, 2020a, b).

4.2 Retail and Manufacturing

4.2.1 Influx of Sick Leave Requests

One of the top retail companies in France is registering an imposing volume of sick leave requests across all their departments due to the COVID-19 crisis. The HR department is facing an issue with sorting the documents submitted by their employees so they can properly classify them as sick leaves, work accidents, or other HR documents, which have a lower priority right now.

The retail company automated two phases of this process, the first involves analyzing and classifying documentation with help from optical character recognition (OCR). The second phase extracts the relevant employee information and leave dates and adds it to their HR systems. This helped their HR department focus on taking care of its people in this time of need rather than processing documentation.

4.2.2 Processing 10× Increase in Sanitizer Orders

Due to COVID-19, a hygienic company has a 10× influx of orders of hand sanitizer. Their order processing team usually processes the orders in SAP but cannot keep up with the spike in demand. The order response teams execute daily updates to 6000 orders (usual demand + new orders). They have a 6-h timeframe in which they need to process these orders, plus 1 h to handle any exceptions.

The company later added 20 RPA robots to handle the volume (40 bots in total), and they will add more robots later to continue to meet a growing market need. The automation team assisted order response teams to help execute daily updates, with the bots bringing efficiency at 1 order per minute.

4.3 Insurance

Many small business customers were raising claims and notifying losses due to the current COVID-19 pandemic. Operation capacity constraint overwhelmed back-office operations. Several RPA robots have been leveraged to reduce the overhead of claims adjudicators allowing back offices to focus on claims processing. Bots were developed and deployed in 40 hours to create a claim, generate, and send the acknowledgment letter to the insured. The RPA bots started handling 200–250 transactions per day right at the peak of lockdown. All COVID-19 First Notice of Loss related transactions were handled by the bots thereby avoiding any delayed resolutions, which would have impacted customer satisfaction.

4.4 Health Care

4.4.1 Speeding Up Patient Diagnosis

A health care provider uses a mobile survey to complete the initial diagnosis for patients. The information from the survey needs to be entered into two core platforms, CareLink and Vivify, by 20+ data entry specialists. The specialists then use the care data to predict potential diagnoses. There is no API integration between the Health care platforms.

With help from RPA robots, the provider has automated the process to free up the data entry specialists to work on other related activities, while also significantly reducing the time it takes to predict a potential diagnosis.

4.4.2 Contact Center Automation

A healthcare provider's contact centers and other communication channels were swamped with a high volume of incoming calls and inquiries from members concerned about COVID-19 symptoms. Members were seeking care as well as basic health care information.

The provider explored how software automation can help alleviate the density of their contact centers. Automation could easily parse through the data in multiple systems and intelligently extracted targeted info about preexisting conditions of member population and collated emails to millions of customers and members, thus providing essential information such as eligible health benefits, nearest testing locations, prescriptions, and tips on staying healthy.

4.4.3 Bots Update Health Department Quarantined Citizens Stats

The State Health Department must regularly update data on a COVID-19 Quarantined People National Health Portal. This includes any inbound traveler who arrived in the last 2–3-month period and any first-level contacts of a COVID-19 positive person. Compiling the data is time-consuming and requires a lot of manual effort considering the large number of people being quarantined in each state.

The State Health Department examined the RPA bots to distribute its data on quarantined people. The bots picked up data from statewide response excel sheets and update the comprehensive records of quarantined people on a COVID-19 Quarantined People National Health Portal.

This automation helped the state relieve the overworked teams engaged to carry out this activity. And it gave The National Health Department better visibility on the number of quarantined people faster than before, so they could plan and react in a more agile way.

4.4.4 Telehealth Registration and Self-Diagnosis for the Coronavirus

To contain the spread of the Coronavirus pandemic, health care companies encouraged their patients to sign up for telehealth services and conduct self-diagnosis. Patient onboarding is being done by contact center employees manually, letting nurses focus on patient interactions. However, the companies are expecting a significant increase in applications in the first few weeks, requiring this workload to be addressed in a more efficient way. The healthcare company deployed RPA robots to manage a webform that auto registers patients for their telehealth platform.

When a request is submitted, it is queued up in the dispatcher robot. Another robot then logs in the data, which is verified, and once completed, the patient is onboarded for telehealth. The case management process has been fully automated, saving 3 FTE worth of clinicians' time each day.

4.4.5 Accelerating Drive-Through COVID-19 Testing

In the United States, the Centers for Disease Control (CDC) allowed private organizations such as Walgreens and labs to become testing sites for COVID-19. In order to avoid long lines and waiting times for taking COVID-19 tests, these sites are allowed to accept patients through drive-through facilities. This also helped preserve social distancing while waiting for the test to be done. Each patient must be registered for the test; the test kits must be labeled correctly. On average, each patient is estimated to wait up to 6 h per test, including setting up and printing the test labels.

The Cleveland Clinic, one of the largest hospitals in the United States, set up and deployed RPA robots quickly that take patient data, check if they are already a patient in their EMR facility, register the patients, and correctly select the right printer for label creation. While it takes a human 2–3 min to execute, the robot executes it 10 times faster in only 14–16 s; reducing patient wait times significantly (Doguc, 2020).

4.4.6 Filling Patient Forms

One of the fastest and most important optimizations that hospitals can make is saving the health care experts' time. On average, nurses spend 7.3 h per week on paperwork, and this number will only go up as more patients are added to their care. Additionally, many health care systems face a shortage of nurses to deal with this surge of new patients. So, while governments hurry to recruit new medical personnel, many hospitals are leveraging automation to ensure nurses spend more time caretaking, and less of their shifts doing repetitive administrative tasks, such as updating records.

The response of Mater Hospital to COVID-19 offers just one example of their work to innovate healthcare through automation. Even before the pandemic, nurses in the Dublin-based Infection Prevention and Control Department were doing tests every day for infectious diseases like Methicillin-resistant *Staphylococcus aureus* (MRSA), influenza, and norovirus. The team struggled to keep up with the amount of resulting administrative work and knew that, despite their best efforts, the process had a high error risk. So, the hospital turned to RPA to build an infection control robot that could augment their team. The robot—which tied together their existing legacy systems—could do the manual, repetitive testing work that used to take hours in mere minutes. The hospital predicted that while automation is essential in the fight against COVID-19, it will continue to deliver benefits long term. As the curve flattens, these process improvements will allow nurses to shift their focus from repetitive administrative work to do what they do best: caring for patients (McDaniel, 2020).

5 Applications in Turkey

5.1 Education

After all educational institutions in Turkey had to move their courses online, the RPA robots took on the responsibility to course follow-up and personalized online exams. The robots participate in online lessons of teachers with Zoom (or alternative applications) with a robot account. It takes attendance by following the participants. After the class starts the robots send the missing students are reminder email with an invitation link. It then records the class for the students that had to miss it. Optionally, the robot (with the trigger of the teacher), sends each student a personalized quiz and collects the responses. The robot receives the answers by email and calculates the grade for each student.

The RPA robots also work on the department and faculty level, by following the instructors' performance and students' attendance. Robots generate reports and scorecards for the management and also for students' parents.

5.2 Hospitals and Pharmaceuticals

5.2.1 Outpatient Monitoring

RPA robots were employed to monitor room occupancies at several hospitals' COVID-19 clinics. Robots provided estimations of the time of discharge by monitoring patient data. In addition, robots could do shift planning according to eligibility for doctors other than in the plan department.

5.2.2 Pharmaceutical Inventory Tracking

Pharmacists are among the most affected healthcare providers during COVID-19. In addition to this, a drug shortage could be expected during the pandemic. With an integrated pharmacy system, the needed drugs were directed to the nearest pharmacy based on the patient's location and by checking the pharmacy stocks. This prevents patients go out for shopping around for the necessary drugs. Also, hospitals and emergency response officers are automatically informed about the patients who are looking for COVID-19 drugs. RPA robots were used for inventory checking and routing patients to available drugs.

5.2.3 Automation of Patient Information Entries and Dissemination

The integration of inter-institutional and intra-institutional application integrations is undertaken by compiling the information of potential patients entering the hospital with the help of OCR from printed documents or transferring them to digital media. This process was taken over by the RPA bots. The data flow here not only contains the initial hospitalization phase, but also the data produced in the subsequent processes. If the robot detects any abnormalities or one of the pre-determined conditions, detailed analyzes were reported to the relevant institutions instantly. At the same time, using the integration with the hospital system, regular reports are produced by making instant follow-ups over existing stocks or hospital constraints. At a later point, epidemiological correlations are made between the patients, and statistics are drawn by creating models with the information to be compiled during the data flow.

5.2.4 Tracking System Over Istanbul Card

During the COVID-19 period when city-wide curfews are on the agenda in Istanbul, RPA bots were used for tracking COVID-19 patients and people who are at risk through their city transportation cards. Users must scan their Istanbul Cards to get access to the public transportation system. Robots check the list of people in the risk category regularly and track their locations through their navigation in the public transportation system. Bots also raise alerts to the public officials and update danger maps based on the real-time navigation information.

5.2.5 Electronic Pulse for COVID-19

Turkey recently introduced the electronic pulse (e-pulse) system to monitors its citizens' health. All prescriptions, lab test results, and doctor diagnoses are added to this central system. This includes the COVID-19 tests, where patients monitor their test results in real time. RPA robots were employed to monitor these results and collect reports based on citizens' demographic and geographic information. These reports were sent to the authorities in the corresponding cities. Reports included patients' ID numbers as well as test results and full address. This process reduced the time for authorities to reach the infected patients, and helped the patients with proper communication and instructions.

5.2.6 Employee Attendance Tracking

The COVID-19 epidemic forced most companies in Turkey to shut down their offices and send their employees home. It is a common practice in Turkey to require both blue- and white-collar employees to scan their badges at the office entrance, and this is called the "personnel attendance control system" (PDKS). PDKS allows the HR department to track absentee records, calculate wages for hourly wagers, and notify the managers about their teams' attendance for the day. Most companies use specialized software that tracks employee attendance through badge scans, and therefore the PDKS process is highly automated.

On the other hand, new PDKS solutions had to be implemented for the employees that work from home. Several companies got help from the RPA bots for this purpose. The bots email employees every morning to fill out an attendance form. In another application, RPA bots chat with employees to ensure that they are online. In addition, RPA bots attend the meetings and record the attendance; and at the end of the send consolidated reports to the HR department and the managers.

6 Conclusion and Discussion

While COVID-19 affected our social and business lives in various ways, robotic process automation (RPA) has been utilized by enterprises and governments to aid with the newly introduced challenges. It offers intelligent and ultraefficient software robots that can learn and act multiple times faster than humans with 100% accuracy. RPA has been particularly used in finance, insurance, supply chain, and HR for increased performance and customer satisfaction during COVID-19. RPA technology introduces innovative solutions to mundane and repetitive tasks that overwhelm the employees, especially after the extra workload that was brought by the pandemic. These robots can create reports, fill forms, send/receive emails, track business processes, and assist employees with judgments.

This chapter discusses several solutions provided through RPA systems for COVID-19 situations in developed and emerging markets, in various areas such as health care, pharmaceuticals, and insurance. These solutions include scenarios like tracking patients, routing the needed material and personnel, assisting students and teachers with online classes, etc. Public and private companies saved millions of hours of employees' time with RPA, which is critical and very much needed during the COVID-19 pandemic. Effective use of software robots during COVID-19 proved the value that RPA can bring in a short amount of time.

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Strategy Recommendations for Finance of Space-Based Solar Energy Investments

Hüsne Karakuş

Abstract The aim of this study is to determine the strategies for financing space-based solar energy investments. Similar studies in the literature on the subject are examined. As a result, it has been determined that space-based solar energy is very important in increasing the economic and social welfare of countries. It was emphasized that investment should be made in space-based solar energy. In this framework, first of all, technical and political issues that arise in the space-based solar energy system should be regulated. Then, necessary financing support should be provided to investors. For the system in question, the government should provide investors with the necessary incentives. Thus, the demand for space-based solar energy systems will be increased. In addition to these strategies, it is important for banks to give low-interest loans to investors. In this way, the short-term funding needs of investors are met. Supports of the leasing companies to provide financing to investors will contribute to increasing these projects.

1 Introduction

Energy means the force exerted while moving or doing work. In this context, energy is needed in all areas of life. People meet their energy needs using fossil resources. But fossil sources are scarce in nature. However, it has negative effects on the environment and human health (Bekun, Alola, & Sarkodie, 2019; Korsakienė, Raišienė, Dinçer, Yüksel, & Aleksejevec, 2020). Fossil sources are not found all over the world. This situation creates problems for some countries that need energy. For this reason, there is a need for resources that are constantly present in nature and have no negative impact on the environment and human health. Renewable energy sources are constantly in nature and meet the energy demand without interruption (Dinçer, Yüksel, & Canbolat, 2019; Li, Zhu, Yüksel, Dinçer, & Ubay, 2020). These

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renewable energy sources are wind, solar, hydrogen, geothermal, and biomass. The use of renewable energies positively affects countries. Countries using renewable energy sources reduce imported energy dependency (Zhong, Hu, Yüksel, Dincer, & Ubay, 2020). In addition, it increases employment by providing domestic production. Countries contribute to their economic development by using these resources. Therefore, investments in renewable energy sources are important (Dinçer & Karakuş, 2020).

One of the renewable energy sources is solar energy. The Sun was formed about 5 billion years ago by the combination of various gas and dust clouds. There is a large amount of hydrogen in these gas and dust clouds. Hydrogen is a light element that contains a proton. Therefore, when two light elements meet, they must repel each other. However, there is high pressure in the gas and dust clouds. This high pressure causes two hydrogen atoms to collide. Colliding hydrogens form a new element. Deuterium is formed by the combination of two hydrogens. The helium atom is formed when the deuterium atom meets again with a hydrogen atom. The resulting element gets heavier and begins to form photons. The helium 4 atoms are formed when two helium atoms meet. Helium 4 atoms are now a source of energy. It begins to emit heat and light. This phased process is called the fusion reaction. This reaction is estimated to take another 5 billion years. Therefore, solar energy is considered as one of the renewable energy sources (Bahcall, Huebner, Lubow, Parker, & Ulrich, 1982; Paneth, 1927). Solar energy is the light energy that occurs during the conversion of hydrogen into helium. This light energy is used for heating or cooling in agriculture, industry, and residences (Ferreira et al., 2018; Kannan & Vakeesan, 2016). Several systems are being developed to make use of solar energy. Space-based solar energy is one of these systems. In this system, solar energy satellites are sent to space. These satellites have solar panels. Solar panels placed on satellites consist of silicon layers made of phosphor and boron. Photons from the sun set silicon wafers into motion. Tension occurs during this movement. Solar panels installed on satellites work thanks to photons (Liu, Yan, Phang, Cuevas, & Macdonald, 2018). Light from the sun is kept in satellites and converted into electricity. The converted electricity is transmitted to the stations on earth by microwave or laser beams (Pritchard, Simon, Dowd, & Joshi, 2016). With this system, one-third of the energy demand is met. However, the need for energy storage is eliminated. In this context, investments in this system are important. However, the technological infrastructure used in this system is insufficient and the equipment used is quite costly. Therefore, priority problems in this system need to be addressed (Feingold & Carrington, 2003; Sasaki, Tanaka, & Maki, 2013).

The use of space-based solar energy has positive effects on national economies. With this system, energy demand is met. However, this system helps countries to develop economically and socially. On the other hand, this mentioned energy type also decreases the import dependency of countries (Rubenchik, Parker, Beach, & Yamamoto, 2009). The current account balance of countries is positively affected by this process. In addition to these issues, it helps to reduce carbon dioxide emissions. In this way, it leaves a positive impact on the environment and human health (White, 2013; Yildiz & Aslan, 2015). When all these issues are evaluated, it is seen that investments in space-based solar energy systems are important. In order to invest in this system, it is necessary to pay attention to some issues. However, ensuring the necessary investment financing is important for the sustainability of the system (Jakhu & Pelton, 2017). There is a positive relationship between providing the necessary financing to investors and preferring the system. In parallel with these issues, in this study, it was aimed to determine the strategies for space-based solar energy investment financing. This study was examined by literature review. Depending on this review, this study has many peculiarities compared to the studies in the literature. Firstly, there is very little work in the literature on space-based solar energy investment financing. Therefore, it is thought that this study will contribute to the literature.

2 Literature Review

Solar energy meets the increasing energy demand and is used in many fields such as heating and electricity generation. Several systems are being developed to make use of solar energy. One of these systems is space-based solar energy. There are many studies on this subject in the literature. For example, Mbunwe, Akuru, Ezea, Okoro, and Ahmad (2019) focused on electricity with space-based solar energy. As a result, it was stated that the energy demand was met by the electrical energy obtained from the space-based solar energy system. Uninterrupted electrical energy is provided by the space-based solar energy system. In this way, energy demand is met without interruption. However, this system ensures the sustainable economic development of countries. Therefore, the use of space-based solar energy is important (White, 2013; Yildiz & Aslan, 2015). There are many differences between solar systems installed on earth and solar systems installed in space. While solar energy installed on earth is affected by the seasons, space-based solar energy is not affected by the seasons. Hence, space-based solar energy should be preferred (Summerer, 2003).

To take advantage of space-based solar energy, solar panel satellites must be installed in space. However, on earth, lines that will transmit energy from the grids must be established. When all these conditions are evaluated, the space-based solar energy system is costly. In the literature, this issue has been addressed by many researchers. Curreri and Detweiler (2011) investigated the installation of space-based solar power plants. The corresponding study was tested with the O'Neill–Glaser model. As a result, it has been determined that initial installation costs are high for space-based solar power plants. Atul (2015) conducted a similar study. It was emphasized that the power plants intended to be used in the space-based solar energy system are costly. However, it was stated that the technologies used to reduce investment costs should be improved. Although the space-based solar system has many advantages, initial investment costs are high (Rubenchik et al., 2009). In addition to these studies, Mori, Kagawa, and Saito (2006) researched space-based solar energy. In the relevant study, Japan was included in the scope of the examination. It has been determined that the technologies used in the space-based solar energy system are costly. In his study, Mankins (2009) focused on cost in space-based solar energy. It is determined that the service and maintenance costs are high in the space-based solar energy system.

There are some technical problems in the space-based solar system. The fact that the satellites used are not durable and the technological conditions are insufficient. There are many studies on this subject in the literature. Pelton (2019) has investigated satellite systems in space-based solar energy. As a result, it has been determined that technology needs to be developed to take advantage of space-based solar energy. Sudhakar (2020) conducted a similar study and it was emphasized that with the development of technologies, the demand for space-based solar energy will increase. The technology used to reflect the energy obtained in the space-based solar energy system to the world must be developed. However, satellite technologies need to be developed (Goel, Chung, & Pellegrino, 2017; Yang, Hou, & Wang, 2017). In addition to these studies, Jaffe and McSpadden (2013) investigated the process of transformation of space-based solar energy into electrical energy in the USA. Consequently, it has been stated that photovoltaics that provide conversion to electrical energy should be developed in the space-based solar energy system.

Political and technical issues are important for the space-based solar system. There are many studies on this subject in the literature. Jakhu and Pelton (2017) investigated issues related to space-based solar energy. As a result, it was determined that the political conditions of the region where the power plant will be established are important in space-based solar energy. Jakhu, Howard, and Harrington (2016) conducted research on the legal aspects of space-based solar energy. It was emphasized that solar satellites are one of the important issues for future energy production. For this reason, it has been stated that legal, economic, and technological dimensions should be paid attention to make this system usable. Jenkins (2009) and Seboldt (2004) focused on topics related to space-based solar energy. It has been determined that many problems arise in the space-based solar energy system, including environmental, political, and technical. It was emphasized that the state would be effective in solving the problem. In parallel with these studies, Mankins (2001) examined space-based solar energy. It was emphasized that there should be a wide-based technology system for space-based solar energy. Therefore, it was stated that technical problems should be corrected.

Financing is also important for the space-based solar energy system. Many researchers have focused on this issue in the literature. Goswami (2018) investigated the political and economic aspects of space-based solar energy. In the related study, China was included in the scope of the examination. As a result, it was emphasized that the state should provide financing in order for the space-based solar energy system to develop. Yang, Zhang, Duan, Wang, and Li (2016) researched a new design project for the space-based solar energy system. The study was tested by system analysis. It has been determined that the technologies used for space-based solar energy are insufficient. It was stated that technological investments should be increased for this. Similar work was done by the National Research Council (2001). Consequently, it was stated that technological investments should be increased. It was emphasized that the necessary financing should be provided by the state. Cost is an important issue for the space-based solar energy system. While financing this system, it is necessary to pay attention to the costs first (Macauley & Davis, 2002; Wood, 2012). In addition to these studies, McSpadden and Mankins (2002) investigated the technology issue in space-based solar energy systems. It was determined that the state should provide financing for technology studies.

According to the results of the literature review, the subject of space-based solar energy has been handled by many researchers. In general, technical, economic, and political issues were determined to be important in the space-based solar energy system. However, it has been emphasized that space-based solar energy is important in meeting energy demand and sustainable economic development. In some of the studies, one country was examined, while in others, the countries were examined without consideration. The issue that is thought to be missing in the literature review is that there are few studies on investment finance for the space-based solar energy system. Therefore, it is thought that this study will contribute to the literature. In this study, it is proposed to determine the strategies for investment financing for the space-based solar energy system. In this way, it is thought that the deficiency in the literature will be completed.

3 General Information About Space-Based Solar Energy

Energy is one of the greatest needs of people. Because energy is needed when doing business or moving. Throughout history, people have obtained energy from nonrenewable energy sources. It uses resources such as oil, natural gas, and coal. But these resources are scarce in nature. Therefore, it cannot provide uninterrupted energy (Bekun et al., 2019). Hence, renewable energy sources should be used. Renewable energy is constantly present in nature. However, it provides economic development for countries (Dinçer et al., 2019). One of the renewable energy sources is solar energy. Solar energy, which formed about 5 billion years ago, emerges from the nuclear fusion reaction. The sun's core has 84% hydrogen. While the positively charged hydrogens should repel each other; elements react under the influence of gravity and pressure. Deuterium is formed by the combination of two hydrogen atoms. When the deuterium element formed meets the hydrogen atom again, it forms the helium 3 atom. Two helium 3 atoms react again and turn into the heavier helium 4 element. Helium 4 atoms become heavier, radiating heat and light (Bahcall et al., 1982; Paneth, 1927). In this way, the sun can be formed (Cameron, 1962). In this context, solar energy occurs during the conversion of hydrogen into helium. However, the usage area of solar energy is quite wide. It is used for heating, cooling, and electricity production in areas such as industry, agriculture, and housing. Thus, it is seen that solar energy is important for both the social and economic development of countries (Sampaio & González, 2017).

A number of systems are being developed to take advantage of solar energy. One of these systems is space-based solar energy. Space-based solar energy system is different from other solar energy systems installed. First, solar satellites are sent to

Table 1 Advantages and disadvantages of space-based solar energy system

Advantages	Disadvantages
Uninterrupted energy	Technological infrastructure insufficiency
No storage need	High unexpected costs
Environmental system	Missing legal regulations
Low maintenance cost	

Source: Feingold and Carrington (2003), Lin (2002), Sasaki et al. (2013)

space. These satellites have solar panels. These satellites are orbiting the world (Pritchard et al., 2016). Photons from the sun activate silicon layers made of boron and phosphorus elements in the panels. Elements in motion create tension. The tension that occurs is kept in panels (Toothman & Aldous, 2000; Work, 2012). Incoming sun rays are converted into electrical energy in these satellites and energy is transmitted to the world by microwave or laser rays. There are ground stations in the world and electrical energy is transmitted to the stations. Electricity is processed in power plants located in the world. Electricity distribution is also realized through networks (Srivastava & Srivastava, 2019). The space-based solar system has many advantages and disadvantages. These advantages and disadvantages are shown in Table 1.

Table 1 shows the advantages and disadvantages of the space-based solar energy system. With the electrical energy obtained from space-based solar energy, energy demand is provided uninterruptedly. However, the need to store energy is eliminated. There is no energy loss in the space-based solar energy system (Sasaki et al., 2013). The space-based solar system is not affected by seasonal changes and day differences. In this way, it differs from other renewable energy sources. This system does not harm any living things and prevents carbon emissions (Lin, 2002). Considering all these advantages, the space-based solar energy system is important for the world. However, some problems arise in the space-based solar energy system. The maintenance cost of this system is low. But in a possible problem, astronauts must be sent to space, which means a serious cost. However, the technological infrastructure required for this system has not developed. Therefore, the demand for this system is low. There are also deficiencies in legal regulations about how this system will be used in countries (Feingold & Carrington, 2003).

4 The Importance of Financing of Space-Based Solar Energy Investments

Energy is an important issue in the economic and social development of countries. However, it is one of the greatest needs of people. People in the world obtain energy by using fossil resources. But fossil sources are not found all over the world. This situation is a sensitive issue for countries that need energy (Yuksel & Ubay, 2020). However, the use of fossil resources poses an important threat to human health and the environment. Fossil sources are scarce in nature (Yılmaz, 2012). Therefore, renewable energy sources must be used. Renewable energy sources are constantly in nature. It meets most energy needs and minimizes negative effects on human health or the environment (Dinçer & Yüksel, 2019). In addition to these issues, renewable energy reduces the import dependency of countries and ensures sustainable economic development. Hence, investments in renewable energy sources are important. Increasing investments in renewable energy sources means that countries can produce renewable energy (Dinçer, Yüksel, Ubay, & Karakuş, 2020). If a country can produce renewable energy, there is no need to import energy. In this way, the current account deficit is minimized (Dincer & Yuksel, 2019). Thus, investments in renewable energy sources should be encouraged.

In today's practice, there are five different renewable energy sources. One of these renewable energy sources is solar energy. The sun was formed about 5 billion years ago because of a fusion reaction. There are scattered clouds of gas and dust among the stars that have expired. There is 84% hydrogen in these clouds. Hydrogen consists of 1 proton. Therefore, elements with the same electron charge must repel each other. However, the high pressure in the gas clouds causes these elements to react. Deuterium atom is formed by the combination of two hydrogen atoms. The deuterium element formed reacts with hydrogen again to form the element helium 3. Two helium 3 atoms meet, and helium 4 atoms are formed. In this process, the sun, a star that emits heat and light, is formed. It is estimated that this reaction taking place in the core will take another 5 billion years. Therefore, it is considered as a renewable energy source (Gallo, Mescia, Losito, Bozzetti, & Prudenzano, 2012; Severino, 2017). Solar energy is the light energy that occurs during the conversion of hydrogen into helium. This light energy is collected in solar panels. Electricity is also produced using solar panels (Lakatos, Hevessy, & Kovacs, 2011). In this way, energy demand is met. The usage area of solar energy is quite wide. Countries need to use solar energy to reduce their import dependency (Kabir, Kumar, Kumar, Adelodun, & Kim, 2018). However, solar energy minimizes environmental damage. Solar energy is important for the economic and social well-being of countries. All these issues attract investors. However, systems used for solar energy are costly. Therefore, investors should be provided with the necessary financing for this system (Steckel & Jakob, 2018; Wang, Liu, Yuksel, & Dincer, 2019).

Several systems are being developed to make use of solar energy. One of these systems is the space-based solar energy system. The space-based solar energy system is not a very new system. Its history is based on ancient times. However, it is not a very preferred system. Because a strong technological infrastructure and financing is required for space-based solar energy (Jenkins, 2009). Many countries are working on technological infrastructure for space-based solar energy. Especially countries such as China, European countries, the USA, India, and Japan are doing technological design studies for space-based solar energy systems. Countries aim to reduce their costs for space-based solar energy through technological design studies. However, the said countries appear to be technology leaders in existing solar energy systems. In this context, developments in solar energy technologies affect the development of space-based solar energy systems (Turkenburg & Faaij, 2000;

Yang & Wang, 2015). The space-based solar energy system meets one-third of the energy demand in the world and provides uninterrupted energy. However, it does not pose a danger to the environment and human health (Zerta et al., 2004). When all these issues are evaluated, countries should encourage the use of space-based solar energy to ensure social and economic well-being (Murali et al., 2017).

For this, firstly, the technological infrastructure required for the system should be created. So first, the barriers to financing need to be corrected. The durability of the satellites used for the space-based solar system and the development of the mechanisms that will provide the electricity conversion are other important issues in this process. For this reason, technical studies need to be increased. Research and development studies should be emphasized. Necessary employment should be provided for the development of technology (Mazzucato & Semieniuk, 2018). However, for this system to become available, countries must also review their political conditions. Governments need to establish regulatory policies to promote this system. In this way, deficiencies in technical and political issues are completed (Creutzig et al., 2017).

Investment finance is one of the important issues for space-based solar energy. After the political and technical opportunities are provided for the system in question, investors should be provided with the necessary financing (Qiu, Dinçer, Yüksel, & Ubay, 2020; Zhu et al., 2020). The initial investment costs of space-based solar energy are high. However, service and maintenance costs in a possible problem are high. All these costs put investors in difficulty. Therefore, necessary financing should be provided to investors. However, financing needs arise among the technological infrastructure studies (Johnson et al., 2009). There are many ways to meet the financing needs of investors. First, the necessary incentives must be given by the government. In this way, the space-based solar energy system is encouraged (Zeng, Liu, Liu, & Nan, 2017). However, investors should be given a grant to meet the needs of the system. In this way, it is ensured that the space-based solar energy system installation takes place in a short time. In addition to these strategies, investors should be given low-interest bank loans so that the short-term needs of investors are met (National Research Council, 2001). On the other hand, system equipment should be allowed to be rented by investors. In other words, leasing companies should rent system equipment at affordable prices. When all these supports are provided, the demand for space-based solar energy will increase. In this process, the current account balance of the countries will be positively affected (Qi, Huang, Dinçer, Korsakienė, & Yüksel, 2020; Tongsopit, Moungchareon, Aksornkij, & Potisat, 2016).

5 Conclusion

The aim of this study is to determine the strategies for space-based solar energy investment financing. For this purpose, space-based solar energy, one of the solar energy systems, was included in the scope of the investigation. Studies on the subject were examined by literature review. As a result, it has been determined that the space-based solar energy system is important for countries. It was emphasized that space-based solar energy provides uninterrupted energy and reduces the import dependency of countries. Therefore, it has been stated that investment should be made in space-based solar energy. However, the technological infrastructure has not developed in the space-based solar energy system and the system equipment used is very costly. Investors are negatively affected by this situation and do not prefer this system. For this reason, infrastructure studies for space-based solar energy should be carried out and necessary financing should be provided to investors.

In this framework, some arrangements need to be made for investors to choose space-based solar energy. Firstly, technological infrastructure studies should be done for space-based solar energy. For this, research and development studies should be increased. However, necessary employment should be provided for technological infrastructure works. Governments then need to regulate their policies for the use of space-based solar energy. In other words, the primary problems that arise in the space-based solar system need to be addressed. After these problems are resolved, investors should be provided with the necessary financing. The government should provide incentives for investors. However, investors should be given a grant for a space-based solar energy project. In this way, investors provide the financing required for the space-based solar energy system. In addition to these strategies, banks should give investors low-interest loans. In this way, short-term funding sources are provided to investors. However, it should be ensured that leasing companies lease space-based solar energy system equipment on behalf of investors. In this way, support is provided to investors. These strategies should be provided within the technological infrastructure studies for the space-based solar energy system.

The most important limitation of this study is to determine the strategies for space-based solar energy investment financing only. Therefore, strategies for other renewable energy sources investment financing remained outside the scope of the review. Hence, it is important to include other solar systems, wind energy, hydrogen energy, geothermal energy, and biomass energy in the new studies. Another limitation of this study is that any country or country groups are not included in the scope of the study. For this reason, it will be appropriate to discuss the countries where space-based solar energy studies are intensive in new studies to be carried out. Another part of the study is that the study is not handled by any econometric analysis method. It will be useful to examine the studies to be done by any econometric analysis method.

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Leading Determiners of Institutionalization in Globalization Era and Strategic Change Management in Educational Organizations

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Abstract The aim of this study is to determine the main reasons for institutionalism and change process in educational organizations by benefiting from the literature through a case study. In this scope, the language school of a private university that is currently undergoing an institutionalization process has been examined as a case study. In the case study, face-to-face interviews with three-level management and instructors have been conducted to get primary data. As a result of the study, external factors such as the increase in student enrollment within the university and the demand of the language skills increasing in the world have pushed the university to undergo this process. On the other hand, the high standards of the university to operate in international platforms have resulted in structural, academic, and administrative changes in the language school. During the process, it is seen that the only resistance exists in midlevel management; however, not against the system, but against the management style. This study is significant as being the pioneer analysis in educational organizations. It contributes to the literature as it is valuable as benchmark for other educational organizations, which plan to institutionalize. The study can be improved with further researches after the process in the language school is finalized.

1 Introduction

The process of globalization has made it compulsory for organizations to change. The change, accepted as one of the main necessities for surviving in the future, affects economic, social, political, and technological structures directly or from time to time, indirectly. Therefore, all the individuals within the organization and the corporation function are under the pressure of a possible change.

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The change phenomenon requires being able to recognize and reorganize the structure of corporations. In this scope, like all other types of organizations, universities are also expected to manage change including all the resources such as its technological equipment, administrative and academic staff, students, and partners. That said, managing change by engaging all parties in the process not only helps the system to get accepted at a personal level, but also helps with potential resistance.

One of the meanings of the institution management is to carry out the management activities with a professional team. The institution management can also be assumed as a management technique that tries to find answer to the question; who is going to determine the important components like the vision, mission strategy, structure, culture, leadership style that belongs to the organization. Therefore, institutionalization has vital importance for the organizations to form a standardized structure, ensuring the continuation and enhancement of its activities without depending on any individuals.

The study tries to find answers to the question, why organizations need to institutionalize. In this process, the purpose is to understand how organizations overcome the possible resistance within the organization and external factors affecting the plan. In the meantime, this progress is exemplified with the case study of a language school of a private university, which is currently undergoing institutionalism. The following questions are asked to three-level management: (1) what was the need for a change within the Language School? (2) What is the plan of the institutionalization process? (3) What are the initial and current challenges? (4) What kind of resistance is there and what is the proposed remedy? (5) What is the expectation of the outcome? Some of the instructors were also interviewed to learn how effective the plan has been so far, and if they are engaged in the process.

The paper is organized as follows: the first part provides the literature review which focuses on definitions of change and institutionalization, reasons of change, and institutionalization process; the second part includes the aim, importance, method, and scope of the study. In the final part, results are analyzed taking the theories in the literature and organizational theory perspective into consideration. Conclusion and related suggestions are also provided in this part.

2 Literature Review

There are various definitions of change, institutionalism, and other related topics such as change management, resistance to change, and institutionalization process in the literature.

2.1 Change in Organizations

Organizations are combinations of systems that are found to carry out predetermined tasks. Because corporations are open systems, any change in the environment affects them. For this reason, it is impossible for organizations to remain insensitive to any advances; otherwise, it will not be possible for them to achieve their goals. They must pursue the changes so as to adapt to new conditions, accelerate their enhancement, benefit from the advanced technology, and strengthen their competitive capacity. In another source, Daft defined organizational change as "choosing a new perspective or approach." Performing the change means to lead the company from the current position to the desired one. In this perspective, organizational change can be assumed as a transition period (Fulop et al., 2005).

Forces that motivate organizations to change can be classified into two groups: internal and external. Due to recent changes in information and communication technology, external forces are more powerful to drag the companies into change. There are three main problems that organizations face in the change process. These are problems resulting from competitive market structure, problems related to workforce, and problems triggered by social environment (Malcolm & Scott, 2011).

2.2 Factors Causing Change

Organizations are a whole that operates in an environment and consists of many sub-systems. Environmental conditions are constantly changing and developing. In particular, because of the developments in science and technology, the accumulation of knowledge has reached important dimensions. Continuous change is both the cause and the result of the rapidly developing information and technology. This situation, as in other organizations, forces educational institutions to become more and more dependent on the environment they are in, to interact and comply. For this reason, educational institutions are faced with the need for constant change and renewal, both due to their internal structures and the various factors arising from the environment (Bögel, Pereverza, Upham, & Kordas, 2019).

2.2.1 External Factors

Social change refers to the change in the patterns of mutual interaction observed between individuals and groups. The basis of this change is population, human relationships, changes in family structure, and cultural problems. Social change is often referred to as cultural change. Changes in cultural structure also affect social institutions and compel them to change (Orji, 2019). Changing values, norms, and understandings in society affect and change educational organizations. In the process of social change, rapid population growth and population mobility are changing the demographic structure of the country. In particular, the increasing population in underdeveloped countries affects the rate of population coming to school age, increases the demand for schools, and raises the quantitative failure of schools (Cui & Jiao, 2019). On the one hand, it is necessary to educate the young population and, to make educational arrangements in accordance with the social structure that changes with urbanization. Along with the economic developments, the division of labor and specialization in the society increases, and new areas of work emerge.

Education organizations must make a change, to meet the needs of qualified manpower required by the country's economy and to create new schools and departments that meet the requirements of the era. In addition, economic developments necessitate the rational transfer of new resources to the field of education. The effective operation of educational institutions requires changes in their organizational structure. New tools and equipment that come with technological change have an important place in the realization of the aims of educational institutions. Technological products such as computers, video, and television are effective in providing faster and permanent learning (Král & Králová, 2016). Thanks to computer technology and the Internet, information has become easily shared by more people. Therefore, the role of teaching is no longer knowledge transfer in the classical sense. The teacher is moving away from the authority that holds the information in the eyes of the student. Now, instead of accumulating information in memory, it has come to the fore to gain the ability to access information. The understanding of learning to learn has started to be emphasized. The understanding of learning has changed the role of teaching, and the teacher has taken the position of a transmitter of knowledge and a guide. In this sense the teacher, who is a guide, can enable students to access information more easily, synthesize the information, create new products, and learn how to learn.

2.2.2 Internal Factors

According to the approaches that explain organizational change in terms of intraorganizational factors, the organization consists of some internal elements that interact with one another. The change observed in one or more of these internal elements is accepted as the main reason for organizational change (Abatecola, Breslin, & Kask, 2020). Among the internal elements that make up the organizations, the building related elements, human-related elements, technological elements, and elements related to organizational goals can be counted (Levy, 2019). Internal factors that force the organization to renew and change can be in the form of changes in organizational goals and changes in organizational structure. Changing organizational goals and practical goals is an inevitable situation for an organization to regulate its relations with the environment. It may be in the form of changing practical objectives, the organization's achieving additional objectives, or expanding the scope of past objectives. Over time, a specific goal may gradually take precedence, and other objectives may be pushed to the second plan or abandoned. Changes in organizational structure can take place in the form of changes in organizational principles and rules, intraorganizational relationships, actions, processes, employees, and technology (Andreasen & Gammelgaard, 2018).

Effective operation of educational institutions requires changes in organizational structure. New tools and equipment that come with technological change have an important place in the realization of the aims of educational institutions. Technology products such as computers, video, and television are effective in providing faster and permanent learning (Whitebird, Solberg, Bergdall, López-Solano, & Smith-Bindman, 2020). Thanks to computer technology and the internet, information has become easily shared by more people. Therefore, the role of teaching is no longer knowledge transfer in the classical sense. The teacher is moving away from the authority that holds the information in the eyes of the student. Now, instead of accumulating information in memory, it has come to the fore to gain the ability to access information. The understanding of teaching-learning has changed the role of teaching, and the teacher has taken the position of a transmitter of knowledge and has become a guide. The teacher, who is a guide, can enable students to access information more easily, synthesize the information, create new products, and learn how to learn.

2.3 *Causes of Individual Resistance*

As the reasons for individual resistance to change, selective attention and memory, habit, fear of losing personal freedom, dependency, fear of uncertainty, economic factors, security, and withdrawal can be listed. People tend to perceive their actions selectively to comply with and compromise the most feasible. If the individual understands the reality and sees the individual and organizational aspects of change, instead of resisting change, he/she approves the change. Unless events related to the change of a situation are not noticeable, individuals will continue to live the way they do. Individuals tend to continue their habits. If the change is perceived to make life more difficult, to reduce personal freedom and to restrict behavior, employees will resist change. If dependency on other people reaches an extreme point, resistance to change may occur. Uncertainty always gives people fear. The fear and anxiety of the unknown cause people to resist change. The future is uncertain, it is perceived not to change, to remain safe in a sense (Carrasco-Peralta, Herrera-Usagre, Reyes-Alcázar, & Torres-Olivera, 2019). The individual can resist change with the concern that he/she will lose his/her current income, economic interests, and business. A process of change will be resisted to the extent that the benefits of the employer, economic security, are damaged (Milton, Chaboyer, Åberg, Andersson, & Oxelmark, 2020). In the process of organizational change, if the change is perceived by the employers as a threat to their economic situation, it is likely to resist change.

2.4 Causes of Organizational Resistance

Among the causes of organizational resistance to change, threats against power and influence, organizational structure, distribution of resources, communication, and group structure can be counted (Packard, 2017). Some people in organizations may think that change threatens their power and effects. Each organization has a suitable structure to achieve its objectives. In organizations with a hierarchical structure, as the communication flow may deteriorate, people can tend to resist change. Groups that control the distribution of limited resources and power within the organization, resist change as a threat to lose power. Individuals or groups who have the biggest share of resources can react with the fear of cutting or decreasing resources. The communication plan of the change itself holds a vital role in the process as it may get lost in translation. Therefore, the structure of the organizational communication needs to be strategically rolled out. Any miscommunication from top down in the hierarchy may cause resistance and mixed negative feelings toward the organization.

In the process of change, language and value judgments used in communication can support change when it is positive. The individual is never alone in the organization. As a member of a group, it is forced by the group to think within certain patterns and to comply with the group norms. The group gives the individual certain forms of behavior and values. Often, group norms are effective in individuals accepting or rejecting change. The structure of the group, the tightness and solidity of the relationships can lead the group members to adopt the change to resist.

In educational organizations, reducing the resistance to change at the organizational level requires effective management and leadership. The factors causing resistance to change at the organizational level should be determined in advance and their negative aspects should be eliminated. Achieving change is a teamwork and requires strong management skills at all levels of the organization. To this end, the following suggestions can be made in educational organizations to reduce resistance to change (Lunenburg & Ornstein, 1996):

- The process of change and renewal should be perceived as a collaborative effort.
- The fact that people will resist change must always be considered.
- The timing is extremely important in the change. Making the change at the right time increases the chance of success.
- Change is not an event that is happening at a time, it is a process that requires patience.
- Factors promoting change and rewarding facilitate the success of the change.
- Training and technical assistance can ease the burden of employees during the change process.
- Priorities regarding the change and the mission of the change should be determined.
- Difficulties and risks to be faced in the process of change should be considered.

2.5 Institutionalism

Selznick's approach is one of the oldest methods that is known about intuitionalism in organizations. Selznick defined intuitionalism as the process of expanding values and ideas. He also asserted that intuitionalism is a practical process, which indicates limitations put forward by individuals and organizations (Selznick, 1949). Intuitionalism explains a kind of adaptation process of organizations to its business segment and it also tries to explain the improvement in these organizations in due course (Schmidt, 2014).

According to Deephouse and Suchman (2008), institutionalism is restructuring the organization based on the predetermined principles and standards, it also means to have competent managers and employees in order to maintain the operations in the organization in the light of information. In this way, the right system for organizations has been set up and organizations succeed in surviving for a long time instead of depending on individuals.

Powell and DiMaggio (2012) stated that institutionalized organizations have an identity that is different from any other in the way of performing the work and its methods. Furthermore, these organizations have procedures, rules, and standards, which means that it is not dependent on individuals. Significant topics such as who will be the people that lead organizations, people in board of management, how the decisions are taken, which information to share, which parties are engaged, and which of them to communicate, constitute the institutionalization process. Institutionalized management explains the relationship between organization and parties that define required strategies to fulfil management activities (Romanelli, 1992).

Institutionalism is restructuring organization to achieve organizational stabilization, legitimacy, to attain various sources and to adapt to the business segment. Forcing, normative forces around organizations and imitation cause organizations to adapt to its business field. When organizations institutionalize, they develop a different kind of character and distinctive talents. Institutionalism increases the capacity of corporations, contributes them to grow and survive for a long time. Some of the terms, which constitute institutionalism, are officializing, autonomy, and professionalism (Greening & Gray, 1994).

2.5.1 Officializing

Officializing means that structures, activities, and relations in organizations, together with the task assignment of employees are predefined and they are already put in writing. Activities are carried out through the rules, standardizations, and systematic procedures. Moreover, it means to determine task assignments and put procedures about how to perform a specific task within the organization in black and white. In the history, it can be seen that organizations that have been officialized, have survived for a long time and this can be explained by their capability of adapting to their environment and stabilization of the activities carried out. Officializing being one of the significant components of intuitionalism contributes to organizations to be dependent on pre-established procedures and rules rather than individuals. In this scope, employees are instructed by the written documents and this helps organizations to be stable in the long run (Král & Králová, 2016).

2.5.2 Professionalism and Autonomy

Professionalism of organizations means to employ professional managers and to organize corporations so that activities can be fulfilled professionally. It also means to have relations with the other professional organizations in the same business segment. However, it is not enough to employ professional employees, there should also be a professional and bureaucratic but not excessive atmosphere within the organization, which helps employees to have job satisfaction (Faulconbridge & Muzio, 2008). The level of professionalism in organization has a direct relationship with employees' ability to keep their authority and be autonomous. Professionals having autonomy increases their loyalty to the organization which boosts their performance. They can also be integrated into the organization due to the autonomy and authority assigned (Sitch, 2005).

3 Strategic Planning for Change in Education

Increasing uncertainties in the environment in which organizations are located have been one of the important factors that directed organizational managers to strategic planning. Strategic planning can assist managers in understanding and defining environmental trends while contributing to developing solutions that will lead to increased organizational effectiveness. Effective strategy development and viable strategic planning are considered essential to survive in today's business world (Rowley, 1997). Business planning is the process of deciding what an organization needs to do to be successful, at least to be able to live economically (Kotler & Murphy, 1981). At the core of determining the strategy, there is an assumption that managers can predict the future of the organization, using a range of effective analysis tools, allowing them to choose a clear strategic direction.

In this sense, strategic planning can be expressed as a model that aims to focus on the future, based on environmental effects and environmental factors. Therefore, using strategic planning in the process of organizational change can increase the success of the change. Strategic planning can be defined as an understanding of giving direction to the organizations by turning their views into the future. Whether using strategic planning or any of the other change methods, these steps must be accomplished in all management strategies (Tsiakkiros & Pashiardis, 2002):

- To make sure that the change is necessary and needed.
- To provide a comprehensive overview of how to achieve a comprehensive planning and how to achieve this change.
- To disseminate the change plan and provide training to understand the process.

Strategic planning involves examining the strategic goals of organizations and their action plan. Strategic planning is a process that encompasses all employees, from employees in the lower divisions of the organization to the top executives. This process is based on a contemporary approach such as effective planning, continuous development, responsibility, and focus on customers (Kools & George, 2020). In order to manage educational organizations effectively and efficiently, a strategic planning model based on the development of future vision, mission, goals, and strategies can be utilized in line with environmental changes. Thanks to an effective strategic planning, the desired planned change can be achieved in schools. Examination of the internal and external conditions of the organization constitutes the first stage of strategic planning. After examining environmental conditions, strategic steps need to be determined. At this stage, the vision, mission, goals, and strategies of the school for the future are developed (Nguyen, Melewar, & Hemsley-Brown, 2019).

After a detailed analysis of the environmental conditions of the organization, the organizational vision and mission are developed and the purpose of existence of the organization in the future is determined. The mission is a clear, concrete statement that explains the reasons for the existence of organizations and answers the question "why." During the development of the strategic objectives, the objectives necessary for the mission to be realized are developed. Developing strategies involves revealing options that can be achieved by organizational vision and mission. Multiple strategy options are created at this stage that can lead the organization to its predetermined goals (Ellis & Goodyear, 2019).

In the strategic planning process, after the mission, strategic goals and strategies are determined, the plan is developed. At this stage, the job descriptions required to implement the desired strategies are made in detail. The implementation plan includes elements such as the schedule, date, mission, goals, basic strategies, program flow, and responsibilities of the activities necessary for the realization of the change.

The last step of strategic planning is evaluation. Evaluation is the beginning of the development of the system with strategic planning. If the necessary evaluations are not made, it will be difficult to determine whether the system is successful, or at which point. In strategic planning, the answer to the question "How can we reach the point we want to reach with the resources we have or that we can reach?" is sought. In strategy development, the following three questions are asked (Yanez, Uruburu, Moreno, & Lumbreras, 2019):

- Where are we?
- Where do we want to be?
- How can we get there?

Strategic planning, which is a bridge between the current situation and the place desired to be reached, can be accepted as an applicable model that can be used in the implementation process of change in educational organizations. However, an important point to consider when making strategic planning is the voluntary involvement of all parties for the change in education to be successful. In a participatory sense of change, individuals or groups that will participate in the change are expected to develop a positive attitude toward change. The effectiveness of the change depends on the student, teacher, manager, and school environment that will be affected by this change to internalize the change.

4 Research and Methodology

4.1 *The Importance and Aim of the Research*

The main goal of this research is to track the change management and the need for institutionalization process of the language school. This research holds the privilege of being one of the rare studies in the literature that researches the institutionalization process of a higher education department. We strongly believe that this research will be an asset to the ELT (English Language Training) industry in terms of being able to distinguish the before and after processes and effectiveness of language schools. During the research, both qualitative and quantitative research methods have been used. Also, the primary source of data has been collected through interviews with 3-level management and lecturers. In addition, the guidelines prepared both by the language school manager and by the chancellor of the university have been a great channel of secondary data for this research. Lastly, with the support of student admissions and human resources the research has been completed with some numeric data.

4.2 *Scope and Restrictions*

The study aims to research the process of institutionalization of the language school and the management of the change. The paper focuses on the process of institutionalization and the change management and therefore aims to find answers to the following main questions: (1) what was the need for institutionalization within the organization? (2) What is the primary plan to achieve the expected results in the process? (3) What were the initial and current challenges? (4) What is the remedies resistance, if any? (5) What are some of the external factors affecting the process both negatively and positively? (6) What are the expected results of the process?

This research paper focuses on the change management of the language school in a foundation university during the process of institutionalization. Although the data and information gathered for this research are very valuable and useful, it would be an objective approach to point out that due to the limitations in the sampling, further research is suggested more effective results.

4.3 Research Type, Method, and Data Collection Tools

In this study, it is focused both on qualitative and on quantitative data. The paper is a case study focusing on the institutionalization process of the language school and the management of the change. The primary sources of the qualitative data are the face-to-face interviews with 3-level management (Upper management, mid-level management, operational management teams), instructors. The interviews with the management team consisted of four main open-ended questions and an elaboration has been requested regarding the institutionalization and the change management. The interviews have been held in private sessions and taken about 45 min to complete.

The instructor team has asked different types of questions, focusing on their attitude toward the change, and the general satisfaction within the institution. These sessions have also been held privately to prevent objectivity. Secondary qualitative data has been acquired from website of the university. On the other hand, the secondary quantitative data has been used with the support of the admissions and human resources at the university. Lastly, the literature has been scanned thoroughly both in the areas of institutionalization and change management in organizations.

5 Research Results

These findings have been gained because of face-to-face interviews completed with 3-level management and instructors. On the other hand, secondary quantitative data have been collected both from student admissions and human resources to support our findings. It is obvious from the results of the interviews that the need for this institutionalization is caused by internal and external factors. The external factors can be listed as the growth of the university in the last 7 years and the high demands in language skills due to globalization. Also, the incline of the student enrolment has pushed many departments along with the language school to increase their academic staff to perform better academically. The changing environment and the demands of the industry requested this change indirectly.

In order to achieve the primary plan of institutionalization and to manage the change effectively in the language school, the upper management and mid-level management receive support from Pearson Assured, an international educational audit organization. This approach will help the language school to become an internationally recognized institution and gain student trust in the process. Also, another approach the language school supports is to engage both instructors and the management team to help the adaptation process. It is believed that every change can bring along challenges and that these difficult times could be overcome with effective communication. Although the management team does resist to any systematic changes within the process itself, efficient engagement seems to be the better approach. In other words, it can be understood from the interview results that the mid-level management is a bit hesitant to leave the human relations behind as the process moves toward the bureaucratic approach. As mentioned in the literature, any resistance can be overcome by engaging all the parties involved in the process since all parties are directly affected by the process. As a result of the interviews with the instructors, the process is positively affecting them in terms of their workload, motivation, and clear communication. There has yet to be seen any kind of resistance from the instructors.

The main goal of the institutionalization in the language school is to create better workflows as they step into the international platforms by keeping their sustainability in the industry. It is vital for any language school to keep up with the technology and the demands the new era and generations demand. It can be seen from the interviews that the process seems to be a challenge for everyone involved, in the bigger picture the management team and the instructors believe that the result will end in an effective and efficient manner. When there is a clearer and bigger picture and teams are informed about processes, we can see that instructors feel more engaged.

6 Conclusion

Educational institutions are faced with a phenomenon of constant change. The success of the change in education depends largely on the belief of the teachers, students, administrators, and other interested parties who are parties to the change and their voluntary participation in the change process. It is not possible for a change initiative, which was not believed to be successful, to be supported. In the success of the change, the concrete support of those who will be affected by the change is an important driving force. For the success of change in education, it is important for change practitioners to give up negative attitude and attitude toward change and to believe in the success of the change. In this sense, to manage change effectively in education, it is necessary to pay attention to the following issues (Vosniadou, 2007):

- The change should be built on organizational forces as much as possible.
- What needs to be done should be determined and only the necessary changes should be made to achieve the goals aimed by the exchange.
- People should not be pressured and rushed to accept the change.
- The implementation stages of the change should be planned with great care.
- In the process of change, one part must be flexible and new changes can be adapted according to unexpected results.
- Efforts should be made to internalize the change.

- The process of change should be closely monitored, and an effective and systematic assessment should be made.

Mentioned language school currently is undergoing an institutionalization process that is challenging the teams in many ways. Even though the challenge is causing some opposing ideas among the teams, it seems that all parties involved seek the same result which are effective and efficient workflows. In the meantime, everyone is very aware of the need of playing a role in the international platform to continue sustainability. Thus, the effort in trying to meet at the midpoint with ideas and perspectives shows that the intentions in the matter are on a linear line. Furthermore, with the support of Pearson Assured, diverse perspectives, and efforts of the teams the success of the process is hoped to be seen soon. Finally, it should be considered that this study is a case study and further detailed empirical research can be done on the matter. Different methodological approaches can be applied to the study by extending the time and sample limitation.

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Management of COVID-19 Through Strategic Roles of Governments: A Study on Highly Affected Countries

Ramesh Chandra Das

Abstract The present pandemic through the outbreak of the Novel COVID-19 in the late December 2019 has claimed lacs of lives and affected crores of people worldwide till date. The human civilization in general and the scientists are helpless in managing and controlling its spread and fatality. The moves of different countries' leaders and lack of unanimity among the scientists, all over the world and accordingly the moves, statements of the World Health Organization (WHO) are sometimes seemed indecisive and fragile. Hence, there is the need for choosing between vaccination and allowing for herd immunity development to combat the microorganism. Under the backdrop, the present study aims to focus on three objectives—pricing and availability of the vaccines, preferences and capabilities of the common people and the governments in accepting the vaccines and the ultimate choice between vaccination and herd immunity. Taking eight highly affected countries from the world into consideration the study has tried to establish the cost of vaccination management vis-à-vis the cost of pension to the old population in relation to availability, pricing, and distribution of the vaccines. It arrives at the conclusion that there will be high prices of the vaccines due to the concentration of a few companies in the pharmaceutical industry and low capability of a large section of population. Additionally, vaccination attempts will not be economically feasible if it is clubbed with pension expenditure. Therefore, it recommends sustainable uses of energy to have long-term solutions to fight against all sorts of viruses and bacteria.

1 Introduction

The present pandemic that happened through the outbreak of the Novel COVID-19 (sourced from SARS-COV 2) in the Wuhan Province of China in the late December 2019 has claimed lacs of lives and affected crores of people worldwide till date. The developed countries specifically have been hit hard by the novel virus. The human

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civilization in general and the scientists are helpless in managing its spread and fatality. The moves of different countries' leaders and lack of unanimity among the scientists, all over the world and accordingly the moves, statements of the World Health Organization (WHO) sometimes seem indecisive and fragile. We, the common people, do not know what to do, rather, as the experts say, should follow some preventive measures out of our own economic and social status.

It is now a billion dollar question 'how to manage the spread and fatality of the virus'. Some scientists earlier opined for generation of 'herd immunity' power across the mass so that human beings are capable enough to produce antibodies and halt the spread and fatality of the virus. Depending on this prescription some countries like Sweden, the United Kingdom allowed their citizens prone, rather made their people vulnerable to this disease. The United Kingdom later shifted away from the decision and tried treating their affected people in hospitals of old and expanded capacities. The United States President also primarily was of that strategy but later he also moved back to the strategy of management through in-built and expanded health facilities. Most of the countries of Europe (especially of Western Europe) have tried their best to control its spread and saved their citizens but they were also helpless. From the developing countries' perspectives, India was sincere from the early periods but its certain wobbly decisions in allowing flights, moving migrant labours, thriftiness in fund allotment for its defence etc. had led to such a today's huge toll. Brazil, on the other hand, was very careless from its President and intentionally made their people highly vulnerable and making huge death toll in a quick interval.

The United States leads the countries in the world with over 55 lacs of its citizens affected by the novel virus followed by India in our selected countries' list. Brazil is in the second slot at world level (it is not shown in the diagram). The European giants in terms of their economic powers have also been hit hard and they were the front runners in respect of spread and fatality after china during the early stages of spread. Further, in the head of death toll, the United States has lost 1.75 lacs of its affected people, followed by India, 57 thousand, the United Kingdom 41.5 thousand, and France 30.4 thousand. The scenario as presented in the figure show that allowing/making vulnerable the citizens of the countries for generating herd immunity should not be the ideal strategy for evading the virus. Although, the strategy may be capable in providing the long-run solutions to the countries and the world as a whole. But, to get long-term solution, we need to depend upon sustainable uses of our economic resources.

The only alternative to the generation of herd immunity is prevention through vaccination. As the data shows that from a single person and single location at Wuhan of China the infection has now spread to almost all the countries in the world affecting crores of people till date, it is thus required to vaccination to all the affected and potential mass to be affected at the earliest possible. Again, having novelty in its nature and its increasing levels of mutation over time the scientists, universities, multinational pharmaceutical companies all over the world are trying their best to invent new vaccines to evade COVID-19. No good news has yet been supplied by the scientists till date on the invention, and not being possible to reach the priority sections by the end of this year.

History says that the world's common people, especially the children from the developing and less developed economies have been affected by several life-threatening viruses. No such medicines were there to control them at first instance, rather there were continuous efforts of the countries in putting their resources upon building appropriate vaccines. WHO has taken initiatives from their part in this respect to make the world virus free. According to WHO, at the turn of the last century, despite the promising progress of the previous two decades, prompted in particular by the work of the Expanded Programme on Immunisation (EPI), there were still 30 million children living in poor countries who were not fully immunized against life-threatening diseases. Coverage was 'stagnating and in some places even declining'. In order to address this challenge, Global Alliance for Vaccines and Immunisation (GAVI) was launched in January 2000 at the World Economic Forum (WEF). Its aim was to improve access to new and underused vaccines for children living in the world's poorest countries. It was funded with the help of a US$ 750 million 5-year pledge from the Bill and Melinda Gates Foundation. India has been one of the members of this initiative. Till date, GAVI has been impacting the world communities in a significant amount. It is estimated that the use of GAVI-supported vaccines from the start of 2011 to the end of 2014 will have averted approximately 3 million deaths. Between 2010 and 2013, child mortality in GAVI-supported countries fell from 77 to 69 deaths per 1000 live births, with vaccines considered to be responsible for reducing mortality from vaccine preventable diseases. Compared to the number of vaccinations in 2010, an additional 207 million children had been immunized with GAVI-supported vaccines by the end of 2014.

World Health Organization has appealed to the world's leading nations to join the GAVI to work together for inventing COVID vaccines. A list of leading countries has joined the venture including India collaborating with a list of pharmaceutical companies. A list of pharmaceutical companies originated from some countries has been working incessantly in search of the proper vaccine. All of them are in Phase I and II stages of development, no one is in the final stage of the trial.

We are thus in a position to wait for at least half of a year to get the vaccines for the highly vulnerable class of society. It is accounted by WHO that the health care workers and old age people are the most vulnerable classes and proposed that once the vaccine reaches the market, it will be applicable to these priority classes in the fast attempt. Reaching the common people will be the next step. Hence, it is the question of eradicating COVID from the planet in 2021. It will thus involve a huge cost to the society in terms of loss of lives, economic degradation, among others.

If it is assumed that it will be equally available to the common people in the first lap of 2021, then it is another question on whether all will be capable of taking this vaccine out of their desire and capabilities. As WHO has appealed for the governments of the countries to come forward, purchase, and distribute among their citizens, will it then be the viable solution to the governments? There are a number of ifs and buts to these situations.

In the present study, we have considered three specific objectives to deal with:

1. Pricing and availabilities of the vaccines.
2. Preferences and capabilities of the common people and the governments in accepting the vaccines.
3. Choosing between vaccination and herd immunity.

2 Review of Related Literature

As the issue is a new one it is hard to find studies in the areas related to the roles of governments and their strategic choices. The present study reviews some of the available related studies that may be helpful in justifying the present study.

In its policy report, OECD (2020) discusses in detail the need for international co-operation to focus on three critical issues related to COVID vaccines-first, there is a need for *pull* mechanisms to incentivize the swift completion of the most promising R&D projects, second, large-scale manufacturing capacity has to be built even before we know which candidates will be successful, and, third, rules need to be set now to manage intellectual property rights and procurement to ensure equitable access, affordability, and supply in sufficient quantities. In the World Bank Blog, Gurazada, Kristensen, Sjoblom, Piatti, and Farooq (2020) opine that the rapidly evolving pandemic calls for active measures on the parts of the developed economies, especially, for safeguarding the lives. Further, the public financial management system of the countries is efficient to allocate funds for proper production and distribution of the vaccines in an uncorrupted way. Marengo (2020) highlights the pricing of vaccines for COVID-19 if they are discovered. Usually, patents are the rewards to the inventors buy it leads to monopolistic power. Keeping in mind the severity of the virus and urgent needs of vaccination the study has also pointed out alternatives like licensing for better pricing of the vaccines. In a different approach, Karim (2020) has analyzed affordability and accessibility of the vaccines by different income groups across the globe. The low- and middle-income economies may impose domestic controls on its application and pricing. Hence, it is a real issue on free and fair accessibility of the vaccines by different countries. In a scientific research based on laboratories, Hotez and Bottazzi (2020) shed light on the process of developing a low-cost COVID vaccine that would be helpful to the world's low- and middle-income groups.

In a pioneering and widely cited study Ferguson et al. (2020) estimate that, absent government measures or behavioural change to respond to the virus's spread, coronavirus could result in approximately 2.2 million deaths in the United States, with almost all of those deaths occurring before August of 2020. Sequel to this study, in their working paper, Broughel and Kotrous (2020) estimate the benefits and costs of state suppression policies to 'bend the curve' during the initial outbreak of COVID-19 in the United States. The results indicate that the net benefits of suppression policies to slow the spread of COVID-19 are likely positive and may be substantial, but given significant uncertainty, net benefits may be close to zero. These studies provide us a clue to the strategic intentions of the governments in dealing with their management costs that would put pressure upon their exchequers. The present study has intended to intercept in this area by considering the savings of their pension cost as well as vaccine costs to the old age people of the concerned highly affected countries.

3 Data and Methodology

The present study has considered world's eight highly affected countries in a number of incidences and death, and the countries that initially neglected the severity of the disease. These countries are the United States, the United Kingdom, Italy, Spain, France, Sweden, China and India. The principal source of data on the number of incidences and death is WHO and for the economic indicators it is World Bank (www.worldbankindicators.org). The data on pension expenditure is borrowed from Statista (www.statista.com). Besides, there are articles from journals, reports on countries and news which helped us in shaping the quantitative exercises.

In the methodological part, we have explained the possible pricing and distributional policies of the pharmaceutical firms from the aspects of industrial organization. The concentration ratio is calculated to find the control of the selected firms in the vaccine market. To measure the concentration of the top 5 firms (say) where more than 50% of the market share is possessed, we have C5 concentration measure. Suppose S1, S2, S3, S4, and S5 are the respective market shares of the top 5 firms sequentially then the concentration of the 5 firms in the entire pharmaceutical industry is given by

$$\mathrm{CR5} = \mathrm{S1} + \mathrm{S2} + \mathrm{S3} + \mathrm{S4} + \mathrm{S5},$$

where $\mathrm{S1} =$ Total market size of the first firm/Total size of the market. The value of CR5 varies between zero and unity. If $\mathrm{CR5} = 0.5$ or 50% then we say that half of the total market is catered by these 5 firms and the remaining 50% is catered by all the remaining firms in the industry.

Then the capabilities of the common people and the governments in accepting the vaccines are explained, respectively by their economic positions (levels of poverty etc.) and fiscal strengths. Finally, the strategies of the governments in behaving casually in the early stage and their true motives are justified by the computation of costs of vaccinations and pension expenditures. The cost-benefit of deferment of the incidence is examined monthly basis.

4 Analysis and Discussions of the Objectives

4.1 Objective 1: Pricing and Availabilities of the Vaccines

In the general economic principle, the price of a product is determined by the strength of the demanders or buyers and the strength of the suppliers or sellers. This is called a market mechanism. If there are a large number of buyers and sellers in a market of a product with complete information then price of the product will be fully market determined and it will be just or ideal pricing since both the buyers and the sellers will be satisfied in their own ways. In this system, as both the parties are satisfied, there will be no burden to the society in terms of loss of buyers' satisfaction or sellers' profit. Therefore, in this form of market, with many buyers and sellers with complete information, there will be no intervention of the government to solve for social burden problem. Both the demand curve (DD′) and the supply curve (SS′) intersect at point E, which means both of them are willing to buy and sell at that point. Nothing is left after transaction means all of the quantity of the product is bought and sold. The price is determined at P*. E is called market equilibrium.

Below E, price is, say at P1, demand is greater than supply and there is no equilibrium in the market. So, the price will go up to make equilibrium until E is reached. Again, above E, supply is greater than demand and again there is no equilibrium in the market. Price will go down till E is reached. This is the normal phenomenon of a market mechanism where there is no unique control of either the buyers or sellers as they are large in numbers and small in size. Whatever is produced is in line with the requirements of the consumers and hence there is no question of scarcity or surplus of the product. The product is then available at the full quantity of the production, and no overpricing is there by the sellers. Society as a whole is benefitted from this type of perfect market.

Suppose we think of a market where there are a few sellers (say, 2, 3, 4, 5 etc.) but infinite buyers. In such a situation, the entire market supply is controlled by a few sellers who enjoy market power or the power to bring the price in their favour. If this happens, they will intend to produce and supply less quantity of the product, which means they will store or reserve their capacity. In such an excess capacity system the sellers will charge high prices to the buyers. So, as we move in the upward direction from E in the diagram, the power of the sellers will increase and as a result price will be increasing from P2 onwards. This type of market is Imperfect or Incomplete Information market where sellers have the power to make the price in their favour. Naturally, the buyers will be dissatisfied due to this high pricing system and as a result there will be social cost and intervention of the government.

Let us think of the pricing of vaccines in this line. In the case of vaccine market, as the history says, for any influenza, polio, smallpox, TB etc. types of diseases, we have seen that total world market for vaccine is covered by 9–10 pharmaceutical multinational companies. But the number of buyers is large around the globe. This means, supply side of the vaccines' market is entirely controlled by a small number of suppliers which leads to imperfection. They will underproduce the capacity of

Table 1 Top 5 companies' revenue share

Years	GlaxoSmithKline	Merck & Co.	Sanofi	Pfizer	Novavax	Total share
2017	24.1	21.1	18.2	16.3	5.9	85.6
2024	24.0	23.6	20.8	21.7	–	90

Source: Statista.com

production, store the quantity, and charge high prices. On the other hand, the common people who are affected by these diseases, are bound to purchase the vaccines to save their lives at the cost of high prices. Therefore, the buyers (or the patient parties) get exploited, which leads to social cost.

Table 1 shows that more than 85% of revenue is earned by only five pharmaceutical companies in the world in 2017. Out of them, 80% is by only four, GlaxoSmithKline, Merck & Co., Sanofi and Pfizer. The total market share increases in 2024 due to expansion of Merck, Sanofi and Pfizer. Therefore, we see in the real world that there is a huge market concentration of the pharmaceutical companies, which are capable enough to charge high prices and exploit the patient parties. Further to say that there are a very few countries behind these limited pharmaceutical companies and saying high concentration with the companies implies high concentration by a few countries. Therefore, there is inter-country competition in the vaccine market in particular and medicine market in general. The increasing cost of treatment and health care over time is the result of these firms' or countries' concentration in the pharmaceutical market.

4.2 *What About COVID Vaccine?*

Till date, there are eight leading pharmaceutical companies are in the race for inventing the vaccine. Table 2 shows their origin, collaboration, and status of development of the vaccine. Eight leading companies are there in the race of the inventing venture who are providing mixed information to the common media day by day. Table 2 gives a clipping of the said list of companies and their status of developments till date.

AstraZeneca PLC with Oxford University and Moderna with NAID, Lonza Ltd. are the leading companies in this respect. The world is very much optimistic about the invention by Oxford University as it has progressed in an unhalted manner. Bharat Biotech, Serum Institute, Zydus Cadila, Panacea Biotec, Indian Immunologicals, Mynvax and Biological E are among the domestic pharma firms working on the coronavirus vaccines in India. Till date, there are only 6 leading countries collaborating with these 8 leading pharmaceutical companies in this race who are namely the United States, the United kingdom, France, Germany, Japan and China. Besides, there is a non-listed country Russia who has reported in the media about their completion of the research and they have invented the vaccine in the name of 'Sputnik V'. If we count Russia, there are a mere 7 countries in the world of around

Table 2 Eight pharmaceutical companies ahead in the COVID-19 race

Name	Collaboration	Stages of developments	Country of origin
Johnson & Johnson	Beth Israel Deaconess Medical Centre, Biomedical Advanced Research and Development Authority (BARDA)	Phase I	USA
Pfizer	BionTech	Phase I	USA and Germany
Moderna	National Institute of Allergy and Infectious Diseases (NIAID), Lonza Ltd.	Phase II	USA
AstraZeneca PLC	Oxford University	Phase II	UK
GlaxoSmithKline	Sanofi	Phase I	UK and France
CanSino Biologics	Precision NanoSystems	Phase I	China
Sinovac	Dynavax	Phase I	USA and China
Novavax	Takeda Pharmaceutical Company Limited	Phase I	USA and Japan

Source: www.forbes.com

200 nations that could have been in the race. If we calculate the concentration ratio, we see that only 3.5% (= 7/200*100) of the countries of the world has occupied the total global market for COVID vaccine. Should we then expect that it will be easily and cheaply available to all corners of the globe?

For the sake of simplicity suppose these 7 countries have the capacity to cater all the 780-crore world population by providing required doses of the vaccine. *Should we then expect that they will produce and supply the same?* That means, *will they operate at their full capacity of vaccine production?* We have to see what the real scenario regarding their capacity utilization is. In their book, Belk and Belk (2020) have pointed out that the pharmaceutical industries giving a promise of providing good health care facilities in the 1970s is now in a declining state as their motives are now centring around profit earning and low capacity utilization. Tim Tyson (October 28, 2019), Chairman and CEO of Contract Development and Manufacturing Organization (CDMO) TriRx Pharmaceutical Services, in his article on Solving the Industry’s Capacity Utilization Problem, pointed out that with capacity utilization in the pharmaceutical industry at a surprisingly low rate, drug makers are rationalizing facilities and contract supply networks to gain efficiencies and reduce cost. The pharmaceutical industry currently faces a significant issue: poor capacity utilization rates. Compared with the consumer products industry, where true capacity utilization rates are maintained above 85%, utilization of existing pharmaceutical manufacturing capacity across the entire industry network hovers near 30–35%. As a result, there will be an extreme increase in the prices of the vaccine. Table 3 shows the approximate proposed cost of vaccine per dose in some leading countries. Different

Table 3 Vaccine cost as proposed by the companies

Country →/Cost ↓	USA	UK	Italy	Spain	France	China	India	Sweden
Vaccine cost $ per dose	20	10	3.5	3.5	3.5	72	10	3.5

Source: www.healthline.com

countries have made agreements with different countries. China and the United States have to pay more for the purpose.

If the entire global vaccine requirement is taken to be 100 and the 7 countries have such capacity to produce then in reality, according to low capacity use, they will produce only 30–35 units. This means, 65–70% of the world population will be out of the vaccine intake. So how will we eradicate COVID-19?

4.3 Objective 2: Preferences and Capabilities of the Common People and the Governments in Accepting the Vaccine

Given the limited availability of the vaccines, and fear of the vaccines, we need to focus on what the common people are requiring or preferring and how they are capable of facing the crises out of lives and livelihoods. In the same way, as it is also the governments' stake around the world, what the governments are preferring and how they are capable to save the lives of their citizens in terms of vaccination and income-earning supports. Both the common people and the governments want the vaccination, there is no doubt about that. *But are they capable of doing so?* This is a crucial issue as a large section of the population in the world are in extreme poverty and the per capita incomes of the world's populous countries are well below the so-called developed countries of the west. Table 4 presents the precarious income situation of a large section of the world population. We see that around 77 crore people are in extreme poverty at the global level out of which 66 crores are in South Asia and Sub-Saharan Africa. With respect to India, its per capita income is 3.2% of North America and it has over 5 crore population lying in extreme poverty. The problems for all the backward economies and regions get further aggravated if we consider the poverty from multidimensional aspects. Hence, although the common people have the desire to accept vaccination, they are not capable to do so.

Now come to the discussion on whether the governments will be capable to go for vaccination to all corners of the society. The economies of all corners of the world have been hardly hit by the pandemic in several aspects whose ultimate results have fallen upon the growth rate of GDP and, unemployment. Besides, already almost all countries' governments have spent a lot from their exchequers as stimulus package for rebuilding health care facilities and compensations to job losers, industrial houses, small- and medium-sized enterprises etc. Keeping all these negative impact issues in mind, lets us analyze the governments' cost and benefit analysis for vaccination in depth to extract the true preference of the governments regarding vaccination or no vaccination.

Table 4 Poverty head count ratio for $1.90 a day (at 2011 PPP) (% of population) in 2018

Region/country	% of population	Population in extreme poverty	Per capita income (in USD)
South Asia	12	22 crore	1960
East Asia Pacific	1.3	3 crore	11,526
Sub-Saharan Africa	40	44 crore	1585
Europe	0.1	44 thousand	34,843
North America	0.1	36 lacs	63,327
Latin America and Caribbean	4.3	2.8 crore	8847
Middle East and North Africa	7.4	3.4 crore	8104
World	10 (2015)	77 crore	11,435
China	0.6	90 lacs	10,261
India	4	5.5 crore	2104
Brazil	4.4	92.4 lacs	8717

Source: World Bank

The World Health Organization's director-general Tedros Adhanom Ghebreyesus said that without vaccinating the planet's highest-risk populations simultaneously, it would be impossible to rebuild the global economy. Also, he said the most exposed 20 percent of each country's population—including front line health workers, adults over 65 and those with pre-existing conditions—would be targeted in the first wave of vaccinations, once the WHO-led COVAX shared facility can roll out a proven safe and effective vaccine. Thus, the priority group for vaccination is the health workers and old age population of the countries. All the developed economies today face the problem of old age population or population ageing. An economy's labour force, both physical and mental, is the prime determinant of its growth and development. Population ageing leads the economies to less growing state in one hand and increase in the tax burden of the young generations. Further, the governments of the countries heavily rely upon the working population to make the economies grow. Hence, spending upon the old age population is a burden to the governments in true economic sense. Governments spend a huge share of countries' income upon pension head which is non-performing in true sense except some consumption demands from the old age population.

Let us add the cost of vaccination to these old population and health care workers with the pension cost. Truly speaking, although it sounds bad and inhuman, huge death toll from the old age group, especially in the developed countries due to COVID-19, has saved huge funds of the governments of the countries. Further, vaccination means saving the lives of the old population and accordingly persistent pension burden. Hence, it is a big question on the part of governments' good intention for quick management of the problem, rather wait for the generation of herd immunity as part of their strategic interventions. Further, the number of health workers affected is also highest in the United States followed by the European countries. Taking the figure for all the priority group we see that the United States

Table 5 Cost of vaccination to the priority sector

Countries	Number of old people affected as of August 24	Number of health workers/ affected	Priority number needing Vaccine (2 + 3)	Total vaccine cost $	Pension cost for affected old people in $ Crore	Vaccine cost for only affected old people in $
USA	4008612.24	1,100,000	5,108,612	102,172,245	97,728	8.01 crore
UK	162302.5	100,000	262,303	2,623,025	12,587	16.23 lakh
Italy	219415.6	23,232	242,648	849,267	26,313	7.7 lakh
Spain	316564.28	57,908	374,472	1,310,653	11,828	11.08 lakh
France	185437.77	2234	187,672	656,851	30,008	6.5 lakh
China	28845.12	3300	32,145	2,314,449	27,412	2.02 crore
India	1,217,976	24,360	1,242,336	12,423,360	2600 (= Rs 195,000 crore)	1.22 crore (=Rs 9,134,000 crore)
Sweden	24,640	10,300	34,940	122,290	1205	86,240

Source: Author's calculations

needs vaccination for over 51 lacs people, India, more than 12 lacs people, Spain around 4 lacs, the United Kingdom, 2.6 lacs, followed by Italy, France, Sweden and China. Now we calculate the cost of vaccination to these priorities listed people. The data on the number of incidences have been for August 24. Table 5 outlines the derived results for the cost of vaccination to these people.

The total cost of vaccination has been calculated by multiplying the per-dose price agreed with the companies by a country and the number of its doses required. The agreed price per dose has differed across countries and companies (www.healthline.com). The United States will have to bear $10.2 crore for vaccination for the priority group followed by India with $1.24 crore (= INR93.2 crore), the United Kingdom $26 lacs and China $23 lacs. But, the vaccine cost for only the affected old people is $8 crore for the United States, followed by India with 1.2 crore (=INR91.35 crore), the United Kingdom with $16 lacs etc. Although the cost amounts for the countries are not so worrying so far as the economies' capacities are concerned, it is spent only a dismal percent of the total population. Hence, vaccination attempts should not be economically viable for the countries as their pension cost are well above the vaccine cost, rather depend on herd immunity. Further, vaccination means life savings of a major portion of the affected old people. Thus, vaccination has twin costs-first, monetary cost of vaccination and second, cost of pension. This is also true for all the leading affected countries in the world. But governments can do vaccination to the old people on humanitarian, social and political grounds.

What would happen if the governments would get the scope of deferring vaccination by one month? Or What would be the monetary benefits to the governments for one-month delay in controlling and managing the pandemic? These questions are raised to justify whether there might be strategic movements of the governments in behaving carelessly in the early phase of the spread. As we saw in the earlier discussion that vaccination was not economically viable, rather it was socially and politically viable. If this was so, the governments could intentionally defer the management against the virus. We have seen that some countries like Sweden, the United Kingdom, the United States, Brazil, ..., and strategic decisions by the Indian government regarding lockdown, moving migrant workers, not restricting air traffic movements etc. did not care initially for the virus. *Was there simply the innocent carelessness? Or something calculative thinking was there in their minds?*

To get a further clue to this plea, let us calculate the cost savings by the governments if a 1-month deferment of vaccination/management is allowed. We consider here only the pension cost as the key measure of alternative cost of management, keeping all other costs constant. We can compute this by multiplying the monthly average number of deaths by per head pension cost. It is seen that on an average there is 23,022 increase in the number of deaths for the United States, 5159 for the United Kingdom, 4715 for India, 2032 for Italy etc. The savings of pension fund is calculated in Table 6.

Due to this increase in death rate on a monthly average basis, there will be an equivalent amount of savings of pension expenditure. For the United States, it is $780 crore, $500 crore for the United Kingdom, $287 crore for Italy, $52 crore for Sweden. For India, there will be monthly savings of $251,716,334 or INR1888 crore if proper management is deferred by 1 month. If a 6 months delay is available and accessible to the governments then think what amount they could save.

Hence, we should not take into grant that the delays in management and control of COVID-19 by the countries are due to their innocent helplessness in true sense, rather it might be strategic and intentional for the long-run gains of the countries in terms of savings in pension spending and increase in working age population. Some studies are there in the literature on the economic burdens of population ageing and retirement plans during COVID (Aronson, 2020; Bhattacharjee, 2020; Ghilarducci, 2020; IMF, 2020; Morrow-Howell, Galucia, & Swinford, 2020; Nikolova, 2016; OECD, 2020) that support the hidden intentions on the part of the governments in deferring management against COVID.

Suppose the governments are not of that negative or inhuman mindset of saving their revenues from keeping away themselves from vaccination-like activities. If vaccine comes to the market and governments purchased the bulk amount on the basis of their allotted capacity, *will they be distributed to all corners of the countries irrespective of political differences? This is a huge question so far as the ever-increasing inequalities in income and wealth for the countries are concerned?*

Hence, the management of COVID-19 by the governments is subject to many strategic, economic, social, and political considerations.

Table 6 Per month savings of pension fund if management is deferred by 1 month

Countries	May 1st–June 1st	June 1st–July 1st	July 1st–Aug 1st	Average Growth (May 1st–Aug 1st)	Per capita pension cost for affected old people in $	Savings of pension cost due to death per month average $
USA	34058.16	17231.76	17778.24	23022.72	338606.5298	7,795,643,326
UK	9374.4	4192.8	1911.2	5159.466667	969461.5768	5,001,904,690
Italy	4630.8	1149.2	317.9	2032.633333	1410873.566	2,867,788,639
Spain	3854	−565.8	73.8	1120.666667	455658.4897	510641280.8
France	3655.32	841.62	321.21	1606.05	1949711.663	3,131,334,416
China	227.52	−238.72	6.4	−1.6	29697884.2	−47516614.72
India	1399.2	5102	7644.4	4715.2	53384.02078	251716334.8 (INR1888 crore)
Sweden	506.52	262.64	114.8	294.6533333	1746884.605	514725371.8

Source: Author's calculations

4.4 Objective 3: Choosing Between Vaccination and Herd Immunity Development

The discussion that we made in covering Objectives 1 and 2 has provoked us to justify the choice between vaccination and herd immunity development. Vaccination is a short-term management as WHO and other organizations are still sceptical about the number of doses required for complete cure. Further, once it is cured by vaccinations, whether it will not evade further is not with have a clear explanation by the scientists. We should thus search for long-term management techniques. Herd immunity development is a long-term management, which largely depends on the climate-changing parameters. Different studies (Biagini et al., 2012; Legendre et al., 2014; NASA, 1969; Tumpey et al., 2005) have established that many typical life-threatening viruses and bacteria were under large glaciers for hundreds and thousands of years and due to global warming, the glaciers are getting melted and as a result the fatal viruses are getting exposed and getting lives. For example, Spanish Flu in 1918–1919 had taken the lives of millions of people and recurred again in 2014, after 100 years and claimed further lives (Morens, Taubenberger, Harvey, & Memoli, 2010). Hence, the origin of getting long-term solution is to conserve our nature through decreasing energy use. We need industrialization, more energy uses etc. to have better livelihoods but these should not be at the cost of environmental health. Hence, we should focus on generating greener capitals for our industrial uses. The investment upon conservation capital should be the ideal choice to protect the earth from COVID-like viruses and microorganisms in the coming days. The rate of herd immunity development will then be faster and protective.

5 Concluding Observations

Keeping into considerations the running spread and fatality of COVID-19 the present study had aimed for analyzing three objectives to justify the strategic roles of the governments on the managements against the virus. The results of Objective 1 show that, as the rule of market says, COVID-19 vaccine should not be cheap since the entire vaccine market is controlled by only a very few pharmaceutical firms (i.e. very high concentration ratio in the vaccine market) and only seven countries have allowed these companies to make business in their soil. The results of Objective 2 show that vaccine intake by the households and distribution by the governments will not be feasible as the major part of the former in the global level face extreme poverty and hence with low capabilities, and the later face huge fiscal problems in paying pensions, rebuilding health care facilities and paying for stimulus to save economic downturns. There is again strategic behaviour observed for the governments in deferring the management of COVID because 1-month delay in controlling and managing makes budget surplus of crores of dollars. The conclusion from Objective 3 gives us to opt for herd immunity development in place of vaccination and for sustained herd immunity development, the economies have to invest in conservation capital.

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Strategy Proposals for Onshore and Offshore Wind Energy Investments in Developing Countries

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Abstract In this study, the main purpose is to capture people and companies' attention upon wind energy issue. For this target, both onshore and offshore wind plant criteria and related risk issues are studied. In this framework, firstly a wide theoretical review is presented on onshore and offshore wind energy. Afterward, the pros and cons of onshore and offshore wind energy were discussed. At this point, these features are viewed from the perspective of developing countries. According to the study's results, it is identified that although onshore wind energy plants have a comparative advantage in terms of cost, when considering efficiency offshore wind energy is one step ahead. In this context, it is determined that investors can encounter many problems when investing in onshore or offshore wind energy projects. Therefore, it is suggested that to invest in onshore wind energy plants, the country's legal system and public awareness must be improved. In addition to this, for invest in offshore wind energy plants, it is proposed that countries should invest in training labor force and technology in order to minimize possible costs.

1 Introduction

There is a strong need for alternative, clean, and reliable energy sources (Yao, Zhang, & Zhang, 2019; Zhu et al., 2020). Unlike fossil fuels, renewable energy sources are environmentally friendly, have low operating costs and, most importantly, are free fuel, and also their installation costs are decreasing as technology advances (Yan, Zou, Du, & Li, 2020; Yüksel, Dinçer, Karakuş, & Ubay, 2020; Yüksel, Dinçer, & Uluer, 2020). Wind energy is one of the most frequently used sources among renewable energy sources. Although high-efficiency wind power plants have been established with such a development of technology, wind energy is not a new source of energy. Throughout the history, people have benefited from the

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power of the wind in tools such as sailing ships and windmills (Dinçer, Yüksel, Ubay, & Karakuş, 2020; Igliński, Iglińska, Koziński, Skrzatek, & Buczkowski, 2016). The production of electricity using wind energy has increased rapidly since the 1990s. As of the end of 2019, the installed capacity of wind energy has exceeded 650.8 Gigawatts with a growth of 10.1 percent (WWEA, 2020). Wind energy is the fastest-growing energy source and is one of the most economical energy generation options today.

Energy cannot be produced when wind does not blow. For this reason, considering this positive picture of wind energy in the world, it is necessary to undergo good analysis and feasibility studies during the implementation phase of wind energy projects (Himri, Merzouk, Merzouk, & Himri, 2020). Therefore, it is essential to successfully analyze the region and the project where the wind turbine will be installed and to perform a feasibility study. Offshore is used in wind energy literature for wind turbines at sea (Costoya, DeCastro, Carvalho, & Gómez-Gesteira, 2020). Onshore turbines, which are the most widely used wind turbines today, are the name given to the installation on land at a minimum distance of 3 km from the shore (Junginger, Hittinger, Williams, & Wiser, 2020). There are some distinct differences between onshore and offshore wind power plants. Wind power plants installed in the offshore regions are able to generate more energy because they get harder and higher wind. However, due to reasons such as logistic problems of offshore wind power plants, installation costs are higher than on land systems and maintenance costs are higher and difficult (DeCastro et al., 2019). For this reason, when offshore wind power plants are to be established, places that will generate high amounts of electricity are generally chosen.

2 General Information About Renewable Energy Investments

Meeting the increasing energy demand in a sustainable, competitive, and reliable manner is a global threat. The 45% increase expected to occur in world primary energy demand by 2030 and the projections made that there will be no change in the share of fossil resources reveal the necessity of a fundamental change in the energy system (Qiu, Dinçer, Yüksel, & Ubay, 2020). Combating climate change, which is directly related to energy use, is another threat that needs to be addressed globally. In other words, energy security and combating climate change are at the center of the debates on the energy sector in the international arena (Li, Zhu, Yüksel, Dinçer, & Ubay, 2020; Zhong, Hu, Yüksel, Dincer, & Ubay, 2020). Despite the projections for 2030 that the share of fossil resources will remain at lower levels, renewable energy sources such as wind, solar, and geothermal will be the sources that increase their share in primary energy demand the fastest (Arabpour, Besmi, & Maghouli, 2019). The steps taken to turn threats in renewable energy investments globally into opportunities are important in terms of guiding many countries. Investor interest in the energy sector, which is the key sector of many countries in terms of investment and employment, continued in both crisis and normal periods (Costa & Veiga, 2016). The renewable energy sector, where the mobility of international financial institutions with project finance opportunities continues even during the crisis period, will bring new business areas and employment opportunities with the necessary support mechanisms and a predictable regulation environment (Walmsley, Walmsley, & Atkins, 2017).

While competition between countries increases in investments made in renewable energy-based generation, the risks created by natural disasters in the world threaten the investments made significantly. The vulnerability of the renewable energy sector to climate-related risks and natural disasters can also negatively affect the sector's profit margin and reliable financing efforts (Yuan, Zhang, Yüksel, & Dinçer, 2020). Awareness of the importance of historical data in examining the impact of natural disasters and climate-related risks on renewable energy investments is gradually increasing. However, we see that this awareness does not increase in parallel with the investments made. Considering the fact that the profitability of renewable energy investments is always under the threat of natural disasters and climate-related risks, it is important to develop risk management practices correctly in order to prevent risk, to ensure that the risks exposed are covered by insurance, to identify possible losses and to reduce possible risks (Korsakienė, Raišienė, Dinçer, Yüksel, & Aleksejevec, 2020).

Applying a forward-looking and analytical risk management approach based on historical data at every stage of the design, construction, and operation of renewable energy facilities enable the estimation of natural disaster resources risks, thus enabling these risks to be identified, managed, and transferred effectively and destructively. It will contribute to the development of solutions that will minimize the effects. Professional solutions based on data and analytics should also be developed against risks arising from climate and technology selection, which are among other factors that threaten investments made in renewable energy resources. When an efficient risk management is applied, renewable energy investments can bring many benefits to countries.

With the development of renewable energy alternatives, it has been possible to reduce the effects of increasing energy consumption on the environment and climate change for years. In this context, accepting energy efficiency as a source of supply is important in terms of realizing an innovative political perspective (Garrett-Peltier, 2017). When energy efficiency practices are supported by relatively rich renewable energy sources, it will be possible to reduce the energy import bill. At this point, it is vital that the demand for energy continues uninterrupted and the government provides investors with new incentives for renewable energy and encourages them to implement various energy projects, and some long-term investments by the private sector. Viewed from another direction, using clean, renewable energy is one of the most important actions that can be taken in order to reduce the impact on the environment (Wang, Li, & Pisarenko, 2020; Wang, Yang, Pham, Khoi, & Nhi, 2020).

The negative effects of energy consumption on human, environment, and natural resources have reached serious levels day by day. Wind energy, which is one of the most important renewable energy sources, is clean, efficient, abundant, and free (Shoaib, Siddiqui, Rehman, Khan, & Alhems, 2019). Applying wind energy does not create emissions and waste heat that will create air pollution, it is the type of energy that leaves the least damage to the nature, and because of these features, its use and investment are increasing every year. The development of wind energy prevents climate change by providing a nonpolluting energy source. Unlike fossil fuels, wind energy without greenhouse gas emissions promises completely clean electricity to the world (Kaldellis & Apostolou, 2017). While the world is struggling with climate change on a global scale, wind energy enables us to provide all the suitable conditions for a clean environment (He, 2016). Considering all these features, wind energy seems to be one of the most important alternatives to obtain energy today and in the future, especially with the increasing environmental awareness in recent years (Forbes & Zampelli, 2019). At this point, it is very important to ensure customer satisfaction for transition to a sustainable wind economy (Sagbansua & Balo, 2017). Rapidly renewed technological developments and changing customer expectations continue to increase in the energy sector. The basic desire of energy consumers is to reach uninterrupted and qualified energy (Azasoo, Kanakis, Al-Sherbaz, & Agyeman, 2019). For this reason, it is of great importance to increase the functions of wind energy, such as storage and transportation, which require more technical knowledge than nonrenewable energy sources and to keep its efficiency up to the end customer (Ding et al., 2018).

Wind energy is one of the reliable sources at this point. The source of wind energy is the sun. As the sun heats the earth's surface and the atmosphere to a different degree, an airflow called wind occurs. The wind, which is abundant and free in the atmosphere, is a renewable and clean energy source. It can be stored by converting to another energy and does not create environmental pollution. Electric energy that is produced by wind energy is obtained from wind turbines. Wind turbines are machines that convert the energy of air in motion into mechanical energy. The energy obtained from the moving air in the form of mechanical energy is transferred to the electric generator through a mechanical transmitter that includes a suitable coupling and gearbox. The electrical output from the generator depends on a load or power grid depending on the application. The controller used in this type of request detects wind speed and direction, shaft speeds and torques, output power, and generator temperature, if necessary, generates appropriate signals for generator control in order to perform wing angle control, direction control, and to match wind energy input and electrical output. In addition, strong wind protects the system from extreme conditions, electrical faults, and generator overloading. In wind-electric systems, all conversion efficiency from wind power to electrical power output is in the range of 25–35%.

Energy has an important place in achieving the goals related to social balance, economic growth, and environmental protection, which are the three main components of sustainable development (Gnatowska & Moryń-Kucharczyk, 2019). It is extremely important to provide energy from sustainable, reliable, cheap, clean, high quality, and domestic renewable energy sources and use them efficiently in order to ensure sustainable development and maintain a natural balance. The ability of countries to access energy seamlessly and safely has been one of the most important priorities on a national and global scale (Juaidi, Montoya, Ibrik, & Manzano-Agugliaro, 2016). In this framework, many countries are developing policies to meet their energy needs largely from domestic energy resources rather than imported resources (Argin, Yerci, Erdogan, Kucuksari, & Cali, 2019). Depending on the fragility of economies, the situation and risks affecting global energy prices may also cause countries to have a hard time (Kumar et al., 2016). At this point, it is vital for countries to include wind energy, which can operate on a large scale, in their plans. The cost of generating electricity from wind energy has decreased over the years, making it competitive with fossil fuel reserves (Williams, Hittinger, Carvalho, & Williams, 2017). Wind power generation reduces dependence on both foreign and temporary fossil fuels since it is possible to obtain this energy only by local means. Many countries in the world prioritize incentive policies to increase wind energy use and to develop energy production technologies in this direction. Countries that adapt wind energy to their countries have also taken an important step for energy supply security (Chalvatzis & Ioannidis, 2017). Energy costs, which are constantly increasing due to the changes in the prices of nonrenewable energy sources all over the world, have turned the eyes into an energy–economy relationship. In this case, ensuring the self-sufficient energy production of countries by using wind energy and even marketing this energy will be an important issue affecting their economic development and national security (Wang, Li et al., 2020; Wang, Yang et al., 2020).

3 An Evaluation for Wind Energy

Wind is a proven renewable energy source. However, wind power projects both on land and at sea are complex facilities subject to certain legal regulations. Unlike traditional energy sources, wind energy does not cause greenhouse gas emissions (Shoaib et al., 2019). Wind energy is not exhausted, can be found everywhere and usage is not subject to a price, but also provides long-term energy security. Wind power plants can be set up in a shorter time than other power plants, so the damage to the environment during the installation of the plant is reduced to a minimum. In addition, the land of wind power plants is open to dual use. In other words, while the wind power plant is operating, afforestation and agricultural activities can also be carried out. Thus, it prevents the reduction of forest areas. In addition, it is possible to remove or remove the turbines that are old or lost their efficiency. Therefore, the land can be reused. Wind energy is an energy source that requires high capital per kilowatt with its current production technologies but has a very low operating cost. If the technological developments in the wind energy sector continue, the costs of wind power plants are expected to decrease significantly in the coming years. Wind energy projects from design to operation have risks in terms of location. For this reason, choosing the right place for wind energy investments and implementing innovative strategies is very important for both state and private companies.

3.1 Onshore Wind Energy

Wind energy, which was started to be used in the years before Christ, has gained popularity in many fields from sailing ships to windmills. However, with the industrial revolution, wind energy began to lose its importance with the construction of a steam machine and the uninterrupted production of energy from fuels such as wood and coal (Tawfiq, Mansour, Ramadan, Becherif, & El-Kholy, 2019). Due to the cheapness and easy access of fossil fuels, wind energy, which was not adopted sufficiently in this process, was recalled upon the understanding of the oil crises in the 1970s and the understanding that fossil fuels would be depleted rapidly. With the developments after 1980, especially in Europe and the USA, wind farms have become modern engineering products in terms of economy, environment, and energy (Ryberg et al., 2019).

On land, the operation of wind turbines is based on a simple physics principle. The electricity obtained by the rotation of the propeller is distributed to cities and countries with the help of transformers (Zeng et al., 2020). This simple working principle is much more advantageous and low cost compared to other energy methods. Since it is a continuously circulating energy source, there is no need for raw materials, logistics, and processing (Grüger, Hoch, Hartmann, Robinius, & Stolten, 2019). The wind capacity of the region should be measured when installing a wind power plant on land. Propeller length, blade system, and turbine model should be adjusted completely according to wind pressure. Since wind power on land is constantly changing, it is a normal consequence that if the wind power is not optimized, the propellers will fail, and the efficiency will decrease. It is very important that the wind turbine to be installed on land is positioned in a way that does not affect the ecosystem. Also, considering that land-based wind turbines can also be installed close to residential areas, the entire system, especially the wing design, must be designed to reduce noise (Lamy, de Bruin, Azevedo, & Morgan, 2020). In this regard, caution should be exercised when deciding on the location of such wind power plants. For example, the establishment of these power plants in a location that will affect the migration routes of birds can seriously damage the ecosystem. As a result, the region desired to be established should be examined first, and then the design and material needs should be met according to the requirements of the region. In addition, the necessary permissions should be obtained for the wind power plants to be installed on land, obtaining such legal permissions can create problems.

3.2 *Offshore Wind Energy*

With the technological developments that have developed since the 1990s, efforts to adapt renewable energy sources to daily life, especially under the leadership of developed countries, have accelerated. Wind energy has become one of the important energy sources since these periods (Carotenuto et al., 2018). Undoubtedly, one of the most important developments in wind energy at that time was the idea of installing wind energy on the sea instead of land. The first offshore wind farm was established in Denmark, in Vindeby, off the coast of Lolland (Colmenar-Santos, Perera-Perez, Borge-Diez, & dePalacio-Rodríguez, 2016). There are many reasons why offshore wind turbines are preferred and spread rapidly, but the main factor is that much more energy can be obtained from the wind with the help of waves. Although the above sea wind energy can provide more efficient energy compared to the wind power plants on land, there are many factors affecting the offshore wind energy. These factors may provide advantages or disadvantages depending on the situation. The main characteristic of the winds that a surface wind power plant can receive is that they have higher speeds than land winds. While the roughness in the land part causes some of the wind intensity to disappear, the turbulence density of the wind flow is lower due to the low roughness on the sea. As a result, the turbines operate at their maximum capacities for a larger part of the time (Bento & Fontes, 2019).

However, while a gain is provided due to the efficiency of the wind, other factors can cause this gain to drop. The distance of the wind power plants to the land and the depth to be installed determine the cost of projects (Beainy, Maatouk, Moubayed, & Kaddah, 2016). These factors are basic and determine the transmission connection costs. Although the establishment of wind power plants, which are getting deeper and deeper with each passing day, has been achieved, this situation poses an important problem for the investors who will invest in offshore wind power plants as the depth and depth will increase, the required material and workforce will increase. Additionally, the transportation of the turbines causes a direct increase in investment cost due to its important effects such as the increase of the underwater cable distance to be laid from the sea to the ground for energy transmission, the increase of the transmission losses, the change of the transmission type according to the distance. In addition to these, issues such as military use, fishing, maritime traffic, and pipelines for the installation of offshore wind power plants can create some problems at the project stage.

3.3 *Onshore and Offshore Wind Energy Investments in Developing Countries*

There are some issues to be considered in the wind energy investments of the countries when choosing the location of the wind power plants. The European continent, which mostly includes developed countries, has increased its investments in renewable energy both with high environmental awareness and the Kyoto protocol they signed. However, the European continent, where wind energy plants are established in most of the continental regions, has both a limited land area and the surface area of the productive wind fields where wind energy plants on the land can be established is gradually decreasing. Although the efforts are made to increase the amount of energy produced from the same region by repowering today, the costs of these re-reinforcement works are high and do not serve much to create an efficient wind field at the desired rate. For this reason, the implementation of overseas WPPs with high installation costs has started for developed countries, which are already familiar with renewable energy, especially wind energy (Ladenburg, Hevia-Koch, Petrović, & Knapp, 2020). In addition, the main motivation in wind energy investments is the movement of the wind. In other words, in these investments, the wind must blow regularly in order to provide electricity continuously. Wind power, which is constantly unbalanced with climate changes in terrestrial areas, is more stable and at higher speed in the above sea regions.

However, it may be more difficult for developing countries to adapt the offshore wind farms. Developing countries have to invest in many sectors at the same time in order for their economies to reach the advanced level rapidly. In this case, the risks they will face will be higher compared to developed countries. Compared to power plants installed on land, wind energy investments on the sea are more complex projects that require more intensive engineering knowledge and many different specific products are used and supplied as raw materials. In addition, these projects have higher initial costs. In addition to all products purchased, charges incurred during the distribution of electricity produced as a result of wind energy from the sea point to the terrestrial regions constitute an additional cost. Considering that the initial cost is also high, the efficiency and profitability of the project can be negatively affected. Another problem concerns the operational costs of offshore wind farms. Since offshore systems are installed in the sea, an effective external protection application on the wind turbine surface is mandatory due to high humidity and salty environmental conditions. In addition, offshore wind energy projects are longer-term projects compared to power plants installed on land. Political, economic, and social problems, which are frequently seen, especially in developing countries, may lead to negative results of the project that has started. As a result, there is a risk that the countries with the sea will decrease their profitability in the wind energy investments.

Therefore, when a comparison is made, although onshore wind power plants are more efficient for developing countries in terms of cost, offshore wind power plants are more successful than land-based wind power plants in terms of efficiency and sustainability. For this reason, it is controversial whether wind energy investments will be on land or on the sea in developing countries. There are some strategies that investors should follow for wind energy investments that will be on land. Structuring in that region can be effective on the performance of wind energy investments. For example, if there are very high-rise buildings in an area, this may lead to the wind power plants in that area not getting enough wind. Therefore, the efficiency of the mentioned investments will decrease. As it can be understood from here, in order for wind energy investments to be successful, areas where construction is regular should be preferred and this situation should be clarified by laws. Accordingly, the legal system can affect wind energy projects. In developing countries, it is likely that there will be an insufficient or incomplete legal infrastructure, which will create anxiety for investors. Investors should carefully examine the legal infrastructure of the countries before starting the project, in order to ensure the permit of the place where the wind power plant will be established and to prevent possible reactions from the surrounding public (Diógenes, Claro, Rodrigues, & Loureiro, 2020).

As viewed from offshore wind plants, as can be seen clearly, as technology advances, the costs of offshore applications will decrease and become competitive with onshore. Considering that all renewable energy types have a long-term vision, it will be inevitable for developing countries to adopt offshore wind energy sooner or later. However, at this point, developing countries can prepare their infrastructure with some measures and carry wind energy production to the sea. In a livable world, priority is given to the use of wind energy resources in the production of energy, which is more than a necessity, to encourage the investments to be made in this regard, to give necessary importance to research and development, and most importantly, to obtain a difficult and expensive way with an advanced engineering work from wind energy. Studies for the transmission, distribution, storage, and use of the energy in the most effective and lossless way should be fully supported. Thus, it will be possible to determine whether the power plants to be installed in places with wind potential are an economic investment. At this point, it is necessary to encourage institutions and organizations that want to work on wind energy and use these systems. Small investors are often the ones that produce clean energy projects such as wind in the private sector. It is very difficult for such investors to access local and international capital markets for financing purposes. In cases where the financial sector cannot provide sufficient long-term and low-cost funds, the realization of renewable energy projects will be possible with the financial contributions of multinational institutions and foreign investors. In this case, importance should be given to providing project finance or loans for wind energy projects (Rogers, Ashtine, Koon, & Atherley-Ikechi, 2019).

In addition to this, in order to establish offshore wind fields in a healthy way, firstly, the wind energy potential, the grid conditions, and wind profile of these regions must be measured. Following these measurements, it will be possible to establish an efficient offshore wind power plant with suitable wind turbine designs. In offshore wind plant, it is useful to approach the subject with a SWOT analysis logic considering the amount of energy to be obtained, external costs, the advantage and disadvantage of the energy source that will replace the same power. To promote investment and innovation in offshore wind energy, policy makers need to focus not just on classic wind energy but on broader investment conditions and wide-ranging policies, from investment and competition to trade and financial markets in offshore environment. In addition, since offshore wind power plants contain high technology, it is very important for developing countries to train qualified personnel to minimize the costs of repair. This will only be possible with investments in education on this subject. Finally, the above-mentioned wind projects are less accepted by the public compared to their land buses. Therefore, raising public awareness on offshore wind energy will increase investments in this direction.

4 Conclusion and Discussion

In this study, it is aimed to propose strategy suggestions that are offered to investors to decide whether a possible wind farm investment will be on land or on sea. At this point, it is aimed to present an explanation for the location selection of wind energy investments, which have increased in parallel with wind energy consumption, which has developed greatly in recent years. In this context, developing countries, which are generally dependent on foreign energy and whose need for energy increases rapidly, are considered. The main purpose here is to determine whether it would be more advantageous to install wind power plants on the sea or on land and make recommendations to countries that want to ensure energy security.

There is a large energy deficit in developing countries, and this deficit can be closed by wind energy (He, 2016). However, the point to be considered when choosing a place at this point is the economic conditions of the country at that time and how open the public will be to this energy. It would be more economically beneficial for such countries that want to develop both the energy sector and other sectors at the same time, to choose onshore wind energy rather than offshore wind energy due to the high cost it incurs in both the establishment and the working process. On the other hand, countries that have increased their investments in offshore wind energy have the opportunity to receive wind energy more efficiently and without interruption.

For onshore wind energy projects, it is suggested that making a detailed research determining the country's legal infrastructure is so important because there are so many territory problems in wind energy plants since they require wide installation areas. On the other hand, considering that renewable energy investments are long-term investments, it makes more sense to get higher efficiency from these investments. This highlights offshore wind power plants. At this point, the proposed strategy is to reduce costs to a minimum by investing in the technology and people of developing countries. In this way, the problem of energy dependence, which is a common problem in many developing countries, can be prevented by providing low cost and high efficiency.

The main limitation of this study is that an analysis was not made. Therefore, in the future studies, by determining criteria sets on onshore and offshore wind energy, some analysis can be made. In addition to this, in this research the topic was examined from perspective of developing countries, so in the future works, new country groups can be taken into consideration. In addition to this, the study only contains wind energy. Thus, in upcoming studies, different renewable energy types can be taken into account and comparative analyzes can be made. It is thought that these studies can have an important contribution to the energy literature.

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Organizational Communication as an Effective Communication Strategy in Organizations and the Role of the Leader

Kürşad Zorlu and Fatma Korkmaz

Abstract In today's business world, organizational structures have become more complex with the effect of global, social, economic, and technological developments, and with the increasing need for division of labor and labor, all employees in organizations need to establish close relationships with each other and continue their activities in harmony. In this context, organizational communication has become a vital phenomenon for organizations to achieve organizational goals successfully. Leadership is considered the most important organizational variable for the effective management of the organizational communication process. The role and importance of leadership and leaders in the effective organizational communication process is an undeniable fact. Leaders play important roles in the effective management of organizational communication with their identity as a good communicator as well as many of their characteristics. In this study, it is aimed to examine the relationship between organizational communication and leadership and to reveal the interaction areas according to the basic dimensions of both concepts. First, the conceptual framework for organizational communication and leadership is presented in the study, and then the relational context is explained. Within the framework of the findings and evaluations revealed in the study, it is understood that leadership variables, which play a key role in the effective management of organizational communication and organizational communication, are complementary to each other, and the successful continuation of the communication process in organizations can be achieved through leader activity interaction.

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1 Introduction

In today's information age, the increase of globalization, the development of communication and information processing technologies have revealed changes and transformations in the field of organization and management, as in all areas of life. In the context of these developments, changes—the transition from the industrial society stage to the information society stage and the increase in specialization depending on this situation, etc. have affected individuals and societies as well as organizations (Koçel, 2013).

With the development of technology and communication networks, the increase in globalization has made organizations more complex and increased the division of labor, which has caused all units and employees in the organizations to be more interdependent. Organizational communication has become the heart of organizations in order for the management functions to function properly and to achieve the goals successfully by maintaining organizational continuity. The transfer of information to the necessary people and organizations at the right time is possible through organizational communication which acts as a blood circulation system in a way (Orpen, 1997). Organizations try to adapt to uncertain, competitive, and dynamic environmental conditions by establishing a strategy by the way of establishing a relationship with the external environment of the organization, transferring the information obtained from the external environment to the information processing centers within the organization, as well as efforts to cooperate within the organization and to unite toward a common purpose regarding production. The success of the activities regarding the harmony, consensus, and coordination within the organization, as well as the adaptation and information flow with the external environment of the organization, can be achieved by establishing an effective communication system in organizations (Özarallı, 1996).

The importance of organizational communication has increased on a par with growing and developing organizations, complex management structures, increased specialization, decentralization, rapid development of technology, and organizations being concerned with social problems (Demir & Demir, 2009). However, with the transition from the industrial society process to the information society process, it has been understood that the most important organizational capital is the human factor (Kılıç & Saygılı, 2019). The level of knowledge of individuals in organizations is considered the most important resource in gaining wealth on a global scale (Serter, 1997). Henry Ford also emphasized that the basic capital of the organization is the human factor with his statement, "*You can take my factories, you can demolish my buildings, but if you return my employees to me, I will set up this business exactly*." (Akıncı, 1998). If the human resources, which are the most basic requirements of organizations, are not sufficient, no matter how much physical and financial resources are, this situation does not matter. Because these resources that organizations have can only be processed and become valuable thanks to human resources. Effective use of human resources can only be achieved through effective organizational communication. Thanks to the communication activities developed effectively with both the internal and external environment of the organization, the capital qualified human resource can be gained, organizational recognition positively increases in the eyes of the target audience and market, and a positive organizational image can be created (Biber, 2004). Increasing the efficiency and productivity levels of the employees, ensuring that the management can easily convey the issues that it wants to convey to its employees, and establishing cooperation between departments can only be achieved with effective organizational communication techniques (Demir & Demir, 2009).

Studies on the relationship between organizations and humans emphasize the increasing importance of organizational communication. All employees, who carry out their activities with common purposes within the organizational structure, have to transmit their needs, ideas, goals, knowledge, and experience to each other. In this context, organizational communication is very important for all employees. In addition, thanks to the healthy functioning of organizational communication, information sharing, organizing activities, and making decisions effectively can be achieved (Ober, 2007). Organizational communication cannot be considered independently from organizational management, nor should an organization management independent from organizational communication be considered. The success of organizational communication is an extremely important source of strength for organizations (Treece & Kleen, 1998). Studies in the literature reveal that there are positive and high-level relationships between organizational communication and performance, job satisfaction, motivation, happiness, productivity, organizational commitment, and loyalty (Raile, 2005).

2 The Concept of Organizational Communication

Communication, which is expressed as the system that forms the basis of human relations and social life, contributes to the formation of an environment that can develop effective solutions for employees by ensuring that the organizational structure operates flawlessly. The development of communication in an original way within organizational structures should be considered by the administrators as a usable phenomenon in the process of creating organizational integrity (Gürgen, 1997). Today's organizations continue their activities in dynamic environmental conditions and this situation requires organizations to be managed with an open system understanding. Organizations managed with an open system approach are in constant interaction with their internal and external environments. In this interaction process, it is possible to manage organizations in accordance with their objectives and to operate basic management functions with successful communication (Tutar, 2016). Organizational communication which is defined as "A social process that enables the continuous exchange of information and ideas between the departments and elements within the organization and the organization and its environment or the establishment of necessary relations between the departments in order to ensure the functioning of the organization and to realize the aims of the organization" by Sabuncuoğlu and Tüz (1995) refers to making use of all means of communication for an effective and quality communication by evaluating the communication environments of organizations as a whole (Van Den Hooff & De Ridder, 2004).

Organizational communication is the set of activities that organizations carry out. The concept of organizational communication, which emphasizes the process beyond any result and makes important contributions to achieving organizational goals, points to the process of sharing information between managers and employees, who are actors of organizational communication, and making sense of this information (Shockley-Zalabak, 2015) and in addition to sharing information and opinions within the organizational structure, it also has an important place in creating a positive work environment for employees (Kalla, 2005). In other words, organizational communication is the creation of a process and system that will enable all units to work in harmony and coordination in a way that can achieve organizational goals and objectives (Akgöz & Sezgin, 2009). For this reason, organizational communication refers to the whole working system of the organization, from the harmony of the organization's employees to each other, the harmony between the management and the employees, and the harmony with the internal and external environment of the organization. In this context, organizational communication is a phenomenon that reflects the basic principles, characteristics, values, orientations, and organizational culture of the organization (Suh, Harrington, & Goodman, 2018).

Organizational communication has important contributions to organizations in many issues such as controlling the behavior of employees, increasing motivation, developing relationships in the work environment, adaptation, conflict management, negotiation, and bargaining skills (Spaho, 2012). Among the most important functions of communication within the organization are the functions of providing information, influencing, persuading, giving orders, and combining with education and training. Thanks to the information provision function of organizational communication, employees can be informed about organizational goals and policies, information about management, authority and responsibility areas of employees, task distribution, and technological developments in order to continue their work more effectively. In addition, it is aimed to influence the thoughts, attitudes, and behaviors of employees through organizational communication (Gürgen, 1997). An effective communication system to be established within the organization makes a very important contribution to the realization of the strategic plans of the organizations. Within the framework of the strategic planning of the organizations, the proactive, effective regulation of organizational communication and its effectiveness in terms of usability play an important role in the realization of organizational goals (Kuchi, 2006). According to Hampton (1977) referring to the importance of organizational communication, "*The role and importance of communication in organizations is the same whatever the role and importance of the blood circulation system in the human body*" (Koçel, 2013) and in terms of explaining its effect on organizational performance, Reinsch's (2001) statement stating that "*communication is as* *important for organizations as carbon is important to physical life*" (Paulraj, Lado, & Chen, 2008) emphasizes once again how important organizational communication is for organizations.

It is thought that it will be helpful to explain the benefits of organizational communication, which holds organizations together and is of vital importance for organizations, as follows. In this context, organizational communication (Bakan & Büyükbeşe, 2004):

- Provides managers with the opportunity to obtain the information they need in the decision-making process.
- Provides convenience for employees to understand and implement the decisions taken in accordance with their purpose.
- Enables the improvement of customer relations by increasing the organizational commitment levels of the employees.
- Contributes to increase the job satisfaction and motivation of the employees and thus the organizational performance level.
- Improves the employees' feelings of sharing and reinforces these feelings.
- Provides the formation and spread of an understanding that produces solutions to problems-disagreement, conflict, pressure, etc. arising from the business environment.
- Provides continuity to a stable working environment by ensuring that all activities within the organization are carried out in cooperation and harmony.
- Helps to reduce the resistance to change and speed up the change process by creating an atmosphere of trust in organizations.
- Provides the opportunity to reduce costs, increase profitability and efficiency in terms of reducing errors.

3 Organizational Communication Theories

In order to maintain organizational communication effectively and efficiently with regard to its importance and contributions to organizations, it is thought that it will be useful to explain the organizational communication theories developed in an attempt to shed light on this field by some researchers who are the leading names of the scientific world as follows:

Aberg's Organizational Communication Theory: Aberg (1990) points out that all forms of communication must be integrated in order for organizations to achieve their goals and objectives successfully. According to Aberg (1990), organizational communication has four basic functions including "supporting basic internal and external activities (regulation)," "organizing and product-based positioning (persuasion)," "informing internal and external target audiences (informing)," and socializing individuals as citizens of a good organization (integration). Aberg (1990) suggests that these four basic organizational communication functions should be integrated (Massie & Anderson, 2003). According to

Aberg (1990), the communication processes of organizations consist of various functions that are different from each other but complement each other. Since maintaining these functions independently of each other creates an obstacle in achieving the desired effect in the target audience, organizational communication should definitely be evaluated as a whole and should be carried out within the framework of a specific strategy and planning (Görkem, 2013).

Goodman's Organizational Communication Theory: Goodman's (1994) organizational communication theory consists of internal and external environmental factors that affect the organization completely. According to this theory, it is claimed that there is a strong connection in the organizational communication process that includes the management of the organization, employees, suppliers, customers, and individuals living in the environment where the organization operates. Goodman (1994) explains organizational communication theory as all the efforts made by an organization in order to perform organizational communication effectively and efficiently Goodman (1994). Goodman (1994) emphasizes that organizational communication should be evaluated in the context of organizational strategy, for reasons such as the fact that it includes concepts such as organizational philosophy, organizational culture and image that affect the organization completely, the necessity of being centrally directed and controlled, and pointing to a regulation and coordination (Ertekin, Ilgın, & Yengin, 2017).

Paul Argenti's Organizational Communication Theory: Argenti (1996) suggests that organizational communication is not limited to relationships only and that the organization's finance, marketing, and production functions are also related to organizational communication. According to Argenti (1996), organizational communication covers organizational image and identity studies, organizational advertising and marketing strategies, media relations, marketing communication, financial communication and agreements, social relations, investor relations, social responsibility projects, government relations, and crisis communication functions. These functions are not all of the sub-functions for which organizational communication is responsible, but only the most important ones of the activities carried out within the scope of organizational communication especially in large organizations (Argenti, 1996).

Alan Belesan's Organizational Communication Theory: Alan Belasen states that all departments operating in organizations are directly related to organizational communication and that each department uses different communication styles according to their own organizational culture, as well as organizational communication outputs can be evaluated in different ways in different departments. These differences sometimes cause ambiguities regarding the goal and communication strategies between the departments. For this reason, Belasen recommends that organizations determine communication functions suitable for the general organizational culture in a way that will not cause these ambiguities and eliminate the communication disorders experienced (Belasen, 2008). In this context, Alan Belasen approaches organizational communication in terms of trying to establish a balance between organizational values and goals that may be inconsistent with each other (Görkem, 2013).

Van Riel's Organizational Communication Theory: According to Van Riel, organizational communication is considered as a framework function in which communication experts can combine their own communication contributions on the basis of a general strategic framework jointly created. This framework should be formed in the axis of organizational strategy, organizational identity, and organizational image. Similar to other theories, it draws attention that organizational communication is an element that organizations cannot give up and that they must constantly add value in this theory. In this context, the communication representatives of all departments in organizations should come together to clearly identify common areas of action that can contribute to the realization of predetermined communication strategies in order to preserve the existing, reach the desired organizational identity, and improve the organizational image (Van Riel, 1992).

Joseph Cornelisse's Organizational Communication Theory: According to Cornelissen (2017), the need for structures, rules, procedures, and processes that will develop and improve common decision-making and practices in the organizational communication process naturally points to a unifying and integrating perspective. In Cornelissen's organizational communication theory, it is suggested that the creation of a clear, strong, and consistent organizational image for all stakeholders can be achieved through the coordination to be developed between communication experts working in all areas of the communication of organizations with both internal and external environment with such an integrated perspective. However, Cornelissen underlines that organizational communication is not a general term that includes all forms of communication in organizations and considers organizational communication as a management function that coordinates and controls the work in all communication areas separately (Görkem, 2013).

4 Types and Tools of Organizational Communication

When organizational communication is examined structurally, it is divided into two as formal and informal communication types. Formal communication is a type of communication that occurs within the framework of organizational rules, independent of the personality traits of the members of the organization, between statuses. Informal communication, on the other hand, is a type of communication between individuals, which occurs between informal groups formed between employees (Gürgen, 1997).

One of the formal communication dimensions in organizations is vertical communication. Vertical communication should be planned from the management to the employees, both from top to bottom and from bottom to top. Another of the formal communication dimensions is horizontal communication and this communication type is explained as the communication established between departments and employees at the same level. Cross-communication, another formal communication dimension, is a type of communication that occurs between employees in different departments and levels. In addition to the types of vertical, horizontal, and cross-communication that take place within the organization, it is also necessary to mention the external communication that the organizations aim to communicate with their external environment. This is because organizations, besides their customers, have to be in contact with many different people, institutions, and organizations, depending on the type of product they produce or the service they offer (Kocabaş, 2005).

Although organizational communication is usually carried out formally, from time to time, the way of providing fast information exchange can be preferred by overcoming the strict rules of formal communication in order to move things faster. Informal communication, which occurs as a result of accelerating work or informal communication groups within the organization, is a form of communication that is not organized by any authorized individual or management within the organization (Şimşek & Çelik, 2014). In informal communication, information is spread throughout the organization in the form of gossip or rumor. Informal communication occurs in cases where formal communication is insufficient and in natural groups that occur due to reasons such as employees' inability to satisfy this issue, employees being from the same environment and having similar characteristics (Budak & Budak, 2004). Although this type of communication sometimes provides benefits for organizational purposes by supporting formal communication, it can cause misunderstandings because the information obtained through this communication channel does not always reflect the truth, thus complicating formal communication and seriously damaging the effective organizational communication structure (Akıncı, 1998).

In order to achieve organizational goals easily, the communication established almost every moment must be realized in a way that organizational and individual interests remain in balance. It should also be determined how and by which means the regular and conscious communication within the organization will take place. Communication tools to be used in organizations should facilitate the use of information and not cause communication problems between departments. Communication tools accepted in terms of validity and effectiveness in organizations consist of verbal, written, and audio-visual communication tools (Sabuncuoğlu & Tüz, 1995).

Verbal tools include all kinds of communication tools that employees use through verbal communication. Verbal communication will take place face to face. It can also be realized through electronic communication tools—telephone, etc. However, tools such as meetings, presentations, vocational training programs, and orientation programs are within the scope of verbal communication tools. This type of communication is considered to be the most effective communication tool, as it provides the employees with the opportunity to use verbal and body language widely, due to the immediate delivery of feedback (Can, Aşan-Azizoğlu, & Miski-Aydın, 2015). *Written tools* are the means of communication provided through written documents between all units and employees in organizations. The advantage of written communication tools over other communication tools is that they provide the opportunity to record and ensure the continuity of the communication. However, it also has a disadvantage in that it does not allow employees to use body language. The most serious risk of this disadvantage is not understanding whether the transmitted message is perceived clearly and correctly by its recipient (Can et al., 2015). *Audio-visual tools,* on the other hand, consist of broadcasting tools such as radio and TV, printed materials such as newspapers and magazines, teleconferencing via the internet, e-mail, some digital social media tools, and various tools such as cinema, exhibition, and fair (Sabuncuoğlu & Gümüş, 2012).

Verbal, written, and audio-visual communication tools that enable the transmission of messages are essential for organizations to carry out their activities in a healthy way. Preferred communication tools should be capable of conveying the message in a complete and understandable way without changing its form and essence and attracting the attention of the target audience. At the same time, these tools should contribute to the faster transmission of the message, the increase of close relations between the employees, and better mutual agreement (Bahar, 2011).

5 Factors Hindering Organizational Communication

Various reasons that hinder communication can occur within the organization as well as between society and individuals. Communication barriers occurring within the organization can damage the organizational structure and cause problems in the continuation of the activities. These obstacles can arise from many different factors, from individual to organizational reasons, and they cause conflicts and failures in organizations by causing a lack of communication (Karaçor & Şahin, 2004).

Factors hindering organizational communication are divided into two as individual communication barriers arising from the individual and organizational communication barriers arising from the organizational environment. Individual barriers are examined at the level of micro barriers, and organizational barriers at the level of macro barriers (Yıldırım, 2001). Eren (2016) lists various factors that impede organizational communication as individual factors, linguistic difficulties, inability to listen, lack of clarity of expression, and insufficient feedback. According to Tutar (2009), organizational communication barriers consist of factors arising from the characteristics of the employees within the organization, organizational communication tools and channels, physical environment and distance, status and hierarchy differences. According to Sabuncuoğlu and Gümüş (2012), organizational communication barriers are classified as technical, psycho-social, and organizational barriers and disorders. It will be helpful to explain the main organizational communication barriers as follows:

Barriers arising from employee characteristics: Based on the fact that employees are the main actors of organizational communication, it is possible to assume that these communication activities between employees will be influenced by many different emotional, intellectual, and behavioral variables specific to them and these variables will be shaped according to their qualities. In this context, employees' personality traits, ways of upbringing, knowledge and perception levels, preferences and tendencies, attitudes and behaviors will shape and direct their communication in all communication activities in which they play a channel or receiver role (Can, 2002; Tutar, 2009).

Barriers arising from the tools and channels of organizational communication: It is very important to choose the appropriate channel and tool to ensure that the messages are conveyed completely and correctly in the communication process. Problems such as insufficient communication channels, carrying loads over difficult capacities, rapid developments in communication technologies, and the inability of organizations to adapt to these technologies on time are factors that prevent the communication process from being carried out effectively (Sabuncuoğlu & Gümüş, 2012).

Barriers arising from physical environment and distance: Another factor that hinders effective communication in organizations is the physical distance between employees and management. Especially in large organizations, because the management and employees' working environments are in separate places, face-to-face communication leaves its place to communication technologies such as telephone or mail. However, these communication technologies are not as effective as face-to-face communication (Sabuncuoğlu & Gümüş, 2012). If the physical environments of organizations are set up in a way to isolate employees socially from each other, cause them to be alone, or make it difficult to reach each other, this will limit organizational communication and cause the employees to be negatively affected and their performance to decrease (Tutar, 2009).

Barriers arising from differences in status and hierarchy: All employees in the organization have different levels of status. These differences in the status of employees within the framework of subordinate and superior relations in the organizational structure can sometimes prevent the flow of information, ideas, suggestions, and problems and cause problems such as filtering messages, changing or restricting their meaning (Sabuncuoğlu & Gümüş, 2012; Tutar, 2009).

6 Effective Management of the Organizational Communication Process and the Role of the Leader

Decisions and practices that determine the outcome of power struggles in different time zones and/or different geographies around the world can be associated with success or failures at the administrative level. The thinking system that shapes these decisions and practices is a leadership phenomenon from the past to the present. The concept of leadership, which has penetrated social life from the first periods of history until this time, is generally a mental and behavioral process that prioritizes the goals of directing, building, and leaving a mark (Zorlu, 2019). Especially, the transformation of the developments after the Industrial Revolution into the information age requires giving more meaning to leadership in both socio-economic and organizational fields (Glueck, 1980).

The communication phenomenon that develops in both management and leadership processes is considered as "effective communication" rather than simply a transference process. As a social entity, the coexistence of people and the resulting need to be managed has revealed people with leadership characteristics throughout history. Leading individuals who can influence large masses, besides their many different characteristics, most importantly, have good and effective communication skills. Leaders can influence the individuals around them with their knowledge, talents, intelligence, self-confidence, rhetoric, broad viewpoint, vision, and communication skills. In this context, it is very important to emphasize that an effective leader is a good listener and a good speaker, that is a good communicator. Leaders who listen to people and make an effort to understand them and have gained empathy have positive contributions to the process of social change and development (Gezgin & Yalçın, 2018).

Leaders are individuals who determine organizational goals and mobilize all employees in this direction, whether they are formally responsible for organizational management or not. From this point of view, leaders are transformative rather than behavior-oriented. Leaders' ability to transform the individuals around them requires their ability to be impressive. The success of an organization is only possible if the office manager is also an effective leader. These individuals who can be named as executive leaders and their leadership qualities play an extremely important role in establishing the organizational communication system and affecting the behaviors of the employees. This role positively affects the productivity of organizations and employees (Gürgen, 1997). In the process of effective management of organizational communication, leaders who develop solutions by understanding and listening to the employees and evaluating the facts and events by them will be able to analyze the problems, perceptions, and feelings of the employees, guide them, and thus, more accurate and healthy decisions can be made at the organizational level (Sabuncuoğlu & Gümüş, 2012).

Effective management of the organizational communication process is considered an important process in order to perform all management functions in an organizational structure. Organizations that have an effective organizational communication system can easily carry out their functions such as planning, carrying out activities, and ensuring the necessary coordination. Globalizing organizations aim to increase the sharing feelings of their employees by creating an effective communication system, to reduce conflicts and pressures in the business environment, and thus to carry out all organizational activities in stability, cooperation, and harmony (Karcıoğlu, Timuroğlu, & Çınar, 2009). If an effective communication system cannot be established within the organization, all employees of the organization try to continue their activities independently and disconnected from each other and this situation sometimes does not allow the realization of organizational goals, sometimes it may require longer time and more effort to achieve the goals (Eroğluer, 2011). In order for the organizational communication system to be useful, it is necessary that both communication channels are open, functional, and interactive, and that the managers who have leadership qualities should show a positive attitude and act with a sense of responsibility (Demirel, Seçkin, & Özçınar, 2011). In this context, it is considered that techniques frequently used and recommended by executive leaders for effective management of the communication process such as monitoring the result, regulating the flow of information, empathy, repetition, simplifying the language used, increasing communication channels, and increasing the use of communication technology and computers become widespread at all levels of the organizational structure (Gibson, Ivancevich, Donnelly, & Konopaske, 2011).

Based on all these, if organizations want to preserve their existence, maintain their continuity, grow and develop further, they must use communication skills and communication technologies, which are vital at the organizational level as well as at the individual level, in an appropriate and effective manner to achieve their goals. Managers and leaders who are the intermediaries of management and management who carry out the function of making decisions and putting these decisions into practice, should use these powers correctly and be able to process the information they receive correctly. Organizations can only maintain their existence and maintain their continuity in a competitive environment if they make the right strategic decisions. In this context, effective management of the organizational communication system should be ensured for all of these issues, and the skill of reaching qualified information, collecting, interpreting, and using this information in the decision-making process should be developed (Karcıoğlu & Kurt, 2009).

7 Conclusion

From past to present, many changes and transformations have been experienced at both social and organizational levels with the effect of the increase in globalization and the important technological developments. These changes and transformations have enabled the transition from the industrial society process to the information society process and it has been understood that the most important organizational capital is human resource. Social, economic, and technological developments experienced on a global scale have made organizational structures more complex, and the need for division of labor and workforce has increased, and this situation has led to the need for all employees to continue their activities in harmony by establishing close relations with each other within the organizational structure. In this context, organizational communication has become a vital fact for organizations in order to achieve organizational goals successfully and to maintain all fields of activity and management functions in a healthy way.

Organizational communication can be expressed as a systematic process that includes all relations, information sharing, and exchange of ideas, both within the organization and with the organization’s external environment in order to ensure the continuity of organizations, to continue their activities in a healthy way, to achieve goals and objectives successfully is evaluated as the whole of the activities they perform in harmony and it makes a very important contribution to the organizational performance and productivity increase. When examined in terms of structure, organizational communication consists of two types, formal and informal. Formal communication develops a formal organizational communication channel with horizontal, vertical, and cross-communication dimensions, while informal communication emerges in the way of gossip, rumors, etc. created by informal groups in organizations. In addition, organizational communication is carried out by using the most accepted verbal, written, and audio-visual communication tools in terms of validity and efficiency due to the necessity of working regularly, consciously, and systematically within the organization.

Many factors that hinder communication can be encountered in the communication process that occurs at the organizational level, as well as in the general communication process between individuals who make up the society. Factors preventing organizational communication can be classified as personal, psychosocial, technical, and structural in general, and occur at the micro level from an individual point of view, and at the macro level from an organizational point of view. Organizational communication barriers damage the organizational structure and cause problems in the realization of activities, cause an environment of conflict and pressure, and this situation causes organizations to fail, causing a decrease in organizational performance and productivity.

The organizational communication system must be meticulously established and managed effectively so that all activities and management functions carried out by organizations within the scope of their goals and objectives can function properly without being exposed to any barrier or adverse situation. The role and importance of leadership and leaders in the effective organizational communication process is an undeniable fact. Leaders play important roles in the effective management of organizational communication with their identities of being good communicators as well as many of their characteristics. In this context, leaders who can make in-depth perception analysis and situation assessment with their self-confidence, intelligence, knowledge, and skills make vitally important contributions to the effective organizational communication process by influencing and directing employees through using techniques such as developing empathy, monitoring the result, using a simpler language, organizing the flow of information correctly, activating communication channels and managing technology resources in a positive way. As a result, thanks to the effective management of the organizational communication process, employees' motivation, job satisfaction, organizational commitment, and job performance increase, organizational goals and objectives are easily achieved, thus providing organizational competitive advantage and organizational performance and productivity increase.

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The Role of Health Policies for the Strategic Investment Decisions of the International Companies

Yaşar Gökalp, Hasan Dinçer, and Serkan Eti

Abstract This study aims to evaluate the effects of health investments in the country on the decisions of foreign investors are examined. Within this framework, it has been examined whether foreign investments will increase if health investments are increased. In this context, E7 countries are included in the study. On the other hand, Kao and Pedroni panel cointegration analyzes are used in the analysis process of the study. The findings indicate that there is a two-way relationship between health expenditures and FDI. In this context, increasing health investments contribute to the increase of foreign investments in the country. In addition, states give more importance to health investments when foreign investments increase. Hence, it is recommended that countries should pay attention to health expenditures. In this context, the state should primarily invest in the health sector. Moreover, the state should also support private sector investors. It would be appropriate to take some measures regarding this issue. For example, a tax advantage can be provided to private sector investors who want to invest in healthcare. In addition, these investors can also be offered low-interest loans. This matter will provide a serious cost advantage to investors. In this way, it will be possible to increase health investments in the country. Hence, countries will be able to reach their social and economic development goals more easily.

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1 Introduction

The main goals of the countries are to provide development in the social and economic field. In this way, it will be possible to increase the quality of life of people living in the country. On the other hand, it is possible for this development to be sustainable, as the performance of companies will also be high. In this context, countries produce various policies in order to achieve these goals. However, achieving sustainable social and economic development is not an easy matter (Dinçer, Yuksel, and Adalı, 2018; Dinçer, Yüksel, and Şenel, 2018). In order for this to happen, many different factors must be taken into account at the same time. For example, both the country's economic growth and social activities that make people happy should be increased (Gründler & Potrafke, 2019).

Considering the issues mentioned above, one of the most important conditions of economic development is a strong economy of the country (Sergi, Popkova, Bogoviz, & Ragulina, 2019). In this framework, the economic fragility of the country should be reduced. In this context, it is important to increase investments in the country. Investments can be made by domestic investors, and foreign investors can also invest in the country (Eti, Kalkavan, Dinçer, & Yüksel, 2020). In order to ensure that foreign investors come to the country, some issues should be considered. For example, the effective legal system in the country and the high economic performance may affect these decisions (Wang, Ha, Kalkavan, Yüksel, & Dinçer, 2020).

The health system of the country can also affect the decisions of foreign investors. The efficiency of the health system is very important for the social and economic development of the country. If the health system in a country is successful, the quality of life of the citizens living in that country is high (Dinçer & Yuksel, 2019). The main reason for this is that these people can benefit from health services when they need them. Thus, there is an increase in the satisfaction of these people (Shi, Li, Wang, Dinçer, & Yüksel, 2019). Such an environment can also attract the attention of foreign investors. If the health system in the country is effective, this also gives confidence to foreign investors (Dinçer, Yüksel, Gökalp, & Eti, 2020; Eti, Gökalp, & Tosun, 2020). This will increase foreign investments in the country and thus the economic development of the country will be possible (Zhang et al., 2020).

In this study, the effects of health investments in the country on the decisions of foreign investors are examined. In other words, it has been examined whether foreign investments will increase if health investments are increased. In this framework, E7 countries are included in the study. On the other hand, Kao and Pedroni panel cointegration analyzes were used in the analysis process of the study. The analysis results to be obtained will guide both researchers and market makers. Taking these results into consideration, it will be possible to develop strategies to increase foreign investments in the country.

2 Theoretical Framework

Concepts such as knowledge, skills, health status, and education level that societies have and affect productivity refer to human capital. Human capital is seen as the source of long-term growth. Countries investing in human capital will improve their workforce capabilities and contribute to greater economic output. This will also mean higher income opportunities for individuals. One of the factors affecting the development levels of countries is foreign direct investments (FDI). FDI is an investment made by a company or a person by establishing or purchasing business assets in a foreign country. Thanks to FDI, investors gain significant influence outside their own country (Solomon, 2011). FDI, which is an integral element of globalization, is one of the leading factors that shape the world economy. FDIs are also important, especially for developing countries with insufficient financing. When deciding which country and which sector to invest, individuals or institutions that will make FDI take into account many factors such as economic situation, political stability, social factors, and health level (Xu & Liu, 2018).

According to the World Investment Report published by UNCTAD in UNCTAD, 1998, factors affecting FDI are specified under three main headings. These economic factors, political factors, and factors stemming from the investment climate. Factors arising from the investment environment include the image and structure of the country to be invested, investment incentives, social factors, and post-investment services. Political factors include the stability in the economic and political structure in the country to be invested, tax policies, international agreements, competition structure, privatization policies, and policies related to the functioning of the markets. It is possible to examine the economic factors affecting FDI under three subheadings in terms of investment strategies:

- For businesses whose investment strategies are oriented toward the market, factors such as market volume, exchange rate, interest rates, access to regional and global markets, customer, and market structure are important.
- Factors such as raw materials, labor costs, technological infrastructure, qualified workforce, and physical infrastructure are important for businesses whose investment strategies are resource oriented.
- Factors such as productivity, economies of scale, and resource costs are important for businesses whose investment strategies are oriented toward efficiency.

The details of the factors mentioned above are examined in more detail below (Aytekin, 2019).

Market Volume: The gross domestic product of the invested country is important at this point. Studies conducted, especially in developing countries have revealed that market volume is an important factor in attracting FDI.

Market Access: Advantageous access to markets thanks to the location of the country of investment is a factor that increases the attractiveness of FDI.

Labor Costs: One of the most important factors affecting FDI is wage. The low labor costs are an important factor that attracts investors.

Exchange Rates: Due to the international nature of investors, exchange rates are important in attracting FDI. Changes in exchange rates directly affect investors' profitability and investment preferences.

Political and Legal Structure: Political stability, legal structure, bribery and corruption situation, and bureaucratic procedures in the country of investment are evaluated within this scope.

Trade Deficits: It is a situation where the country to be decided to invest is desired to have a trade surplus. Because it is generally accepted that the economies of countries with no trade deficit have a healthy structure. Therefore, trade deficits are also important in attracting FDI.

Growth Rates: In order to attract FDI, it is important to have both stable growth rates and high economic growth. Because countries with stable and high economic growth can offer more advantageous investment environments to investors.

Taxes and Incentives: Especially corporate tax rates in the country of investment are an important factor affecting investment decisions. Tax incentives are also an important factor affecting investment decisions. Tax incentives can be used more effectively in economies with a strong structural environment.

R&D Expenditures: The share of R&D expenditures in GDP is one of the factors affecting the investment decision of the country to be invested, the importance it attaches to R&D activities.

One of the subcomponents of human capital is health. Countries must have healthy individuals in order to survive. Because healthy individuals contribute to the development of the country's economy by joining the workforce. For this reason, health is considered as one of the important production factors of growth. The health of the society is, in a sense, qualified human resources. Investments and expenditures to be made in the field of health are also important for qualified human resources. Poor healthcare infrastructure and staff in the country of investment may result in investors having to financially support healthcare plans for their employees. Low motivation of employees due to sick leave, high funeral expenses, and health problems, especially in developing countries, can increase investment costs. In addition, the lack of immunity to specific diseases is an obstacle for foreign direct investment. The good health of the employees lays the groundwork for a more efficient and productive work environment, thus becoming attractive for foreign direct investments. The COVID-19 pandemic, which we have experienced recently, has clearly revealed how liberal policies have collapsed and the state should contribute to spending. Good health of individuals is not only a good factor for the economy, but also increases workforce productivity, eliminates diseases, and allows investment in education by increasing the tendency to save. Therefore, having sufficient health expenditures will positively affect human health. Therefore, it will be an important factor for attracting FDI.

3 Literature Review

When the literature studies are examined, it is seen that there are many studies examining the relationship between health expenditures and economic development. When the main and current studies are examined, the effect of health expenditures on growth was investigated in the study conducted by Oni (2014). According to the results of the study, it shows that total health expenditures and labor productivity are important determinants of economic growth in Nigeria, while the life expectancy ratio has a negative effect on growth for the period covered by the study. In the study conducted by Khoshnevis Yazdi and Khanalizadeh (2017), the relationships between air pollution, economic growth, and health expenditures were examined. The study was conducted using ARDL analysis with data from MENA countries between 1995 and 2014. According to the results of the study, economic growth has statistically significant and positive effects on health expenditures. Zaidi and Saidi (2018) examined the relationship between environmental pollution, health expenditures, and economic growth in Sub-Saharan African countries. ARDL analysis was used in the study using annual data from Sub-Saharan African countries for the period 1990–2015. The VECM Granger causality test was used to examine the direction of causation. According to the results of the study, it was concluded that economic growth has a positive effect on health expenditures. It was also concluded that a 1% increase in GDP per capita would lead to a 0.332% increase in health expenditure. Halıcı-Tülüce, Doğan, and Dumrul (2016) concluded that private health expenditures have a negative effect on economic growth, while public health expenditures have both negative and statistically significant effects.

In the study conducted by Ogundipe and Lawal (2011), the relationship between Nigerian economy and health expenditures was examined. The study used data on life expectancy at birth, fertility rate, capital, and recurrent expenditures between 1985 and 2009. This study concludes that if the funds are spent rationally on the right channels, the effects of these expenditures on economic growth will be direct and significant. In the study conducted by Mehrara (2011), the relationship between health expenditures and economic growth was examined. The study, in which Iranian data between the years 1970–2007 were used, was conducted with ARDL analysis. According to the results of the study, it shows that while health expenditures are among the most important factors in reducing infant mortality, they do not make a significant marginal contribution to economic growth in Iran. Shave and Ağır examined the relationship between health spending and economic growth in OECD countries. As a result of the analysis, it has been found that in most OECD countries, there is a causal relationship between income and at least one of the health expenditure types handled.

Chaabouni, Zghidi, and Mbarek (2016) conducted a study to examine the relationship between carbon dioxide emissions, health expenditures, and economic growth. Data of 51 countries for the years 1995–2013 were included in the scope of the study. According to the results of the study, it is concluded that there is a bidirectional causality between health expenditures and economic growth. It has also been found that health plays an important role in economic growth and limits its impact on an increasing deterioration in environmental quality. Saraçoğlu and Songur (2017) researched to examine the relationship between health expenditures and economic growth for Eurasian countries. As a result, it is seen that there is a bidirectional causality between health expenditures and economic growth. In addition, as the increase in health expenditures improves the life span and quality of individuals, it also positively affects economic growth. Şen and Bingöl (2018) researched the relationship between health expenditures and economic growth. In this study, in which data for the years 2006–2017 are used, bidirectional causality between health expenditures and economic growth was determined. In addition, it was observed that health expenditures were affected by economic growth in all periods.

A study was conducted by Mehrara and Musai (2011) to examine the relationship between health expenditures and economic growth in Iran. According to a study using Iranian data from 1970 to 2008, it is concluded that there is a long-term relationship between these variables. The causality test results show that although health expenditures do not support the view that they support long-term economic growth, there is a strong unidirectional effect from GDP to health expenditures. Atilgan, Kilic, and Ertugrul (2017) examined the relationship between economic growth and health expenditures. For the period 1975–2013, bound test approach, autoregressive distributed delay approach (ARDL) and Kalman filter modeling were used. The results of the study show that a 1% increase in per capita health expenditure will lead to an increase of 0.434% in gross domestic product per capita. Saraçoğlu and Songur (2017) analyzed the relationship between health spending and economic growth for Eurasian countries. As a result, it has been observed that there is a bidirectional causality between health expenditures and economic growth. In addition, as the increase in health expenditures increases the life expectancy and quality of individuals, it also has a positive effect on economic growth.

However, studies examining the relationship between health expenditures and FDI are very limited in the literature. However, many empirical studies have shown that health is a part of human capital. Therefore, it is accepted as an important factor driving FDI alongside health, education, workforce, and R&D expenditures (Ingram & Silverman, 2002). In most of the studies examining the relationship between health and foreign direct investment in the literature, health is considered only as the life expectancy at birth. One of the original aspects of our study is that health considers not only life expectancy at birth, but all expenses incurred. Globerman and Shapiro (2002) examined the positive impact of human capital on FDI in developed and developing countries. In the study, human infrastructure is measured with the Human Development Index (HDI), a composite index created by the United Nations. Although the authors find that the HDI and all HDI sub-indices (GDP per capita; education and life expectancy) have a positive effect on FDI, this effect is lower in developing and transition economies. Alsan, Bloom, and Canning (2006) stated that higher labor productivity is one of the mechanisms that can positively affect FDI. One of the important factors affecting high workforce productivity is health. In other words, poor health infrastructure and personnel in the country of investment may cause investors to financially support a healthcare plan for their local staff. Also, the fear of staff getting sick is a barrier to FDI, as there is no immune resistance to local specific diseases.

The idea that health can affect the investment decisions of multinational companies has not been fully explored in the literature. The few studies suggesting a positive relationship between health and FDI focus solely on life expectancy (Giammanco & Gitto, 2019). Gauselmann, Knell, and Stephan (2011) investigate the role of different national institutional environments in attracting FDI in 28 member states of the European Union. According to the results of the study, the relationship between FDI and explanatory variables of health expenditure is always important. In the study conducted by Talukdar and Parvez (2017), the effect of population health and education on FDI entries was investigated by applying the panel data analysis of 46 developing countries in the 1996–2011 period. It has been concluded that FDI inflows are heavily affected by population health in developing countries. In the study, it is stated that increasing life expectancy by one year increases gross FDI inflows by about 7%.

Azemar and Desbordes (2009) conducted a study to examine the relationship between health and FDI for 70 developing countries using the 1985–2004 panel data. According to the results of the study, it is stated that when epidemics such as HIV and malaria are prevented in Sub-Saharan African countries, FDI entries will increase by one third. Also, Shahid, Siddique, and Liaqat (2019) conducted a study examining the relationship between health, FDI, and income. In the study considering health and life expectancy at birth, a positive relationship was found between FDI and health. Shahbaz, Loganathan, Mujahid, Ali, and Nawaz (2016) conducted a study to investigate the effect of FDI on life expectancy. In the study performed by applying VECM Granger and ARDL model, it was concluded that there is a long-term relationship between variables. Herzer and Nunnenkamp (2012) examined the relationship between health and FDI. The results show a significant negative link between FDI and health. Golkhandan (2017) examined the relationship between FDI and health. In the study covering the years 1995–2014, health was specified by infant mortality rate. According to the results of the study, it is stated that a 1% increase in FDI will decrease infant mortality by 0.07%. Magombeyi and Odhiambo (2017) conducted a study to examine poverty reduction through FDI. In this study, poverty was determined by infant mortality, life expectancy, and household consumption expenditures. The study using data covering the years 1980–2014 in Tanzania showed that FDI has a short-term positive effect on poverty reduction.

4 Methodology

4.1 Pedroni Panel Cointegration Analysis

Cointegration methods are used in econometrics to examine the long-term relationship between two variables. In the Pedroni panel cointegration method, there are a total of 7 different tests, 4 in-group, and 3 out-of-group (Yüksel, Dinçer, & Uluer, 2020). The over-testing is a strength of this method. Looking at the probability values of these 7 tests calculated, it can be said that there is a cointegration between the two variables, that is, the existence of a long-term relationship, if at least 4 of them are less than 0.05 (Dinçer, Yüksel, & Canbolat, 2019; Ersin & Baş, 2019).

4.2 Kao Panel Cointegration Analysis

Kao cointegration analysis, like the Pedroni cointegration method, is an econometric method that examines the long relationship between variables. Kao method performs panel inter-series cointegration analysis using Dickey–Fuller and ADF test structure (Yüksel, Dinçer, Karakuş, & Ubay, 2020). Unlike the Pedroni cointegration, one probability value is considered in the Kao method. If this value is less than 0.05, it is interpreted that there is a cointegration between the two variables. In other words, it is said that there is a long-term relationship between these two variables (Ersin, 2020; Kara & Ersin, 2020).

5 Analysis Results

In this study, annual health expenditures and foreign direct investment data of E7 countries for the years 1999–2019 were taken into consideration. E7 countries (Brazil, China, India, Indonesia, Mexico, Russia, and Turkey) are the countries with the largest emerging economies. In the analysis section, two different analyzes are made to see the effect of health expenditures on foreign direct investments. As the health expenditure variable, the ratio of all health expenditures to GDP is used. In addition, the ratio of foreign direct investments to GDP was used similarly. The data for these variables are taken from the website of the World Bank. Panel cointegration model is used to understand whether there is a long-term relationship between health expenditures and foreign direct investment. In this context, a panel unit root test is performed to see whether the variables are stationary or not. Details of the Im, Pesaran, and Shin W-stat panel unit root test are given in Table 1.

According to the results in Table 1, while the significance level of the stagnation test at the level of the foreign direct investor variable is less than 0.05, the significance level of the health expenditure variable is greater than 0.05. This situation shows that health expenditures have a unit root. Therefore, the first difference of this

Table 1 Im, Pesaran, and Shin W-stat panel unit root test results

Variables	Probability (level)	Probability (first difference)
FDI	0.0353	–
Health expenditures	0.2483	0.0000

Table 2 Pedroni and Kao panel cointegration analysis results

Relationship	Test	Statistics	Probability values
Health expenditure affects FDI	Panel v-Statistic	1.344.800	0.0893
	Panel rho-Statistic	−6.428.317	0.0000
	Panel PP-Statistic	−9.398.319	0.0000
	Panel ADF-Statistic	−8.488.599	0.0000
	Group rho-Statistic	−4.968.155	0.0000
	Group PP-Statistic	−1.262.276	0.0000
	Group ADF-Statistic	−9.289.212	0.0000
	KAO	−7.599.592	0.0000
	Residual variance	0.137557	
	HAC variance	0.046398	
FDI affects health expenditure	Panel v-Statistic	−0.036902	0.5147
	Panel rho-Statistic	−1.103.995	0.1348
	Panel PP-Statistic	−2.359.530	0.0091
	Panel ADF-Statistic	−2.391.520	0.0084
	Group rho-Statistic	−0.173128	0.4313
	Group PP-Statistic	−1.877.371	0.0302
	Group ADF-Statistic	−1.783.409	0.0373
	KAO	−2.582.714	0.0049
	Residual variance	0.739662	
	HAC variance	0.405059	

variable is taken into account and it is seen that the new significance value is less than 0.05. It has been determined that the health expenditure variable has become stable at the first awareness. Considering the results of these operations, it is concluded that the panel cointegration analysis meets the prerequisite. After the stationary analysis, Pedroni and Kao panel cointegration tests were conducted to determine the relationship between these variables. Detailed information about these tests is given in Table 2.

When Table 2 is examined, 6 of the 7 Pedroni tests related to the relationship between health and FDI are below 0.05. The significance level of Kao, which is the other cointegration test between the two variables, is below 0.05. Therefore, it was found that "no cointegration" hypothesis is rejected. In other words, it is seen that there is a long-term relationship between total health expenditure and foreign direct investment for these countries. Moreover, 4 of 7 Pedroni tests belonging to the relationship between FDI and health are below 0.05. The significance level of Kao, which is the other cointegration test between the two variables, is below 0.05. Similarly, the H0: "no cointegration" hypothesis established between these two variables was rejected. In other words, it is seen that there is a long-term relationship between total health expenditures and foreign direct investments for these countries. Panel regression analysis was applied to determine the direction of the relationship between these two variables. The coefficient at the end of the analysis was determined as 0.240844. Since this value is greater than 0, it can be said that there is a positive relationship between health and foreign direct investments.

6 Conclusion

One of the most important goals of countries is to ensure social and economic development. The main reason for this is that every country wants to improve the life quality of its citizens. In this context, many different factors need to be taken into account at the same time. In this framework, attention should be paid to issues such as economic growth, improving the legal system, and increasing the quality of education. The quality of the healthcare system also contributes to the economic development of the country. The good health system in the country is one of the factors that attract foreign investors. The reason for this is that when the health system in the country is better, this issue gives confidence to foreign investors. In this study, the relationship between foreign investments and health investments is analyzed. In this framework, E7 countries are included in the study. On the other hand, Pedroni and Kao cointegration methods were taken into account in the analysis process of the related study. According to the analysis results, there is a two-way relationship between health expenditures and FDI. In this context, increasing health investments contribute to the increase of foreign investments in the country. In addition, states give more importance to health investments when foreign investments increase.

Considering these issues, it is understood that countries should pay attention to health expenditures. In this context, the state should primarily invest in the health sector. In addition to the aforementioned, the state should also support private sector investors. It would be appropriate to take some measures regarding this issue. For example, a tax advantage can be provided to private sector investors who want to invest in healthcare. In addition, these investors can also be offered low-interest loans. This matter will provide a serious cost advantage to investors. In this way, it will be possible to increase health investments in the country.

Thanks to the increasing health investments, it will be easier to attract foreign investors. As a result, foreign investments may increase. This situation has multiple benefits for the country's economy. Thanks to the new investments that will increase, the economy of the country will be able to develop. In addition, thanks to the new investments to be made, new business opportunities will arise in the country. This will help reduce the unemployment rate. Considering these issues, it is of vital importance to increase foreign investments in the countries. In this context, it will be possible to increase these investments even more by investing in the health sector. In this way, countries will be able to reach their social and economic development goals more easily.

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A Rapid Implementation of Remote Work as a Strategy in Response to COVID-19: An Examination in Terms of Work-Life Balance

Ümit Deniz İlhan

Abstract Since early 2020, by considering the widespread consequences of the COVID-19 pandemic, one of the initial measures taken to ensure the flow of working life has been the closure of workplaces and the implementation of remote work. In fact, remote work, which has not been accepted as a strategic managerial practice although it has been discussed for many years, has thus become the center of attention in working life. This study, in which a theoretical research method was adopted, aims to examine this rapid implementation of remote work as a strategy in response to COVID-19 in terms of work-life balance. In this framework, first, remote work, and work-life balance were explained, respectively. Afterward, remote work implemented in Turkey as a response to COVID-19 was detailed by emphasizing work-life balance. The study concludes that remote work, which has become one of the main strategic managerial practices of organizations during COVID-19, maybe an opportunity to contribute to the establishment of work-life balance within the legal and practical procedures and principles to be developed.

1 Introduction

COVID-19, which was declared as a pandemic by the World Health Organization (WHO) on March 11, 2020, and was first seen on the same day by detection of the first positive cases in Turkey (Turkish Ministry of Health, 2020), has brought about radical changes in almost every aspect of life (Shellhaas, 2020). Indeed, epidemics have profoundly affected human history and changed the flow of the usual life. By considering the course of the previous epidemics, it is a fact that these changes will have consequences which (1) are priorities in the short-term, and (2) are likely to be permanent in the long-term (Singh & Singh, 2020).

Just after being declared as a pandemic, the initial response to COVID-19 at the global level was providing social isolation between people to slow down the rate of

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spread of the virus (ILO, 2020a). Such a response on the working life has reflected that organizations have to abandon many practices within the framework of the priority of taking care of the health and safety of employees while managing their workflow and work continuity. Therefore, there has been a rapid shift to remote work at specific workforce segments (Bartik, Cullen, Glaeser, Luca, & Stanton, 2020). It is commonly thought that the implementation of remote work, which has increased after the COVID-19 pandemic took place, will continue to be practiced at a high level even after the pandemic (Goldsmith-Pinkham & Sojourner, 2020).

Actually, remote work is one of the flexible working structures that have frequently taken place in the agenda of organizations in recent years, mainly in line with the opportunities offered by technological progress, and especially today's digital technologies. This new economic paradigm shift led by technological progress brings about some discussions on several fields even from financial reporting (Ertuğrul, 2020) to flexible working structures which has not been appropriately and practically responded to by almost all stakeholders all around the world (DeMarie & Hitt, 2000). As a matter of fact, although the Turkish Labor Law (Turkish Republic Official Gazette, 10.06.2003, Number: 25134) which is revised in 2016, defines all procedures and principles regarding remote work, the legislation regarding flexible working structures have not yet been fully regulated as of October 2020. Such an environment of legal uncertainty makes the practice of flexible working structures vulnerable to abuse (Koç, 2016).

On the other hand, remote work is a valuable opportunity as it creates a wide area of control over working life and enables the establishment of work-life balance (Kalajärv, 2019), which is frequently emphasized today in terms of managing both work and nonwork activities and roles. However, the legal gap regarding the principles and procedures to be considered in practice overshadows this opportunity. Besides, the practical inexperience of management further expands the scope of this shadow (Turkish Ministry of Family, Labor and Social Services, 2015).

In this context, adopting a theoretical research method and focusing on Turkey, the rapid implementation of remote work in response to COVID-19 was aimed to be examined in terms of work-life balance. Clarifying the subject in current conditions of the pandemic and offering suggestions regarding the legal and practical procedures and principles to be developed is thought to contribute to guiding both researchers and practitioners.

The study is organized as follows. In Sect. 2, remote work was detailed. Work-life balance was summarized in the following section. In Sect. 4, remote work implemented as a response to COVID-19 was examined by emphasizing work-life balance. In the last section, final concluding remarks were stated and as well as main contributions and suggestions.

2 Remote Work

Remote work labelled also as "telework," "work at home," "home-work," and "home-based work," is a phenomenon that in general points out working from a distance and/or working at home. In fact, although there are some nuances between these concepts, they are closely related and to some extent overlap (ILO, 2020b). Currently, statistical standards defining these different flexible working structures are lacking, and countries use different and sometimes overlapping definitions. It is even seen that these concepts are often used interchangeably (Bailey & Kurland, 2002). To give a few examples, ILO (1996) defines in Home Work Convention No. 177 as "*Work carried out by a person to be referred to as a homeworker (i) in his or her home or in other premises of his or her choice, other than the workplace of the employer (ii) for remuneration, (iii) which results in a product or service as specified by the employer, irrespective of who provides the equipment, materials or other inputs used.*" In the Framework Agreement on Telework, which is the first agreement to be implemented by the social partners at a national level, the European Commission (2002) defines the concept as "*a form of organizing and/or performing work, using information technology, in the context of an employment contract/relationship, where work, which could also be performed at the employers' premises, is carried out away from those premises regularly.*" Turkey, though not a party to the arrangements made in this agreement took into consideration both of these contracts. In this regard, Turkish Labor Law (Turkish Republic Official Gazette, 10.06.2003, Number: 25134), revised in 2016 defines as "*a written business relationship based on the principle that the employee fulfils his/her job at home or outside the workplace with technological communication tools within the scope of the work organization created by the employer.*" According to this definition in the Turkish Labor Law, remote work includes both working from home in the traditional sense, where technological tools are not used, and telework, where the use of technological tools is intense. By considering these definitions, in this study, the definition of remote work was offered as carrying out the work fully or partially on an alternative worksite outside the default workplace using technological tools.

Such flexible working structures are not a new phenomenon. Changing trends in the dynamic competitive structure of working life have changed the existing working structures and caused the emergence of new ones (Costa et al., 2004). Especially since the mid-1980s, globalization and accelerated technological developments have affected the working life in the whole world causing the emergence of new approaches in employment in parallel with the structural changes related to work and its organization (Lewis, Brannen, & Nilsen, 2009). Such changes have led to flexible working structures to be adapted to the Turkish Labor Law as well. Remote work, part-time work, on-call work, loan employment, job sharing model, fixed-term service contract, and sub-employer practice are just some examples of this adaption.

As it is understood, while traditionally labor was performed by an employer at a particular workplace, today it is performed in many different ways. In this case, it is obvious that paid work is no longer limited to certain hours carried out at a particular workplace, and that traditional workplaces have been replaced by workplaces created by the internet and other digital technologies (Messenger & Gschwind, 2016). So that, flexible working structures in general, and remote work that stands out in this context will continue to exist in today's working life as it emerges as a way to adapt to changing demands with changing conditions by aiming to use human capital in the best way (Harpaz, 2002). Therefore, thanks to advances in information and communication technologies (ICTs) that support and enable remote work, more organizations will possibly implement it as a strategy to some extent soon (Shin, El Sawy, Liu-Sheng, & Higa, 2009).

The relevant literature has shown that working remotely, on behalf of both the employee and the employer, has several positive and negative consequences. Basically, its positive consequences are demonstrated as follows: Improvement in employee performance, reduction in home-work-home travel costs, saving in time and organizational resources (e.g., Molino et al., 2020); higher employee engagement (e.g., Prasad, Mangipudi, Vaidya, & Muralidhar, 2020), higher job satisfaction (e.g., Wheatley, 2017), lower work stress (e.g., Staples, 2001), improved employee productivity (e.g., Felstead & Henseke, 2017), better quality in work-life balance (e.g., Kalajärv, 2019), and organizational commitment (e.g., Chen & Fulmer, 2018). However, some other studies point out that remote work has negative effects on individual and organizational performance by reducing employee interaction, information sharing, and team collaboration (e.g., Allen, Golden, & Shockley, 2015). Remote work is also associated with employee retention and it is claimed that there is not always a positive relationship (e.g., Choi, 2018). Besides, some research results also reveal that remote work leads to increased family and job demands as a result of the overlap of more than one role (e.g., Molino et al., 2020). Another issue that several research results put forward about the negative consequences of remote work is symptoms related to technostress, such as anxiety, tension, mental fatigue, physical fatigue, lack of concentration, and insomnia (e.g., Arnetz & Wiholm, 1997) which will, in turn, result in reduced productivity, job satisfaction, and organizational commitment (e.g., Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008). Last, increasing information technology costs and digital security problems are listed to be other negative consequences of remote work (e.g., Molino et al., 2020).

3 Work-Life Balance

Although there is still a debate in the literature, there is no agreed definition of work-life balance. Even so, more common definitions of work-life balance have been made with an emphasis on several conceptualizations such as (1) equity across multiple roles, (2) satisfaction between multiple roles, (3) fulfillment of role salience between multiple roles, and (4) perceived control between multiple roles (Kalliath & Brough, 2008). In this regard, work-life balance is defined respectively as "*balancing time, involvement, and satisfaction*" (Greenhaus, Collins, & Shaw, 2003), "*achieving satisfying experiences in all life domains*" (Kirchmeyer, 2000), "*meeting one's expectations about work and family roles*" (Eby, Casper, Lockwood, Bordeaux, & Brinley, 2005), and "*having a measure of control over when, where and how to work*" (Fleetwood, 2007). Considering such defining criteria, in this study, the definition was offered as the perception that work and nonwork activities are in harmony with each other and encourage the development of the individual by considering current life priorities.

Contexts that shape the meanings of work-life balance can be said to be global, national, organizational, and temporal (Lewis & Beauregard, 2018). In the global context, it is argued that the understanding of work-life balance is affected by the spread of neoliberal values that prioritize profit over personal life (Fleetwood, 2007). This view is also influenced by the International Labor Organization (ILO) and European Union (EU) directives, which are increasingly using the terminology of work-life balance to popularize family-friendly discourses (Lewis & Beauregard, 2018). Next, national context is often considered in terms of structural differences such as public policy support, laws, and cultural factors (e.g., values and norms) (Ollier-Malaterre, Valcour, den Dulk, & Kossek, 2013). For example, as for the latter, it is claimed that countries that are more sensitive to gender equality are more likely to implement policies to support working families than those who are less sensitive (Brandth & Kvande, 2015). In the organizational context, it is argued that work-life balance can vary within and between the organization, thus, the employees may perceive the work-life balance differently (Mescher, Benschop, & Doorewaard, 2010). As an example, Herman and Lewis (2012) observed that the 4-day working weeks, offered as a form of work-life balance support at the French headquarters of two multinational companies in the same sector were perceived as a form of flexibility for working mothers in one of the companies, and in the other, they were perceived more neutral in terms of gender and as an offer to the benefit of both men and women. Finally, in the temporal context, it is emphasized that the meaning of work-life balance may change over time in response to certain events in particular locations (Fleetwood, 2007). To give an example, after the 2008 global recession, when there were tight government cuts in public finances, flexible work arrangements were made to provide mutual benefit to employees and employers, and the work-life balance provided by these arrangements was interpreted as an organizational tool to save money (Lewis, Anderson, Lyonette, Payne, & Wood, 2016).

Despite this diversity in conceptualization and context that shape the meaning of work-life balance, a growing literature in many disciplines defines the concept as a state of harmony between work and nonwork activities (e.g., Campbell-Clark, 2000), and the determinant of employees' well-being (e.g., Jones, Burke, & Westman, 2013). Moreover, a large body of literature studying work-life balance finds it to be related to work outcomes such as increased work satisfaction, increased organizational commitment (Amstad, Meier, Fasel, Elfering, & Semmer, 2011), and decreased turnover intention (Michel, Mitchelson, Kotrba, LeBreton, & Baltes, 2009). Thus, it is obvious that work-life balance is not only important for the well-being of the employees, it is also a precursor to several positive organizational outcomes.

The reason that more emphasis has been given to the work-life balance, especially in the last two decades is the fact that the line between a person's work life and nonwork life has become increasingly blurred (Kinnunen, Rantanen, Mauno, & Peeters, 2014). This is largely due to the advances in ICTs and changes in family roles as a result of increases in women's labor force participation. Actually, advances in ICTs, on the one hand, facilitate the performance of work and provide individuals with more free time, on the other hand, they put pressure on individuals to spend more time for work, as they make it possible to work anytime and anywhere (Fleetwood, 2007). As for the increase in women's labor force participation, it is more commonly claimed that work-life balance was not an important problematic issue until the end of the twentieth century when women were more likely to manage household chores while men did their normal work. However, as time goes on, with women entering the working life in large numbers, work-life balance has become a problematic issue both for women and men (Crompton, 2001).

4 Remote Work as a Response to COVID-19

COVID-19, an infectious disease caused by a newly discovered Coronavirus known as SARS Coronavirus-2 (SARS-CoV-2), was declared as a pandemic by the WHO (2020) on March 11. The first detection of positive cases in Turkey was also found on the same date (Turkish Ministry of Health, 2020). Following this declaration, since the protective vaccine has not yet been developed and there is no agreed treatment method, governments have primarily instructed employers and self-employed workers in many industries to close their businesses and work from home to prevent the spread of the virus. It is estimated that around 81% of the worldwide workforce is affected by the full or partial closure of the workplaces (Savi'c, 2020). Thus, a rapid shift to remote work has been experienced globally almost in all sectors and businesses where working conditions are possible (Goldsmith-Pinkham & Sojourner, 2020).

In parallel with the whole world, in Turkey, with workplace closures, remote work has been implemented in both public and private sectors as well (Ateş, 2020). In fact, COVID-19 is a process that has not initiated the trend of working remotely but has brought it to the fore. Before this pandemic period, remote work has already been implemented in several countries around the world at a certain level. However, considering the negative consequences mentioned above, it has been approached with caution by most organizations (Tuna & Türkmendağ, 2020). Despite all this, with the pandemic period we are in, remote work has become a life-saving alternative managerial strategy for organizations (Akça & Küçükoğlu, 2020). As we all have personally experienced, the COVID-19 pandemic has dramatically led to disruptions in many areas, and a sudden change in the way work is conducted with a sharp but uneven increase in remote work (Beland, Abel, & Taylor, 2020). In this period, many sectors have started to make remote work a part of daily working life, rather than seeing it as a temporary solution against the spread of the virus, which has not found enough place in practice even though it has been on the agenda in recent years. Remote work, which has become widespread during this pandemic, is expected to maintain high practice levels even after this emergency as well (Bartik et al., 2020).

Besides being an alternative strategy in this crisis period, the rapid shift to remote work has revealed several problem areas all over the world. At this point, it should be admitted that remote work, which has become a necessity today, has brought certain problem areas to the surface once again. By considering Turkey, for example, Tuna and Türkmendağ (2020) identify the perception of working hours as one of the most important problem areas. As a result of the research conducted on a sample of 58 white-collar employees and managers working in several different sectors, they determined that some workplaces have tried to comply with usual working hours, but many have misinterpreted flexibility and spread the working time throughout the day. The researchers also determined that the number of meetings and the workload has been increased with the concern that the work to be done will be delayed and the employees will neglect the work. Other researchers Akça and Küçükoğlu (2020) draw attention to the lack of ergonomic working conditions in the home environment in this period as another important problem area. Moreover, according to data collected by KPMG (2020) from 102 professionals, 45% of which are senior executives, the lack of a culture of remote work leads to a decrease in the work discipline of the employees due to the comfort they experience at home. Also, according to the research findings carried out by Güneş and Yıldız (2020) through 388 participants, another problem area of remote work is determined as the lack of a work environment to socialize due to working alone. Besides, reporting the results of the surveys of 334 participants from 17 different cities across Turkey, Deloitte (2020) determines the lack of management skills to use the technology required to manage the employees as one of the problem areas that comes to the fore during this period. It is also underlined that the increasing number of remote workers makes this problem even more complex.

In the focus of this study, it would be correct to conclude that all these hazards experienced during the COVID-19 period have negative effects on work-life balance since they are all linked to one another in a highly dynamic way (Popovici & Popovici, 2020). Indeed, increased workload, lack of ergonomic working conditions in the home environment, lack of a culture of remote work, lack of a work environment to socialize, and lack of management skills to use the technology required are in many cases directly, and in some cases indirectly related to work-life balance (Brough, Timms, Chan, Hawkes, & Rasmussen, 2020). Besides these, the closure of the workplaces also means that day care centers, schools, and universities have closed their doors and education has continued in homes. This has come with many employees trying to adapt to remote work full time while also trying to adapt to being at home 24/7 with all family members (Akça & Küçükoğlu, 2020; KPMG, 2020). In addition to managing the increased burden arising from the implementation of remote work, under such conditions, many parents have had to balance work commitments with increased demands, including supervising children's learning and spare time. This has been more demanding for women, especially because of the dual roles they play. It is already well known that before COVID-19, women had more problems than men in maintaining work-life balance (Chung & van der Horst, 2018). Finally, it is worth noting that during this period, all family members who mostly had to be together 24/7 probably had to share internet access, IT equipment such as laptops, tablets, printers, and desktop space to work, which posed an obstacle to maintaining work-life balance as well (Tuna & Türkmendağ, 2020).

5 Conclusion

In this study, in which the rapid implementation of remote work as a strategy in response to COVID-19 was examined in terms of work-life balance, it is seen that Turkey is not prepared for the legal and practical procedures and principles required for working remotely. The Turkish Labor Law (Turkish Republic Official Gazette, 10.06.2003, Number: 25134), which is revised in 2016, enables the employee and the employer to determine their working conditions according to their own needs with several regulations. Although such regulations are made with the Law to increase the flexibility of labor markets, it is not possible to say that the legislation regarding flexible working structures is fully regulated and widespread in practice. Thus, the regulations are not sufficiently known by the practitioners and are mostly applied incorrectly (Koç, 2016). Therefore, in this period, remote work could not go beyond being a temporary measure to protect against the health-threatening effects of COVID-19. Even remote work could not be carried out with the true nature of the concept. For this reason, the positive consequences which have been discussed in the literature for many years were not experienced during this pandemic period. However, the success of a legislation depends on whether it includes provisions appropriate to the country's conditions, and their correct implementation. So, the implementation of a legislation is as important as its enactment (Demir & Gerşil, 2008). That is why it would be correct to say that although Turkey has the necessary legal regulations regarding remote work, practical procedures, and principles are not sufficient for facing their strategic implementation.

The negative consequences summarized above in the focus of the researches done so far are obviously stem from the gap in laws and lack of practical experience rather than the nature of remote work. Indeed, a large number of both employees and employers are thought to have experienced remote work for the first time and generally have not received any training regarding remote work before (Molino et al., 2020). Besides its many positive consequences, it is often claimed that the main reason for the negative consequences of remote work in the previous years is the gap in laws and lack of practical experience as well (De Menezes & Kelliher, 2011). This is also not specific to Turkey. Similar shortcomings in law and practice prevail in many other countries.

Consequently, failure to maintain work-life balance, which is the common problem of almost all employees working remotely in this period, draws attention in today's conditions where human capital is essential in global competitive power. Indeed, in a knowledge-based economy of the twenty-first century, human capital is one of the key factors in the process of innovation, change, and creativity to gain competitive power (Chen, 2008). In this regard, work-life balance has a tremendous impact on many positive organizational outcomes and hence on organizational performance (Bhende, Mekoth, Ingalhalli, & Reddy, 2020). Thus, in the battle to stay healthy today, organizations have found themselves in a difficult position to help workers overcome a work-life crisis. By considering the positive organizational outcomes of maintaining a healthy work-life balance, it is of vital importance to maintain a work-life balance to get out of the current crisis with more committed and engaged employees (Beauregard & Henry, 2009).

Within this framework, there is an increasing need for policymakers to address remote work and its consequences more actively and concretely, as organizations seek new ways to take advantage of remote work and reduce the hazards associated with it. In this context, new regulations should be made to prevent these practices from negatively affecting the overall health and safety of remote workers. Another factor that plays a critical role in the success of remote work, thus ensuring the work-life balance and achieving the goals of the organization is that working remotely should become the corporate culture. At this point, the biggest responsibility and burden falls on the managing staff. Moreover, since the maturity and cultural readiness of each organization toward remote work are at different levels, it is necessary to determine priority human resources strategies and action plans with an organization-specific analysis. Only in this way, although it is expected to be adopted years ago, remote work, which has become one of the main strategic practices of organizations in the crisis encountered with COVID-19, may be an opportunity to contribute to the establishment of work-life balance within the legal and practical procedures and principles to be developed. When the reasons for why these regulations will be made are not understood and good preparations are not made about how to implement and manage these regulations, it is likely to return to the discourse that the old working structures are more advantageous due to the failure in implementation.

The contribution of this study is twofold. First, it contributes to the literature by focusing on sudden changes in short-term working life and documenting the effects of remote work implemented during the COVID-19 period. The study also contributes to the literature by drawing attention to the fact that the legal regulations on remote work are not well defined in laws and widespread in practice.

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The Strategic Importance of Quality Training Given to Personnel: An Evaluation for Nuclear Energy Companies

Hasan Dinçer, Serhat Yüksel, İdil Tamer, and Esra Serezli

Abstract Nuclear energy investments are important for the economic and social development of countries. Countries can produce their own energy with this energy type. This contributes to the independence of countries both politically and economically. A country that can produce its own energy is not politically dependent on another country. In addition, thanks to nuclear power, countries will not have to import energy. In this way, the current account deficit problem of the countries will be reduced. As this will reduce the economic fragility of the country, it will enable countries to reach their sustainable development goals. However, there are some problems with nuclear energy investments. One of the most important issues in this process is the need for qualified personnel. Nuclear energy investments are projects that involve very comprehensive and detailed engineering processes. Therefore, there is a need for personnel qualified to be able to master these processes. Otherwise, the process in these facilities will not be managed effectively and efficiency in energy generation will decrease. On the other hand, any problem that may occur in these facilities cannot be effectively intervened, and this may lead to huge damages. In this context, the importance that nuclear energy companies should give to the training of their personnel was emphasized in this study and strategy recommendations were made for these companies.

1 Introduction

Energy is shown among the vital needs of a country. This is true both socially and economically. Energy is important in meeting the daily needs of citizens in a country. People's warming is one of the best examples of this issue (Zhong, Hu, Yüksel, Dinçer, & Ubay, 2020). In addition to this, energy also contributes to the economic development of countries. The main reason for this is that electricity is one

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of the most important raw materials in industrial production. In other words, it is essential to be able to provide the electricity required for the development of the industry in a country. Otherwise, industrial production will decrease, and this will negatively affect the economic development of countries (Yuan, Zhang, Yüksel, & Dinçer, 2020; Zhu et al., 2020). Therefore, electricity consumption is considered as one of the most important indicators of a country's social and economic development.

As mentioned above, energy is essential for countries. Therefore, the energy needed must be supplied regardless of its cost. Based on these explanations, it can be said that countries that have their own energy resources are much more fortunate than others (Qiu, Dinçer, Yüksel, & Ubay, 2020). These countries will be able to obtain the energy they need by their own means without purchasing from other countries. This will provide very serious advantages to the countries. On the other hand, countries that do not have their own energy resources have to obtain this energy from another country. This situation will increase the economic and political risks of the countries. If a country has political problems with the country from which it imports energy, there is a risk for the availability of energy (Li, Zhu, Yüksel, Dinçer, & Ubay, 2020). In addition, energy imported from abroad will adversely affect the country's current account balance.

The ability of countries to ensure energy supply security is very important in terms of the effectiveness of energy policies. In this framework, countries that do not have their own energy reserves need to develop some strategies. For example, these countries need to search for energy reserves within their borders. In this way, it will be possible to identify some reserves within the country (Qi, Huang, Dinçer, Korsakienė, & Yüksel, 2020). On the other hand, despite the detailed exploration studies, there is a risk that energy reserves cannot be found within the borders of the country. In addition, countries can also make energy investments to have their own energy resources (Mikayilov, Mukhtarov, Dinçer, Yüksel, & Aydın, 2020). Renewable energy sources play an important role in this process. These types of energy offer the countries that do not have energy reserves the opportunity to produce their own energy. In contrast, the installation cost of renewable energy types is very high (Zhou, Zhou, Yüksel, Dinçer, & Uluer, 2020). In addition, since electricity production from these types of energy depends on natural resources, it is not possible to ensure continuity in electricity generation.

Nuclear energy is one of the energy types that can be taken into account in this process. In nuclear power generation, the uranium atom is broken down. In this way, a very significant temperature is obtained. The steam of this temperature is also considered in turning the turbines. In this way, it is possible to obtain electricity. As can be understood from these explanations, nuclear energy has many benefits for countries. Primarily, nuclear energy helps countries to produce their own energy. Countries will be able to obtain the energy they need with their own means by nuclear energy. In this way, there will be no need to pay large amounts to other countries for energy supply. Another benefit of nuclear energy is that uninterrupted electricity generation is possible. Nuclear power generation is not affected by seasonal or temperature differences. Finally, during the process of generating electricity with nuclear energy, carbon gas is not released into the atmosphere. In this case, nuclear energy is considered an environmentally friendly energy type, since it does not cause air pollution (Wang et al., 2020; Yüksel, Dinçer, & Uluer, 2020).

On the other hand, certain issues should be taken into consideration in order for nuclear energy facilities to operate effectively. There are some risks in nuclear power plants (Saidi & Omri, 2020). In this process, the most important issue is the risk of explosion. The process of breaking up the uranium atom must be carried out in a controlled manner. Otherwise, there is a risk that the nuclear power plant established to generate electricity will turn into a nuclear bomb. Many people died as a result of the explosion at the Chernobyl nuclear power plant in 1986 (Vo, Vo, Ho, & Nguyen, 2020). In addition, another issue to be considered in nuclear energy is waste management. As a result of obtaining electricity by breaking down uranium, radioactive wastes are formed. These wastes pose a serious threat to the health of living things. Therefore, these wastes also need to be disposed of effectively.

As can be seen, companies should pay attention immensely in order to ensure the efficiency of nuclear energy investments. One of the most necessary factors in nuclear energy investments is qualified personnel. Nuclear energy investments are projects that involve very comprehensive and detailed engineering processes. Therefore, there is a need for qualified personnel to be able to master these processes. In this framework, nuclear energy companies are required to employ trained personnel (Hassan, Baloch, & Tarar, 2020). In contrast, there are not many people on the market who are familiar with nuclear energy processes. In this case, it is understood that an education policy to be developed by the country administration is needed. In addition, it is important for nuclear energy companies to provide the necessary training to their current employees. Otherwise, the process in these facilities will not be managed effectively and efficiency in energy generation will decrease. On the other hand, any problem that may occur in these facilities will not be able to be effectively intervened, and this may lead to great damage. In this context, in this study, the importance that nuclear energy companies should give to the training of their personnel was emphasized and strategy recommendations were made for these companies (Yeom & Sridharan, 2020).

2 Literature Review

In this part of the study, the studies that emphasize the importance a company should give to education will be covered. Tilak (2018) examined the relationship between education and poverty in India using a questionnaire method. In the study in question, a strong and inversely correlation was found between poverty level and educational opportunities. In the related study, it was also stated that poverty prevents access to educational opportunities. On the other hand, it is explained by numerical data that the rate of enrollment of rich children in school is higher than that of poor children. As a result of these, it was concluded that education level can be increased by having all education expenditures free of charge, increasing employment opportunities for adults, and improving public services such as health services. Bonal (2016) researched the role of human capital in poverty reduction through a literature review. As a result of his studies, he argued that while focusing on poverty alleviation, education inequality was ignored and thus the importance of education in poverty reduction was not sufficiently explained. In addition, he explained why education policies are less effective than expected in poverty alleviation. In the article of Shi and Zhang (2018), the contribution of internet education in the fight against poverty in the People's Republic of China was explained with a literature review. In the study, it was stated that the efforts to be made to provide education by reaching the poor people living in rural areas, who do not have educational opportunities, via the internet are important for reducing poverty.

Zhang (2018) addressed the Yunnan region of China and poverty alleviation in rural education. This study emphasized government support on education investments, and it was recommended to take measures in this regard. Mihai, Țițan, and Manea (2015) explain the relationship between education and poverty in Romania with the data interpretation method. In the study, it was concluded that the graduation rate was low, the educational opportunities of poor children were limited, and these individuals who could not access educational opportunities as a result of this cycle were in exclusion. Duarte, Ferrando-Latorre, and Molina (2018), in their article, the issue of avoiding poverty through education in Spain was investigated with the conceptual quantity quality model of Baker Lewis empirically. In the related study, factors affecting secondary education graduation were analyzed and the transmission of poverty between generations was examined. On the other hand, it was concluded that the economic status and character of households affect the risk of poverty when children become adults. Nwokolo, Dywili, and Chimucheka (2017), the role of entrepreneurship education in reducing poverty in the South African region was analyzed using the chi-square and independent t-test method of the survey data. According to the results obtained from the survey study, it has been determined that promoting the entrepreneurship culture plays an important role in reducing poverty in South Africa. In this context, it has been suggested to encourage entrepreneurship education given to university students in reducing poverty in South Africa.

Chen (2019) examined the role of education in poverty alleviation with the method of interpreting data for the Ganzi Tibet Region of the People's Republic of China. In the related study, it is argued that it is possible to solve the social conflict in China through education. The study also stated that poverty alleviation through education in rural and poor areas such as the Ganzi Tibet Region is a very long and difficult process. However, it has been concluded that reducing poverty through education enables the prevention of the transmission of poverty from generation to generation. Herianingrum, Iswati, Anshori, and Zadjuli (2017), the effect of education in reducing poverty in Malaysia and Indonesia was analyzed with the Johansen cointegration and Granger causality test. According to the results, a two-way relationship between Islamic education and poverty reduction in Indonesia, and a one-way relationship from education to poverty in Malaysia has been identified. In Spaull (2015) article, the effect of education on the intergenerational poverty cycle is explained through a literature review. In the relevant study, the South Africa region was evaluated, and it was stated that the quality of education of schools that provide education to the black and the poor is lower than the others and this situation leads to the poverty cycle between generations.

Bloom, Canning, and Chan (2015) explained the place of higher education in development in their research with a literature review. In this study, it was seen that although primary and secondary education was given importance in the development plan for Africa, higher education was not considered to be necessary for this process. However, it has been argued that despite the introduction of innovative policies toward advancement in higher education in recent years, it is insufficient. As a result, it has been concluded that the role of higher education in development has become a more frequent subject of research and its importance has begun to be understood. Waldfogel (2017) examined the role of early childhood education in preventing the transmission of poverty by interpreting data. This study, which evaluates the quality of education in schools in the Boston region, argued that the high quality of preschool education constitutes an obstacle to the transmission of poverty between generations. Khan (2015) studies the role of education in poverty reduction in the literature. Studies reviewed by the author show that investment in human capital and education increases the skills and productivity of poor households, which raises the wage level and the general welfare of the population.

In Bandala and Andrade (2017), the relationship between economic growth and education is examined with the Myrdal theory econometric model. As a result of the study, it was stated that low growth rates lead to uneducation, poverty, increase in crime and corruption, and decrease in educational opportunities as a cycle. Eze and Odenigbo (2017) explain the effects of adult development education on poverty reduction in Nigeria through a literature review. In this study, it was stated that the literacy rate among young people and adults is very low in Nigeria, which is one of the places where the poor population is highest despite abundant human and natural resources. On the other hand, it was stated that adult education is the only way to reach them, in this way, knowledge and skills can be acquired and poverty reduction will be possible. Arias, Giménez, and Sánchez (2016), in the propensity score matching method analysis conducted in regional, urban, and rural areas to determine the impact of different education levels in Costa Rica on poverty, it was examined whether education could help people from different regions meet the satisfactory basic needs. The results show that education is an effective mechanism to help people overcome poverty.

Hussain, Bhuiyan, Said, and Ab (2017), empirical studies examining the effect between entrepreneurship education and poverty alleviation were researched by scanning the literature. According to the results obtained from the study, it was determined that family background, state support policies, entrepreneurship education, and individual entrepreneurship characteristics are important tools that encourage employment. Rislana, Good, Adams, and Scott (2016), using a case study of Nigeria Jigawa State, the effect of information communication technology training on poverty reduction and economic development was examined with the Richard Heek's Design-Reality Gap model. As a result of the study, it was stated that the state can provide competitive advantages in the way of advancing education, health, agriculture, and tourism through sectoral integration with information communication technology. de Vuijst, van Ham, and Kleinhans (2017) examined the effect of higher education on the prevention of the transmission of poverty to generations in poor rural neighborhoods with the Sequence visualization method. As a result of this study conducted in the Netherlands region, it has been determined that the educational attainment of individuals contributes to their parents' separation from their disadvantaged neighborhoods.

In Lanzi (2007) article, the relationships between human capital and human abilities are discussed. In this study, taking the "Capacity Building Principles" of the United Nations as a reference, it is claimed that education not only provides job-oriented skills acquisition, but also life skills and options. As a result, an opinion was expressed on how to follow a way to increase the effects of education policies on human development. Blöndal, Field, and Girouard (2002) analyzed data on investment in human capital through compulsory education and training in his article. In this article examining OECD countries, it was determined that human capital investments targeting productivity provide higher employment rates and significant labor market gains that exceed investment costs. The estimates revealed in the study point out that there are powerful factors for a student to continue working beyond the average compulsory education age. He also states that students in higher education are more likely to come from a wealthier environment, young people with disadvantaged origins are less likely to participate in higher education and therefore they can benefit less from state support. In the study of Rodríguez-Pose and Vilalta-Bufí (2005), regional returns of human capital in the context of the relationship between education and migration for the European Union region were examined with regression analysis. This study also explored the link between the quality of human capital and the evolution of regional inequalities in the EU. According to the findings, it has been determined that there is a significant correlation between the quality of human capital of European regions and their economic performance in the last few years.

Faggian, McCann, and Sheppard (2007) conducted a study on Scottish and Welsh students, investigating the immigration behavior of higher education students and graduates. In this study, the logit model methodology and MAPINFO geographic information system were used. The author aims to understand the relationship between qualified human capital gained through education and labor migration. In addition, the relationship between students' sequential migration behaviors before and after higher education is being investigated. The findings of the study show that for Welsh and Scottish students, an individual's behavior toward immigration is related to an individual's previous immigration background and the level of human capital an individual has achieved. Venniker (2000) examines the latest theoretical and empirical literature on human capital externalities in the Netherlands region. In the research, it has been concluded that the economic literature is uncertain about the relationship of human capital externalities. On the other hand, it was stated that the literature offers some indicators for positive externalities, but they are not very strong and undisputed. Consequently, the most promising evidence has been interpreted as being related to its effect on crime reduction. Winters (2011) discusses the effects of local human capital level and the existence of higher education institutions on the quality of life in the US metropolitan areas. In the study, quality of life differences in 289 metropolitan areas are measured by logarithmic differences in real wages. As a result, it is revealed that the quality of life is positively affected by both the local human capital level and the relative importance of higher education institutions. In other words, it is concluded that the human capital stock and the relative importance of higher education institutions have a common effect and also separate effects on quality of life.

Wigley and Akkoyunlu-Wigley (2006) defended the human capabilities approach against the human capital approach in the study. For this purpose, the channels in which educational attainment affects health functions were examined, and panel data analysis was used for 35 developing countries, and the health functions obtained with the increase in income resulting from education gains were compared with the total health functions obtained from education gains. As a result, it has been determined that educational attainment significantly affects life expectancy independent of income increase. It was stated that this result means that the human capital approach seriously emphasizes the value of education. Lightning and Qadi's research on the stock of human capital in Turkey, the link between trade and economic growth were examined using Johansen cointegration test and error correction methodology. According to the results of the related review, in Turkey, export growth is human capital stock in the long term and positive impact on the growth of human capital stock and supports the growth of GDP. In Çakmak and Gümüş (2005) study, the connection between human capital accumulation and economic growth was analyzed by Engle-Granger cointegration method. According to the results obtained in related studies, human capital stock in Turkey yielded a positive effect on economic growth. However, examination of the positive impact that the human and physical capital on GDP in Turkey; the workforce has been found to have a negative impact. In addition, it has been determined that the effect of physical capital on economic growth is more than human capital. Bayoğlu (2018) analyzed the relationship between education expenses and economic growth by Engle-Granger cointegration test, Granger causality test, was examined by Toda-Yamamoto causality test and Hacker-Khatami-Jan causality test. According to the findings of the study, it was concluded that there is a bidirectional causality between growth and education expenditures. In Acaroğlu (2005) master's thesis, human capital was measured with a model comparing production with Krueger's inequality calculation based on cities. As a result of this study, it has been observed that human capital has a positive effect on GNP per capita.

Akça (2014) examined the relationship between human capital economic growth in Turkey in his master's thesis with time series analysis method. According to the findings obtained in the analysis, in Turkey human capital was detected to have positive effects in the long term on economic growth. The effects of education on poverty reduction, economic growth, and development have been investigated in the studied studies. In the relevant literature, econometric models such as cointegration, causality, and data analysis are mostly used in analyzing the effects of education. In addition to these, it was observed that analysis of survey data and interpretation of statistical data were also performed. Considering the results achieved, the common point is that education has a positive effect in the long term in the fight against poverty, economic growth, and development. When we look at the details of the studies on poverty reduction, it is stated that although education has a positive contribution in the fight against poverty, poverty is an obstacle to accessing educational opportunities and this is a vicious circle that causes the transmission of poverty between generations. In studies conducted on this subject, it has been stated that reducing poverty through education enables the prevention of the transmission of poverty from generation to generation, however, the quality of education opportunities reached by the rural and poor people is lower than others and this situation leads to the cycle of poverty between generations. In this context, it is suggested that education expenditures should be free of charge, employment opportunities for adults should be increased and education level should be increased by improving public services such as health services. In addition, it has been emphasized that governments support education investments in this regard and it has been recommended to take relevant measures. To put it briefly, it has been observed that increasing the level of education has positive effects on skills, productivity, income level, general welfare of the population, decrease in crime, quality of life, economic growth, development, increase in GNP, and reduction of income inequality. Studies conducted in the relevant literature mostly cover a single country/region or a single group such as OECD, underdeveloped or developing countries, and there is no new study on both underdeveloped and developing countries. In this context, it is thought that a comprehensive study in which the subject matter is handled with a new and original method will be useful.

3 Theoretical Framework Regarding Employee Training

3.1 The Importance of Human Capital

Human capital refers to the accumulation of individuals such as knowledge, skills, talents, and experiences in production. It describes the individuals' being efficient and productive labor force in the production process by improving their personal abilities and skills through education. It is the technical knowledge and skills that are formed as a result of investments made with formal education brought together in the workforce of a nation. Investments made in order to increase the productivity of human capital and to make it qualified are called capital investments. Education investments are of great importance among human capital investments. For this reason, the effects of these investments in developed, developing, and underdeveloped countries around the world are examined and analyzed in many studies (Bayoğlu, 2018). The reason for the changes in the level of wages, which is the income of labor, is due to the difference in the quality of the labor force. The reason for these differences may be the individual's prior abilities, but also the qualifications acquired through education, culture, and experience are very important.

There is a direct proportion between the qualification of the workforce and the income level. Qualified labor has a high benefit for production. The human resources units of the organizations pay attention to the quality of the workforce and take into account the benefits of the company in determining the salary levels. Those who earn high income get their education investments in return. In this context, human capital is a concept that describes the productive and valuable knowledge that emerges in the educational process (Acaroğlu, 2005). When we look at the progress of the human capital theory, it is seen that its components started in the centuries when knowledge and education were effective. We can understand that man is the important productive factor in the works of the pioneer writers of political economy, by including the individual and his abilities in the notion of capital. First of all, these ideas were mentioned by William Petty, an intellectual of political economy and statistics, in his "Political Arithmetic" study in 1967. In this study, it was mentioned that the individual is efficient with his abilities and this creates wealth. He stated that in order to enrich societies, not only commodities and stocks but also labor should be included (Zhumabekova).

3.2 The Details of Human Capital

Human capital is one of the most important elements of the economic growth and development of countries. When evaluated in terms of the sustainable growth of countries, its importance increases (Bayoğlu, 2018). The human capital stock plays an important role in achieving people's capacities and opportunities to work. For this reason, it is decisive in determining the income level and share in the countries. Studies have confirmed the importance of education investments on economic growth and development. However, education has been found to have not only economic but also various important noneconomic effects (Blöndal et al., 2002). These benefits of human capital to societies, organizations, and individuals can be listed as productivity, economic growth, development, low crime rate, solidarity, and preventing the poverty cycle passed down to generations. The returns of human capital investments can be obtained in the long run. Human capital can accumulate like physical capital, but unlike physical capital, it exhibits a feature subject to increased productivity. Another characteristic of human capital is that it is dynamic. That is, the person who represents human capital is in constant change. In this sense, the normal flow of the population and migration movements have a significant impact. Again, due to its dynamic nature, it is not possible to stock it. Therefore, for each time period we do not use human capital, we have lost it.

3.3 The Approaches of Human Capital Calculation

Cost-Based Approach: Using this approach, human capital stocks are created using a continuous inventory method where investment expenditures are accumulated and existing stocks are depreciated (Li, Fraumeni, Liu, & Wang, 2009). It is the sum of all costs incurred in the formation and depreciation of human capital. This approach is a frequently used method because the data can be obtained easily (Albayrak, 2018).

The Jorgenson-Fraumeni Income-Based Approach: The Jorgenson and Fraumeni (J-F) income-based approach is the most widely used method of estimating human capital stock and has been adopted by many countries in the creation of human capital accounts. Considering the advantages of this approach, it can be listed as having a solid theoretical basis and obtaining data and parameters and being easier than other approaches (Li et al., 2009). It is based on the idea that change in income directly affects productivity. But not always this assumption is correct. Sometimes the change in wages can change for different reasons. In addition, achieving income change rates is a problem, especially in developing countries (Albayrak, 2018).

Indicator/Index Approach: It is a method of calculating human capital based on education output information. This method is often used to compare human capital levels between countries. It is mostly achieved by measuring the indicators that determine the education level of the society, such as education records, duration of education, the ratio of total public expenditure transferred to education in GDP, literacy status, and education expenditure. Although there are different components of human capital, education is the most important among them and therefore education investments are mainly taken into account in its measurement. In the calculation of the indicators used in measurement, some wrong and incomplete results occur. For example, not getting the same return in the same period for each training program, variability of training costs, not taking the quality of the training into account contradicts the assumptions so the comparisons cannot fully reflect the reality (Albayrak, 2018).

Residual Approach: This approach measures human capital according to the usage rate of residuals. The relevant approach assumes that the reduced provisions of benefits to be transferred over the period of capital accumulation will be qualified at the same amount as the existing financial value of capital assets (Albayrak, 2018).

Latent Variable Approach: Human capital, which is defined as a hidden variable in the literature, is stated that it cannot be calculated directly and therefore it is stated that it can be calculated by estimation method. In this approach, the hidden variables estimated for human capital are transformed into a financial price transaction that does not have only one representative index and as a result, the average value of human capital is calculated (Albayrak, 2018).

Human Development Index as a Measure of Human Capital: The United Nations Development Organization (UNDP) uses this index to calculate the development levels of societies. Economic development is also examined with the results of education and income levels, which are an element of development as well as growth. Human development defines a healthy and long life, knowledge, and well-being as the criteria. Estimated life expectancy for a healthy and long life, average education time for knowledge accumulation, per capita income for welfare measure are calculated and the average of these three indices is calculated.

3.4 The Indicators of Human Capital

Education is the investment made to make the human resources of a nation valuable. Education has the meaning of socializing individuals and becoming beneficial persons to society. It is the realization of the expected differentiation in people's attitudes through their individual experiences. They are physical and intellectual abilities. Education is one of the critical dimensions in which public policies for economic growth and social development can be evaluated and analyzed. It creates human capital that increases individual skills, talents, and competencies. It also expands individual freedoms to facilitate social cohesion (Lanzi, 2007). The history of the concept of education goes back to Mercantilism. Mercantilist economists have stated that skilled labor is necessary for the growth of national wealth. In this context, they were the first to explain the link between economic events and education. Adam Smith, one of the classical economists, explained in his book "The Wealth of Nations" that the whole nation benefits from the savings created due to education expenses (Akça, 2014).

Education, which is the most important element of human capital, enables individuals to find qualified jobs, increase their income levels, be included in a better social class, and break the cycle of poverty that has passed through generations; it increases the general welfare of the population and decreases poverty and unemployment rates. Education is a process that increases the productivity and personal skills of individuals by providing personal development and makes the workforce qualified. For this reason, it has been accepted by many studies that it has an important effect on the development of countries. The positive effects of education are passed down through generations. Educational investments and incentives direct individuals to academic studies, ensure the transmission of information to next generations, and thus prevent the migration of skilled workforce to different countries. Education and academic work opportunities in developed countries are among the reasons why qualified employees migrate to other countries. In this context, the welfare and development level of countries that do not attach sufficient importance to education cannot show improvement (Bayoğlu, 2018).

Today, technological developments change production techniques, types of mechanical equipment, and output types. It is recognized that economic progress is not only through technological innovation but also through investment in people (Weisbrod, 1962). Adapting to technological developments is possible thanks to qualified and trained employees. Trained employees adapt to innovation development more quickly and thus contribute to productivity increase. The most important determinants of human capital are indicators such as schooling rate, the amount spent on education from national income, literacy rate, proportion of working population, education level, education records, and duration. It is seen that education expenditures are the most important expenditures known as human capital investments.

The most important consideration in the education process is the quality of education. The quality of education is the ability of educated individuals to meet the needs of the society as desired with the knowledge, mastery, and attitude they have gained from this education (Kayadibi, 2001). Studies show that the cognitive skills of the population have a strong positive effect on individual earnings, income distribution, and economic growth. Indices used in the calculation of education data mostly neglect qualitative differences in providing information. It can be said that this negligence significantly changed the picture that determines the relationship between the quality differences of education and the economic results of education investments. In this table, the effect of skills acquired through education, which is one of the important factors affecting the interpersonal distribution of incomes and economic growth among societies, on individual earnings is overlooked. While comparing educational data between countries, it is assumed that a student in a school in Zambia, Yemen, and Uganda will gain the same level of knowledge from the education received in a calendar year and the same education in Singapore, Korea, or the Netherlands. Undoubtedly, education received in the same period creates the same amount of acquired knowledge regardless of the quality of the education system. However, it is obvious that the education system provides different increases in skills depending on the quality of education, the educational infrastructure, or the effectiveness of the curriculum. For this reason, it seems very important to focus on the quality of the education they received during this period, as well as calculating the duration of students' education. In this context, international comparisons including expanded data on cognitive skills reveal much greater skill deficiencies than those obtained from school enrollment and attainment alone.

The most comprehensive and well-known assessment test that measures the quality of international education worldwide is the International Student Assessment Program-PISA (The Program for International Student Assessment). The evaluation program, which was first started in 2000 and implemented by the OECD, tests 15-year-old students from more than 70 countries every 3 years. Through tests covering mathematics, reading, and science, it is measured how well students are mastered in main subjects in order to prepare for real-life conditions. PISA also aims to help governments shape education policies, releasing test results a year later. Governments around the world use PISA results to compare the knowledge and skill levels of their students in their countries and to reach and raise the standard education level.

Health investments are an important element of the continuity of qualified human capital and an integral part of education investments. It is imperative that efficient and effective human resources be physically and mentally healthy. In addition, the right to benefit from health services is one of the most fundamental rights for all humanity. Not paying attention to health investments, the shortening of the average life expectancy, and the low quality of life of the living population cause production loss and inefficiency and create negative effects on the development and growth of the country. Increasing the human capital stock in a healthy nation is an expected situation as a healthy workforce is more productive. It is faster and more likely for a physically and mentally healthy person to complete their education. For this reason, the first condition of human capital accumulation is the healthy individual.

One of the main factors that show the health level of nations is infant and child mortality rates. However, the approximate lifespan is another important index. There is a positive correlation between these indices and human capital increase. From this perspective, it can be said that societies with healthy and long-lived individuals have more human capital accumulation. Although the indicators for education are mainly taken into account in the measurement of human capital, health-related components are also used in the calculation of human capital. As societies develop, the importance they attach to health investments and individuals' awareness of health increases. There is a direct relationship between the progress of health and economic development. However, it is claimed that there is a negative link between the education level of families and child mortality (Albayrak, 2018).

Labor transfer, which is defined as the transfer of well-educated and qualified workforce from the country where they were raised to another country with better opportunities, interferes underdeveloped and developing countries with limited resources to lose their qualified workforce to more developed countries. The coherence indicators between education supply and labor demand, the employment degree of the best-qualified individuals and the level of migration are important indicators of a society's capacity to transform human capital into economic growth (Rodríguez-Pose & Vilalta-Bufí, 2005).

3.5 The Importance of Human Capital to Minimize Income Inequality

Poverty and unfair income distribution is an important problem for national economies. Education investments, which are an important element of human capital, also play an important role in preventing these problems. In less developed countries, investments are made in items that provide economic returns with short-terms instead of social investments with long-term returns, and therefore human capital investments such as education and health have to be taken into the background. The poor people who do not have educational opportunities and whose children cannot access educational opportunities due to their low level of income cause the poverty cycle to not be broken. Although the expenditures made to increase human capital are perceived as consumption expenditure in the short term, they are actually explained as investment expenditure in the long term (Akça, 2014). Studies show that investment in human capital and education increases the skills and productivity of poor households, which increases the wage level and the general welfare of the population (Khan, 2015). Human capital has traditionally been considered one of the key factors behind economic growth. Societies with better human capital are thought to have a greater development potential than societies with scarce or insufficient human resources (Rodríguez-Pose & Vilalta-Bufí, 2005).

4 The Contribution of Personnel Training on the Effectiveness of Nuclear Energy Investments

There is a complex structure in nuclear power plants. In the nuclear reactor, the element uranium is broken down. In this context, protons are thrown into the reactor and the protons and neutrons of the element uranium are separated from each other. In this process, a very serious amount of heat is released. This temperature helps to heat the water in the pipes. The steam obtained helps to obtain electricity by rotating the turbine system. However, there are some points to be considered in this process. For example, control rods are located in the nuclear reactor. This mechanism contributes to the controlled execution of the uranium breakdown process. Otherwise, there is a risk of a nuclear reactor explosion. In other words, if the temperature increases excessively, control rods are put into the reactor. In this way, this specified risk is eliminated. Another point to be considered in nuclear energy and electricity generation is radioactive waste. As a result of obtaining electricity by breaking down uranium, radioactive wastes are formed. These wastes pose a serious threat to the health of living things. Therefore, these wastes also need to be disposed of effectively.

As can be understood, there are different processes in the nuclear reactor integrated with each other. Therefore, the personnel who will work in these power plants must also have the necessary knowledge. If the necessary actions in nuclear reactors are not taken in time, very serious problems can occur. Some nuclear facilities have exploded before, and this has caused hundreds of people to die. As can be seen here, it is very important for the personnel working in nuclear power plants to have detailed information. In this context, attention should be paid to this issue in the selection of personnel to work in nuclear facilities. In this framework, employees must have engineering knowledge for the working process of nuclear reactors. On the other hand, it is also very important to provide the necessary training to increase the knowledge of the personnel currently working in nuclear facilities.

5 Conclusion

The ability of countries to ensure energy supply security is very important in terms of the effectiveness of energy policies. In this framework, countries that do not have their own energy reserves need to develop some strategies. For example, these countries need to search for energy reserves within their borders. Nuclear energy is one of the energy types that can be considered in this process. In nuclear power generation, the uranium atom is broken down. In this way, a very significant temperature is obtained. The steam of this temperature ensures turning the turbines. In this way, it is possible to obtain electricity. Nuclear energy investments are important for the economic and social development of countries. Countries can produce their own energy thanks to this type of energy. This situation contributes to the independence of countries both politically and economically. A country that can produce its own energy is not politically dependent on another country. On the other hand, certain issues need to be taken into consideration in order for nuclear energy facilities to operate effectively. There are some risks to nuclear power plants. In this process, the most important issue is the risk of explosion. The process of breaking up the uranium atom must be carried out in a controlled manner. Otherwise, there is a risk that the nuclear power plants established to generate electricity will turn into nuclear bombs. As can be understood, there are different processes integrated with each other in the nuclear reactor. Therefore, the personnel who will work in these power plants must also have the necessary knowledge. If the actions in nuclear reactors are not taken in time, serious problems can occur. In this context, much attention should be paid to the selection of personnel to work in nuclear facilities. Employees should be enriched with the necessary engineering knowledge regarding the working process of nuclear reactors. On the other hand, it is also very important to provide the stated training programs on a regular basis for the personnel working in nuclear facilities.

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The Importance of Foreign Direct Investments in Turkey's Export: A New Strategy for Low and Medium Tech Firms

Zafer Adalı and Tuba Bilgin

Abstract This research investigates the relationship between Foreign Direct Investment (FDI) and export operated by low-, medium low-, and medium high-tech firms in Turkey. For this purpose, a hidden cointegration approach developed by Hatemi and Iraoundaoust Hidden cointegration is conducted on data covering the period between 2006:Q1 and 2018:Q3. According to Hatemi and Irandoust (Asymmetric interaction between government spending and terms of trade volatility. Journal of Economic Studies 39(3):368–378, 2012), hidden cointegration, there is no long-run relationship between the cumulative positive shocks of Low Tech Export (LTX) and cumulative positive shocks of FDI; the same existence is obtained for the cumulative negative shock between the variables. The outcomes identify that LTX and FDI respond to shocks differently in Turkey. Moreover, the same results were found for Medium Low-Tech Export (MLTE) and FDI. In another saying, a positive and negative shock in MLTX does not proceed with positive and negative shocks in FDI. Nonetheless, a long-run relationship between Medium High-Tech Export (MHTE) and FDI concerning both the positive and negative cumulative shocks is also found. A positive shock in MHTX is associated with the influence of positive in FDI. Furthermore, a negative shock in MHTX is also linked to the impacts of negative in FDI. Thus, it is recommended that Companies and governments manage cooperatively with foreign investors, sustain and create locational advantages, and implement policies that lower costs because low and medium low-tech export plays a ruling role in export performance.

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1 Introduction

Sustainable economic growth and economic development are the most preeminent aim of all countries. Export performance is one of the most leading instruments to achieve these macroeconomic objectives. However, the countries with low income, inadequate resources, and lack of savings stick in a vicious cycle that prevents sustainable investment level, dampening export performance. Foreign Direct Investment (FDI) has been accepted as a way to disentangle the vicious cycle by providing the needed investment and knowledge (Basılgan & Akman, 2019).

FDI and its effects on the economy have resulted in massive attention because FDI is accepted as a tool for achieving higher economic growth, shaping, and changing a country's economic and institutional structure. In today's World, enterprises have tended to invest globally to eliminate tariffs, quotas, access foreign markets, and decrease production costs using host countries' cheap labor and raw materials (Dinçer, Yüksel, Adalı, and Aydın 2019; Dinçer, Yüksel, Korsakienė, et al. 2019). Besides, the developing countries have quietly implemented many policies to attract FDI to integrate the global market, overcome their obstacle, solve adequate saving, and transfer high technology to their countries. However, FDI is widely believed as a desirable concept for developing countries, the advantages and impacts of FDI the host country depend on many factors involving the economic, political, industry-specific conditions, and FDI motivation (Zhao & Du, 2007). Thus, the topics of FDI have one of the foremost research areas in the economic literature.

The role of FDI in the export performance of the host country is one of the most debated research topics in the literature. Since the born of the classical economy, foreign trade has been accepted as an engine to grow faster (Yüksel, Dinçer, Karakuş, & Ubay, 2020). Many researchers then emphasized that sustainable, profitable foreign trade and economic development depend on countries' ability to produce and improve their technology (Wang, Ha, Kalkavan, Yüksel, & Dinçer, 2020). Theoretical frameworks emphasize two relevant theories linked to the effects of R&D activities on exports. The first theory is called the Product Cycle Theory, and the second is the Technology Gap Theory. Both of them identified that sustainable, profitable foreign trade, and economic development are dependent on countries' ability to produce and improve their technology. Companies will continuously create and develop new products in the free market because there is enormous competition in the market, which wipes out companies that can not comply with the technology. Standing the pace requires highly skilled labor, expenditure for research and development (R&D), and knowledge. R&D is one of the leading and critical factors that create knowledge accumulations, innovations, and technology resulting in new products. This view confirmed that both domestic and foreign demand meets new products. The alternative mechanism is explained through learning by exporting. It was underlined that exports lead to higher R&D and innovation activities since export activities improve know-how, and innovation flows, which stimulate R&D activities (Esteve-Pérez & Rodríguez, 2013; Girma, Görg, & Hanley, 2008; Neves, Teixeira, & Silva, 2016; Vernon, 1966).

Nevertheless, developing countries have not adequate knowledge, technology, R&D and innovation activities, managerial, and labor techniques to create competitive products for foreign trade. Indeed, a broadly shared belief that FDI seems to be a promoting factor for host countries' export performance by increasing domestic capital, enabling transfer technology and product, and expanding market access. On the other hand, when the aims of the FDI to the host country are achieving local cheap labor, raw materials, or targeting the host country's market, FDI does not appear to be a stimulating factor helping the host country's export performance.

Turkey is one of the critical FDI destinations globally because of its geographical location, young and dynamic populations, cheap labor resources compared to the developed countries, and the government policies for attracting FDI. Historically, Turkey has implemented and followed different growth strategies. During 1950–1980, import-substitution strategies were adopted to protect the domestic firms from foreign competitors, for production of some essential goods for domestic needs. Then, in 80's, Turkey has adopted liberal economic policies to integrate its economy with the global economy. These strategies were implemented to increase export performance, boost the economic structure, and stimulate innovation and technology. However, the Turkish economy has many obstacles involving lower domestic saving, inadequate knowledge, insufficient innovation, and R&D activities, which induce the Turkish economy's performance abiding by foreign sources. When the foreign capital and foreign enterprises invest in the Turkish economy, the economic growth, employment rate, and other macroeconomic indicators seem desirable. However, the reverse scenario occurs in other words, shrinking in the foreign capital or sudden stops in which the Turkish economy encounters the recession.

Generally, when manufacturing industry export performance in Turkey is observed, it is understood that low-tech export played a vital role in the export performance in the 1990s and 2000; nearly more than half of the export is related to low-tech export. However, medium low-tech export becomes the leading sectors in the Turkish export and medium high-tech export also seems to reach the increasing export performance trend. On the other hand, high-tech export performance is the lowest contributor to the Turkish economy. Moreover, low-tech export still appears to be the dominant actors in the Turkish economy. Turkish economy should diversify the export products and implement policies for producing relative high-tech products to achieve the developed countries. Turkish exporter firms encounter many obstacles, such as inadequate saving, know-how, management, and labor skill. As a result, foreign direct investment seems to be a sufficient factor in stimulating and improving export performance. That is why, in this study, we decompose aggregate export into low-tech export, medium low-tech export, and medium high-tech export because three of them nearly cover all export performance in Turkey. Besides, we also employ a hidden cointegration approach in which the positive and negative shocks can be decomposed, and the cointegration test provides more valid evidence compared to the traditional cointegration approach. For the first time, we analyze the asymmetric relationship between various export activities related to their technological level in Turkey using the hidden cointegration approach on data covering the period between 2006:Q1 and 2018:Q3 to the best of our knowledge. Using a measure that includes these phases helps to provide an important criterion for policymakers when detecting the asymmetric relationship between variables and guides in which macroeconomic tools should be used and when they should be implemented. The rest of the paper is organized as follows. Section 2 defines theoretical frameworks. Methodology, data, and empirical results are presented in Sect. 3. Finally, Sect. 4 concludes the study, gives main findings and policy recommendations.

2 Theoretical Framework

Foreign Direct Investment (FDI) is also named direct investment or foreign investment. FDI defines an activity where foreign enterprises invest in a host country to set up and/or run business enterprises. More precisely, FDI is intended to constitute investments associated with a particular degree of control over the use of the funds invested. FDI is comprised of three types:

- Equity acquisition is based on an existing or a newly created enterprise's buying share.
- Profit re-investment is related to reinvesting profits for further expansion.
- The loans from a parent company.

FDI is a relatively new phenomenon in the literature, and the volume of FDI in the world has accelerated since the 1980s. As a result, FDI's theoretical explanations and motivations still seem to be among the field's most studied areas. However, three possible explanations could be used for why FDI occurs, and production facilities move from the home country to the host country. The first explanation is based on the factor proportion hypothesis. This hypothesis is confirmed with the standard Heckscher–Ohlin trade model. Regarding the hypothesis, it suggests that labor-intensive goods are produced in low-income countries with more labor. As low-income countries acquire capital by investment, its product mix will also change. The second hypothesis is linked to the technology ladder hypothesis. According to this hypothesis, production is determined by quality involving R&D, IT infrastructure, labor and management skills, and appropriate education. It emphasizes that countries with little investment but capacity improvement will attract FDI, which results in new industries. Finally, the FDI dynamic hypothesis is the third one. This viewpoint argues that the host country policies and the low cost of doing business play a key role in FDI flows. According to the third one, an attractive FDI environment and other production costs involving electricity, water, communication play a leading role in explaining FDI inflow.

There are some theoretical frameworks for FDI used by trade motives. The classical trade theories such as Ricardo and Heckscher–Ohlin are associated with the assumption of immobility of production inputs. In other words, there is no FDI framework in classical theories. Mundell (1957) improved the classical theory by allowing FDI concepts and eliminating identical production functions. This model introduces capital mobility as a perfect substitute for trade. According to the model, trade stimulates products and production factors, which lead to a complementary relationship between FDI and trade. Besides, Vernon (1966) also introduces a substitutional relationship. It is argued that a locational dimension to the product cycle theory plays a vital role in explaining FDI. According to the idea, a change in production location resulting from a decline in production costs induces an outflow of FDI from the host country to low-income countries, replacing export flows. Another explanation is the Ownership, Location, and Internalization (OLI). Dunning (1977) develops the OLI paradigm, which plays a considerable role in FDI theories. According to OLI, the MNEs serve a foreign market for local production or exports in the light of the combination of ownership, location, and internalization advantages (Abor, Adjasi, & Hayford, 2008).

In terms of all hypotheses, there are some recommendations for the host country's policymakers to attract FDI. These recommendations could be presented as follows:

- Working cooperatively with foreign investors,
- Creating superior locational advantages and implementing policies lower the costs of doing business,
- Implementing free trade policies,
- Targeting the country's dynamic comparative advantages,
- Abiding by rules,
- Figuring out FDI dynamics.

There are different theoretical approaches to examine the relationship between FDI and economic growth. First of all, the hypothesis of FDI-led economic growth is associated with the endogenous growth model. The first hypothesis emphasizes that FDI is related to human capital, export, and technology transfer, stimulating economic growth. Multinational corporations (MNCs) embodied in FDI play a leading role in technical assistance to domestic firms, which boost productivity and technology (Borensztein, De Gregorio, & Lee, 1998; Hassan, Aslam, & Abou Sakar, 2013). Furthermore, the growth-led FDI hypothesis suggests that MNCs focus on the host country's locational advantages, such as market size. As a result, higher economic growth inducing more significant market size increases FDI (Zhang, 2001). Finally, there is also the feedback causality hypothesis. This framework underlines that greater market size induces economic growth, leading to a higher flow of FDI and subsequently stimulating profitability, resulting in higher aggregate demand. This linkage is based on the interdependence between FDI and the macroeconomic environment (Adalı & Yüksel, 2017; Seetanah & Khadaroo, 2007; Sunde, 2017).

Various economic thoughts, being established since the beginning from the classical era, related to the growth model, emphasized that capital accumulation and foreign trade are accepted as the irreplaceable factors inducing growth. The developing countries may encounter many insolvable bottlenecks such as the lack of domestic saving, inadequate knowledge, technology, the skilled labor force, and limited market area. Because of all subtle obstacles, external saving becomes an essential way of eliminating these obstacles, which prevent economic development.

To find external sources, FDI seems to be the most popular and effective way for the developing countries. According to the endogenous growth model, FDI can contribute the developing countries to reach higher economic growth and living standards through the spillover created by the human capital and technology (Balasubramanyam, Salisu, & Sapsford, 1999; Tapşın, 2016).

FDI has been a significant contributing factor inducing a higher economic environment for the host country. All governments have implemented, reshaped, and changed their policies to attract FDI. For example, tax allowance, duty drawbacks, grants in aid, and investment allowance are some of the most common encouragement policies to increase FDI inflow. General opinion related to FDI in the host country is that FDI leads to higher employment, improved technological capacity, and productivity, and enabling innovation. Another critical contribution of FDI to the host country is growing and diversifying in export activities. Thus, many studies have been conducted to investigate the relationship between FDI and host country's economic performances, generally measured as export and economic growth (Aitken, Hanson, & Harrison, 1997; Barry & Bradley, 1997; Blake & Pain, 1994; Blomström, 1986; Gorg & Strobl, 2001; Greenaway, Sousa, & Wakelin, 2004).

There are many theoretical sights to explain the relationship between FDI and trade. Still, the horizontal and vertical FDI seems to be the most illustrated approach to understand this linkage. The horizontal FDI is based on the motives of achieving better market access, reducing costs by eliminating tariffs and transportation cost. That is, firm-scale economies determine the horizontal FDI. As a result, a trade-off between the gains from being near the consumer and the losses originating from production can identify the purposes for firms investing abroad. Second, the vertical FDI developed by Helpman (1984) is related to investment, which is separated into different parts because of benefiting from differences in factor prices between regions; in other words, the vertical FDI is based on differences endowments. The vertical FDI can occur when firms want to benefit from access to cheap production factors. In terms of understanding the relationship, the vertical and horizontal FDI and exports, complementary and substitutional (export-platform) model the export decision process. The shipping costs and cost advantages determine export-platform, and it identified that the goods are totally or partly produced in a foreign country's production facilities and served to a third country. These manufactured goods are not coming back to the home country. The complementariness between FDI and export represented a process based on the export and FDI flows from the home to foreign countries. There is a positive relationship between FDI and export when horizontal and vertical FDI are established through complementarities across product lines. All in all, an export-platform is related to the collateral linkage between inward FDI and host country's exports (Abor et al., 2008; Ekholm, Forslid, & Markusen, 2003; Helpman, 1984; Kneller & Pisu, 2004; Markusen, 1984).

There are two different sights to assess the effects of FDI on a host country's exports. The first view suggested that FDI plays a vital role in expanding and improving a host country's export performance through various mechanisms. FDI is an essential promoting factor for exports in the following ways:

- Increasing domestic capital for exports,
- Improving and assisting technology and new highly technological goods for exports,
- Enabling and facilitating a way to new and large markets,
- Enhancing the abilities of local labor for technıcal and management skills (UNCTAD, 2002).

On the other hand, the controversial view emphasized that FDI seems to be tools exploiting the host country's resources, and it induces the host country to depend on foreign countries in many ways. Therefore, FDI causes some harms on the economy;

- A decrease in domestic saving or saving motives,
- A preference of countries with more raw materials, and cheap labor force,
- A hooble for domestic firms that might expand their business to become exporters,
- The transfer of low-level technologies (UNCTAD, 2002).

3 Literature Review

Considering the two different view empirical assessment of the relationship between FDI and exports has been essential and compelling topics for researchers. Africano and Magalhães (2005) performed an analysis related to the FDI and bilateral trade between Portugal and OECD countries, plus Brazil, between 1998 and 2000. They estimated this relationship by applying the gravity model. The result of the model indicated that the effect of the FDI on export is found as positive. Moreover, Johnson (2006) focused on the relationship between FDI and exports, considering the evidence from High performing East Asian Economies A data covering from 1980 to 2003 estimated by both time series regressions for individual economies and panel data model was employed. Both time series and panel estimation found that FDI inflows are important stimulating determinants of the host countries' export performance. Further, Hsiao et al. evaluated the time series and panel data causality analysis to find the causality relationship among GDP, exports, and FDI in eight rapidly developing East and Southeast Asian economies. According to a panel data causality analysis, exports are influenced by FDI for all countries. On the other hand, there are various causality rotations among the variables. As a result of panel and time series techniques, authors underlined that panel causality techniques seem to be superior conclusions than the time series causality analysis. Zhang (2001) examined the effects of inward foreign direct investment on the Chinese economy in the lights of establishing a growth model. China is divided into the coastal and the inland region. In this direction, cross-section and panel data covering the period between 1984 and 1998 were evaluated. As a result of the model, it was concluded that inward FDI promotes exports and increases productivity. Besides, the beneficial effects of inward FDI have more potent in the coastal region. Zhang (2005) concentrated on the relationship between FDI and China's export performance by using

Chinese industrial data based on capital-intensive and labor-intensive industries separately. The regression model results confirmed that FDI has a positive impact on China's export performance, and FDI's export-contributing effect is much more significant in industries dominated by the labor force. Furthermore, Kutan and Vukšić (2007) centered on 12 Central and Eastern European (CEE) economies for time, including 1996–2004, to evaluate exports' FDI impacts. They separated the effects of FDI as supply capacity-increasing and FDI-specific impacts. They concluded that FDI increases supply capacity and thus promotes exports for all countries employed in their sample. However, it was also identified that the FDI-specific effects are larger beneficial in multinational companies because they have superior information, technology, and excellent contact with the parent firms' supply chain. The supply capacity effects become effective when inward FDI has a stimulating impact on a host country's domestic production capacity, promoting export performance. Metwally (2004) analyzed the linkage among FDI, exports, and economic growth in Egypt, Jordan, and Omen by applying the simultaneous equation model over data from 1970 through 1995. The model's result underlined that export volume in all countries used in the study is greatly affected by FDI. Tebaldi (2011) undertook to investigate the determinants of high-tech exports across 99 countries by using panel data analysis. The research finding showed that human capital, FDI, and openness to international trade are significant determinants of the high-tech industry. On the other hand, gross capital formation, savings, and macroeconomic volatility seem to do not influence high-tech exports. Jawaid, Raza, Mustafa, and Karim (2016) conducted a study to investigate the role of FDI on Pakistan's export performance by focusing on data from 1974 to 2012 by using causality tests. The results of the causality analyses showed that FDI has a substantial positive influence on real exports.

Some studies state a mutual interaction between FDI and export in the literature. Ahmed, Cheng, and Messinis (2011) investigate the relationship among exports, FDI, and imports by employing ARDL and Pedroni panel estimation on Sub-Saharan African countries. According to results, it was indicated that there is bi-directional causality between FDI and exports in Ghana, Kenya, and Nigeria. Besides, there is a causality direction running from FDI to exports in South Africa, but the causality direction running from exports to FDI in Zambia exists. Besides, Chang (2005) analyzes the dynamic interaction among selected variables: economic growth, exports, FDI, and unemployment in Taiwan. Quarterly data over the period from 1981:1 to 2003:3 was analyzed by employing VAR Model. According to the model, it was found that there is a positive mutual relationship between the inward FDI and exports, and an increase in exports prevents FDI outflow. Won, Hsiao, and Yang (2008) focus on nine Asian newly industrialized countries to detect the linkage between FDI and export by implementing a panel causality test, and the mutual causality relationship is found. The mutual causality between FDI and export performance is found in Mexico due to a study conducted by Pacheco-López (2005).

Nonetheless, some studies find that there is no causal relationship between FDI and export. Sharma (2000) examines the contributions of FDI to Indian's export performance by using annual data for 1970–1998. A simultaneous equation framework is employed to evaluate the linkage between FDI and exports. It was concluded that FDI appears to have no impact on Indian's export performance. Vukšić (2005) employs panel data model on 21 Croatian manufacturing industry sectors for the period between 1996 and 2002. The study concludes that FDI is a necessary factor that promotes exports. Sultan (2013) focuses on the relationship between FDI and export in India by employing Johansen cointegration and Granger causality methods over data between 1980 and 2010. The cointegration analysis posited a long-run relationship between FDI and exports, and the causality direction from export to FDI is found as a result of Granger causality analysis. However, many previous studies related to the relationship between FDI and export performance in India found no evidence of the relationship between FDI and export (Aggarwal, 2002; Pant, 1993). Khan and Leng (1997) examine the interactions among inward FDI, exports, and economic growth in three dragons called Singapore, Taiwan, and South Korea by observing cointegration and causality methods. They identify that there is no evidence of a causal relationship between FDI and export. On the other hand, they also found a causal direction from FDI to exports in Singapore.

In the literature, the effects of FDI on export diversification or different technology export goods have been received massive attention in two decades. Export diversification and the various technology export goods incredibly high vs medium technology exports are desirable situations that have a more beneficial impact on the economy and increase technology advantages, product the foreign trade income. For example, Ancharaz (2003) evaluates the effects of FDI on the goods diversification in Mauritius. As a result of the statistical analysis, it was suggested that FDI appears to be an essential factor inducing the industrial goods diversification. Amighini and Sanfilippo (2014) peruse the African countries in terms of the relationship between FDI and the various technology degree export goods by applying GMM and fixed effects models. The results show that FDI coming from developing countries based on advanced diversification boosts the low-tech industry group. On the other hand, Bebczuk and Berrettoni (2006) review 56 selected countries to investigate the relationship between FDI and export goods diversification. The finding of the study argued that FDI is not the determinant of export diversification.

The relationship between FDI and export in Turkey is also examined by researchers. For example, Temiz and Gökmen (2009) analyze the role of FDI in Turkish export performance using various time series techniques such as Johansen cointegration test, VECM, and Granger Causality analysis over the time between 1991 and 2008. They conclude that there are no positive spillovers from FDI to export. The same authors have also reinvestigated the linkage between FDI and export by expanding the study's time. Temiz and Gökmen (2011) also examine the relationship between FDI and exports in Turkey by using monthly data over December 1991 and October 2010. As a consequence of the time series techniques used the same methods in the previous study, it was found that there is a long-run relationship between the FDI and exports, and the causality running from export to FDI is confirmed. Briefly, there is no kind of FDI-led growth linkage in Turkey. Alıcı and Ucal (2003) confirm the same conclusion by investigating variables such as exports, imports, FDI, and economic growth. They employed Toda and

Yamamoto Causality test over the quarterly data covering the period between 1987-I and 2002-IV. In short, there are no important spillovers from FDI to export. Karagöz and Karagöz (2006) concluded that there is no causal relationship between FDI and export. Karimov (2019) researches the effects of FDI on export in Turkey by implementing Granger causality analysis and VAR model. The research covered the time 1997 to 2017. The result of time series methods proved that exports impact FDI; in other words, there is uni-directional causality from export to FDI. Sayar (2017) finds uni-directional causality running from export to FDI by employing VECM model over data covering 1989–2016. Pata and Terzi (2016) test the symmetric and symmetric causality between FDI and foreign trade. The asymmetric and symmetric test results confirm a positive and statistically significant causality operating from exports to FDI. Cambazoğlu and Guneş (2014) applied Johansen-Juselis cointegration and VECM for Turkey on data covering 1980–2012. It was emphasized that there is a one-way causality going from export to FDI. Çetin and Seker (2013) researched the relationship between FDI and export in seven developing countries and Turkey by using Toda-Yamamoto and Dolado-Lütkepohl Granger causality analysis. As a result of the causality test, it is found that there is a uni-direction causality test running from export to FDI.

However, the causality relationship between FDI and export is studied by Şen and Karagöz (2010a, 2010b). They used quarterly data of FDI, exports, and economic growth over the period 1994-II to 2004-IV. Granger causality test indicates that FDI meaningfully impacts on exports. Eryiğit (2012) analyzes the long-run relationships among FDI, export volume, and GDP by applied panel cointegration tests. In this study, the FDI variables measured as panel data for 2000–2010, obtaining from 15 countries regularly investing in Turkey since 2000. The panel cointegration tests suggested that FDI appears to be an essential factor in stimulating exports. Tapşın (2016) finds causality among FDI, export, and economic growth by employing Toda Yamamoto causality test over the period 1974 through 2001. The causality test shows that FDI influences export. On the other hand, Basılgan and Akman (2019) find evidence using ARDL methods that FDI plays a vital role in the export's performance. Gocer, Bulut, and Dam (2012) used the monthly data for 2000–2010 by using ARDL to examine the relationship between FDI and Turkish export performance. They posed that the impact of FDI on the export is statistically positive and significant in the long-run. Delice and Birol (2011) analyzed the relationship between FDI and the trade balance by using Bound Test on data from 1992 to 2011. The result of the analysis found a positive causality operating from FDI to export in the long run. In addition to total export, some studies strived to diversify the total export as final, intermediate, or the different technology levels. For example, Kızılkaya, Sofuoğlu, and Ay (2017) researched the influence of FDI and openness on high technology product export in Turkey and other 11 developing countries by applying panel cointegration and panel FMOLS and DOLS. As a result of the regression, it was concluded that FDI and openness boost high technology product export. In light of the evidence found by many studies focusing on Turkey, there is no consensus evidence of the relationship between FDI and exports. Cunda and Hatirli (2019) focused on the relationship between FDI and export product diversification by employing VAR and Granger Causality Analysis. In the study, they used THEIL Index as a proxy for export product diversification. As a consequence of the analyses, it was identified that FDI does not influence export product basket. Kösekahyaoğlu and Can (2016) investigate FDI impacts on export product diversification in developing countries involving Turkey. They applied panel regression and employed Theil and Herfindahl Hirschman index to define export product diversification. The result of the regression underlined that FDI significantly stimulates the export diversification basket in developing countries. Alkın and Türkcan (2018) identify the effects of FDI on export. They decomposed Turkey's export data set into intermediate and final goods export. The results of the gravity model posed that FDI does not influence on intermediate goods. In contrast, there is a complementary linkage between FDI and final goods export and total goods export. Besides, the causality analyses also showed that the bi-direction causality relation between FDI and export.

4 Methodology and Results

In this study, we aim to investigate the relationship between export, including Low-Tech Export (LTE), Medium Low-Tech Export (MLTE) and Medium High-Tech Export (MHTE) and FDI by using Hatemi and Iraoundaoust Hidden cointegration approach on data covering the period between 2006:Q1 and 2018: Q3. All variables related to export are achieved from TURKSTAT, and FDI is obtained from EDDS.

The hidden cointegration approach criticizes the logic provided by the traditional cointegration. The traditional approach is based on the logic in which the cointegration relationship happens as economic variables respond synchronously to shocks. Some studies oppose the logic, and they argue that the effects of the positive and the adverse shocks differ from each other. Hatemi and Irandoust (2012) hidden cointegration approach is one of the methods used in the decomposing variables to detect the long-run relationship between the variables.

In this context, Hatemi and Irandoust (2012), the hidden cointegration test based on the traditional Johansen cointegration test reveals that positive and negative shocks have different impacts in series. When the cointegration test is employed between two cointegrated series such as x_{1t} and y_{2t}, the econometric model could be presented as follows:

$$x_{1t} = x_{1t-1} + \varepsilon_{1t} = x_{10} + \sum\nolimits_{i=1}^{t} \varepsilon_{1i}$$

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{20} + \sum\nolimits_{i=1}^{t} \varepsilon_{2i}$$

Both equations present that x_{10} and y_{20} define the initial values. ε_{1i} and ε_{2i} represent the zero-mean white noise series. However, x_{1t} and y_{2t} pose the aggregate state of series. The decomposition process is performed by using the separation of error terms in terms of the negative and positive shocks. The error decomposition process can be presented as follows:

$\varepsilon 1_i^-$= min ($\varepsilon 1_i$,d) and $\varepsilon 1_i^+ =$ max (ε_{1i},d); $\varepsilon 2_i^- =$ min ($\varepsilon 2_i$,d) and $\varepsilon 2_i^+ =$ ($\varepsilon 2_i$,d) with the variables present as $\varepsilon 1_i = \varepsilon 1_i^- + \varepsilon 1_i^+ + \mathrm{d}$ and $\varepsilon 2_i = \varepsilon 2_i^- + \varepsilon 2_i^+ + \mathrm{d}$. In these equations, *d* represents the threshold value and assumed to be equal to zero. Besides, $\varepsilon 1_i^-$, $\varepsilon 1_i^+$, $\varepsilon 2_i^-$, and $\varepsilon 2_i^+$ are based on the I(1) process. When these values are replaced in the first and the second equation, respectively:

$$x_{1t} = x_{1t-1} + \varepsilon_{1t} = x_{10} + \sum\nolimits_{i=1}^{t} \varepsilon 1_i^- + \sum\nolimits_{i=1}^{t} \varepsilon 1_i^+$$

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{20} + \sum\nolimits_{i=1}^{t} \varepsilon 2_i^- + \sum\nolimits_{i=1}^{t} \varepsilon 2_i^+$$

Assuming x_{10} and y_{20} represnts the intercepts and hence the next step can be followed:

$$x_{1t} = x_{10} + x_t^- + x_t^+$$

$$y_{2t} = y_{20} + y_t^- + y_t^+$$

The shocks achieve from the first stage of hidden cointegration analysis. Granger and Yoon (2002) hidden cointegration results are achieved when the Engle and Granger (1987) test is employed to the decomposed values of the series. However, the Johansen cointegration analysis is employed to the decomposed values, Hatemi and Irandoust (2012) hidden cointegration results will be achieved.

We examine the relationship between different technological level export and FDI. The presence of a long-run relationship between export and FDI may not be found when these variables' typical values are considered. However, when the variables with hidden components are used, there may be a relationship between these variables' hidden components. Thus, we employ Hatemi and Irandoust (2012) hidden cointegration to detect different technological export and FDI relationships. In terms of this approach, there are some requirements to employ the cointegration test. First, the positive cumulative shocks and the cumulative negative shocks are defined for each variable. Second, it is required to determine the stationarity levels of the series. The variables should be integrated at I(1). To realize this requirement, the positive and negative components of FDI and export, including LTX, MLTX, and MHTX, were first obtained; then, Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests were applied, and Table 1 presents the results of the unit root tests. The results confirm that the positive and negative components of export (LTX, MLTX, and MHTX) and FDI are non-stationary at the level; in other words, the series includes a unit root at I(0). Then, all series were converted into their first difference in which they become stationary.

According to these results, a hidden cointegration test can be employed between variables. Table 2 shows the results of Hatemi and Irandoust (2012) hidden

Table 1 Results of unit root tests

	ADF (original level)		ADF (the first difference)		PP (original level)		PP (the first difference)	
Variable	Constant and trend	Constant	Constant and trend	Constant	Constant and trend	Constant	Constant and trend	Constant
PFDI	−2.588 (0.287)	0.1137 (0.963)	−10.631*** (0.000)	−10.73*** (0.000)	−3.326* (0.07)	0.748 (0.992)	−11.134*** (0.000)	−11.15*** (0.000)
NFDI	−2.058 (0.554)	0.3753 (0.979)	−2.773* (0.07)	−2.784 (0.21)	−3.5225** (0.047)	0.328 (0.977)	−20.767*** (0.000)	−20.69*** (0.000)
PHTE	−2.5883 (0.2872)	0.1137 (0.963)	−10.631 (0.000)	−10.737 (0.000)	−3.326* (0.073)	0.748 (0.992)	−11.134*** (0.000)	−11.15*** (0.000)
NHTE	−2.0582 (0.554)	0.3753 (0.979)	−2.7846 (0.21)	−2.773* (0.07)	−3.5225** (0.047)	0.328 (0.977)	−20.767*** (0.000)	−20.69*** (0.000)
PMHTX	−3.22 (0.092)	−2.325 (0.168)	−5.674 (0.000)	−5.1664 (0.000)	−4.003 (0.0148)	−2.842 (0.059)	−13.031 (0.000)	−12.199 (0.000)
NMHTX	−2.824 (0.196)	−0.6279 (0.854)	−3.117 (0.114)	−3.084 (0.034)	−2.2541 (0.450)	−0.634 (0.853)	−5.659 (0.000)	−5.681 (0.000)
PMLTX	−1.693 (0.739)	−2.217 (0.202)	−8.351 (0.000)	−7.866 (0.000)	−1.362 (0.860)	−7.085 (0.000)	−10.851 (0.000)	−7.863 (0.000)
NMLTX	−1.898 (0.640)	−0.809 (0.807)	−7.743 (0.000)	−3.978 (0.003)	−2.154 (0.503)	−0.7054 (0.835)	−7.7033 (0.000)	−7.7429 (0.000)
PLTX	−1.833 (0.673)	−2.148 (0.227)	−7.9166 (0.000)	−7.4409 (0.000)	−1.6068 (0.776)	−5.865 (0.000)	−9.225 (0.000)	−7.439 (0.000)
NLTX	−1.848 (0.665)	−0.580 (0.865)	−6.288 (0.000)	−6.354 (0.000)	−1.848 (0.665)	−0.580 (0.865)	−6.278 (0.000)	−6.347 (0.000)

*10% significance, **5% significance, ***1% significance

Table 2 Hatemi-J hidden cointegration test results

Model	Trace statistic	Eigenvalue	Prob	Result
PLTX-PFDI	6.3935	0.1124	0.649	No cointegration
NLTX-NFDI	9.5775	0.0953	0.941	No cointegration
PMLTX-PFDI	7.074	0.1176	0.569	No cointegration
NMLTX-NFDI	2.594	0.0515	0.9822	No cointegration
PMHTX-PFDI	14.608	0.267	0.044	Cointegration
NMHTX-NFDI	18.4772	0.2910	0.017	Cointegration

cointegration. According to Table 2, there is no long-run relationship between the cumulative positive shocks of LTX and cumulative positive shocks of FDI, and the same existence is found for the cumulative negative shock between the variables. The results emphasize that LTX and FDI respond to shocks differently in Turkey. Furthermore, the same results were obtained for MLTX and FDI. In other words, a positive and negative shock in MLTX does not act with the impact of positive and negative shocks in FDI. Table 2 also shows a long-run relationship between MHTX and FDI concerning both the positive and negative cumulative shocks. A positive shock in MHTX is associated with the impact of positive in FDI. Besides, a negative shock in MHTX is also linked to the impacts of negative in FDI.

5 Conclusion

Export performance is one of the leading factors which provide sustainable economic growth and economic improvement. Many developing countries encounter many obstacles such as inadequate resources, low income, poor management, technological and labor skill, preventing increasing and diversifying export activities. Foreign Direct Investment (FDI) is accepted as an instrument for shaping companies in developing countries. Export performance is not enough because foreign trade is a dynamic process requiring producing new products and improving existing goods to sustain their foreign competitiveness. Diversifying and improving export activities are highly necessary because companies will continuously create and develop new products in the free market. There is enormous competition in the market, which wipes out companies that can not comply with the technology. Achieving FDI to improve export performance is one of the most desired policies in the World, which pushes the host countries to implement many foreign enterprises' policies. With the help of FDI, enterprises have tended to invest globally to eliminate tariffs, quotas, access foreign markets, and decrease production costs using host countries' cheap labor and raw materials.

Turkey is one of the countries implementing various foreign trades to achieve export performance, improve technologically, and stimulate the economic structure. Furthermore, the Turkish economy has encountered obstacles involving lower domestic saving, inadequate knowledge, insufficient innovation, and R&D

activities, which provoke the Turkish economy's performance abiding by foreign sources. Thus, foreign capital and foreign enterprises invest in the Turkish economy; macroeconomic indicators appear welcome. However, Turkey has some characteristics like geographical location, young and dynamic populations, cheap labor resources analyzed to the developed countries, and the government policies for inviting FDI.

Turkish export performance depends on low-tech export, medium low-tech, and medium high-tech export. Three of them appear to be dominants in the Turkish economy. Companies operating these technological fields should understand the relationship between FDI and various technological export goods to diversify the export products and implement policies for producing relatively high-tech products to achieve the developed countries. As a result, we employ Hatemi and Irandoust (2012) hidden cointegration tests in which the positive and negative shocks can be decomposed to detect the relationship between FDI and various tech exports such as low-tech export, medium low-, and medium high-tech export. According to the results of Hatemi and Irandoust (2012) hidden cointegration, there is no long-run relationship between the cumulative positive shocks of LTX and cumulative positive shocks of FDI, and the same existence is found for the cumulative negative shock between the variables. The results highlight that LTX and FDI reply to shocks differently in Turkey. Furthermore, the same results were found for MLTX and FDI. In another saying, a positive and negative shock in MLTX does not move with the impact of positive and negative shocks in FDI. However, it is also found a long-run relationship between MHTX and FDI concerning both the positive and negative cumulative shocks. A positive shock in MHTX is connected with the influence of positive in FDI. Furthermore, a negative shock in MHTX is also linked to the impacts of negative in FDI. The hidden cointegration approach emphasizes no long-run asymmetric relationship between FDI and low and medium low-tech export; on the other hand, there is a long-run asymmetric relationship between medium high-tech export and FDI. Companies and governments should work cooperatively with foreign investors, sustain, and create locational advantages, and implement policies inducing lower costs because low and medium low-tech export plays a dominant role in export performance.

Turkey's economic growth periods are periods in which the current account deficit is increased. The most important reason for this is the intensive use of imported intermediate goods in production. The fact that the production technology has not been developed at a competitive level causes imported intermediate goods demand. The added value created in production for the foreign market is meager. Here, innovation and technology are the two essential elements that determine the economy's global competitiveness. The development of these two elements depends on both structural policies and foreign direct investments. Increasing competitiveness with structural policies is vital for high and sustainable growth. Foreign direct investments are supportive of this process. Therefore, an accurate determination of foreign direct investment and export strategy could increase competitiveness of Turkish exporter firms in international markets.

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A Research on Effect of Performance Evaluation and Efficiency on Work Life

Kağan Cenk Mizrak

Abstract In this study, performance evaluation and efficiency, which are measurement techniques in business life, are discussed and research has been done on their effects on work life. Namely, the study tries to find out whether performance evaluation and efficiency have an impact on working life. In the study, importance of performance evaluation and productivity are explained benefiting from the most recent studies in the literature and a face-to-face survey is applied. The data collected with the survey have been analyzed and interpreted with the help of SPSS program. Findings of the survey suggest that work life has been greatly influenced by performance evaluation and efficiency at workplace.

1 Introduction

In today's business world where the information age is mandatory, companies strive to compete in very complex environments. This new business environment gives the right to survive only to companies that are global-scale, able to create a value chain from their suppliers to their customers, have rapid change and innovation skills, have knowledge of the past, but focus on future and have a functional structure. Therefore, it is vital that companies know and understand their goals very accurately and the methods they will use to achieve these goals. For this, company executives need tools and indicators that are determined according to their strategies and abilities and measure environmental and performance conditions from many different angles (Vukšić, Bach, & Popovič, 2013).

The development and innovation of a business are more related to human resources than material resources. The most basic and indispensable feature of human resources for the business is that they work in line with the objectives of the business. It is also unthinkable for an enterprise that does not take into account

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the performance and performance management principles to get the required efficiency from the human power.

Today's businesses try to integrate organizational goals with individual goals by investing in human resources. Thus, it is aimed to increase the resistance of the organization against the negative effects from outside and to improve the adaptability (Tang, Pee, & Iijima, 2013).

The system approach, which is counted as a modern management approach, still maintains its validity in the field of business administration, despite new models such as "Total Quality Management," "Management by Objectives," "Process Approach." As it is known in the system approach, certain inputs are used in the system, and they go through one or more processes and as a result, outputs are obtained (Wang, 2020). If there is a faulty output, the error is tried to be corrected with feedback. Each organized job that we adapt to this cycle takes us to examine events with the system perspective. For example, when the production activity is considered in this way, system inputs such as material, worker, machine, energy are used and it continues with the workers processing the material in the machines and ultimately outputs are obtained. After that, final checks are made, and defective products are sent back to the production system for correction. This can be very complex depending on the nature of the system. However, obtaining outputs from inputs, which is the common point of all systems, guides us to some indicators of how well a system works. For the production system in the example, it can be said that the more the number of products produced without error, the better the system works (Gong, Li, & Yin, 2019). For this, the number of outputs produced by the system can be taken as an indicator, which leads us to the concept of performance. On the other hand, how well a system works can be obtained by proportioning the inputs and outputs of the system, which leads us to the concept of efficiency.

Businesses are mostly systems that include production. Performance indicators and efficiency indicators of the operating system can be dealt with in various ways (Nojavan, Heidary, & Mohammaditabar, 2020). For example, performance and efficiency indicators can be determined for the production system or for the marketing unit. The common point is that each of these indicators is indicators of the entire operating system. Because, according to the system approach, a system consists of many subsystems that form itself, and their good working means that the whole system works well at a certain point.

Efficiency and performance are two key indicators for seeing where the transmission system is headed. People often use these words to mean each other and in fact, they mean very close to each other. However, there are differences between them as calculation methods. For example, when evaluating according to the output values obtained in performance calculations, the output value obtained in efficiency calculations is proportioned with the input value and the evaluation is made according to the ratio obtained (Yu, Shi, You, & Zhu, 2021). For example, if a person produces 100 products a day at the machine, this is his performance. However, this is not efficiency because the output obtained while calculating the efficiency is proportional to the input. In this example, the efficiency of the product can be calculated by proportioning the number of products produced with the input of the energy used, and the productivity of the person who produces the same number of products using less energy than the person who produces the product using more energy is higher (Kotane & Kuzmina-Merlino, 2017). In this respect, performance evaluation and efficiency should be handled together.

Although there are many studies that deal with performance evaluation and efficiency theoretically, in this study, performance evaluation and efficiency are discussed theoretically and the theoretical part is tried to be expanded and updated by making use of recent studies. In the application part, the statistical results of the questionnaire about the effect of performance evaluation and productivity on working life are included and interpreted. These results are obtained with SPSS program and presented by interpretation.

2 Theoretical Framework

2.1 Performance Evaluation

Performance evaluation is among the most important functions of human resources management. Studies are conducted to determine the effectiveness and success level of the person in any subject with performance evaluation. Measuring efficiency and success is a very difficult task. The main reason for this difficulty is that what is at stake is an assessment for a person. Another challenge is that performance or success is a subjective concept (Choi et al., 2017).

Performance appraisal is the assessment of individuals' work, deficiencies, competencies, excesses, insufficiencies, regardless of their duties in the institution. It is important for individuals to assess themselves and to be assessed from time to time by the institution in order to see to what extent they fulfill the requirements of the role they occupy. In addition to the performance appraisals of individual people, the performance appraisal of the institution as a whole can be considered as an important process (Lendel & Varmus, 2014).

Performance evaluation is the determination of the level of performance of an individual within the framework of a specific job and job definition, the effort, and the level of the employee to perform his/her defined tasks within a certain time frame. Thus, the person sees the results of his/her own work, in a sense, and evaluates the results of his individual success (Watanabe et al., 2016). On the other hand, the institution sees to what extent the terms of the employment agreement with the person are fulfilled and to what extent the employee's interests and abilities are reflected in the work. At the same time, the job success of the person, whether he has reached the standards in the job description, and the level of career planning will be determined by performance evaluation. According to the results obtained, it is determined how much the person's expectation of success is realized. As a result of this information, the management can make decisions about the promotion of the person, career planning, increase in salaries, change of duty, dismissal and similar issues (Ramakrishnan & Kaur, 2020).

2.1.1 Importance of Performance Evaluation

Performance evaluation mainly chooses the individual as the focus. Evaluation in the organization starts with the human elements and ends with the human, with the arrangements related to it. Individual organization incompatibility can instantly disrupt the work of the organization and reduce its effectiveness immediately. Therefore, performance evaluation, which is a study aimed at improving the individual and maximizing his/her harmony with the organization, is an important study (Wu, Lin, & Tsai, 2010).

The performance element does not constitute the essence of management and organization in the enterprise. Undoubtedly, it is much more difficult to evaluate the human being, who has a very complex structure, than the property, machinery, and buildings. Being able to make management and organization appraisal correctly, in which performance appraisal is at its core, is the primary appraisal problem of businesses struggling to survive and develop today (Hameed, Nisar, & Wu, 2020). Performance evaluation is of great importance in terms of increasing productivity, training, developing, rewarding, and determining the principles for promotion decisions in an enterprise.

2.1.2 Performance Evaluation Applications

Performance evaluation can be made in three ways: evaluation of individual performance, evaluation of business performance, and evaluation of corporate performance. Each has its own methods (Keil, Reibstein, & Wittink, 2001).

In the evaluation of individual performances, individual standards are determined for each job to be evaluated and evaluation is made within the framework of the determined standards. It is a form of assessment based on competence. This is more suitable for evaluating middle and upper-level people. Because, in this type of evaluation, the standards and competencies are determined by considering the personal characteristics of the people rather than the jobs they do are taken into consideration (Ghosh & Lusch, 2000). When making such an evaluation, first, the competencies to be addressed, in other words, the competencies to be used as criteria in the performance evaluation system are determined. Some competencies that a manager should have can be listed as follows (Vegter, van Hillegersberg, & Olthaar, 2020):

- Technical skill
- Ability to practice
- Personal integrity
- Leadership in general
- Contribution to individual development
- The ability to motivate

There is no accepted standard for what competencies will be. It can be as written above, or it can be different. Competence is a concept that has the flexibility to be determined in different ways according to the structure of the business and its employees. Therefore, this performance evaluation system depends on the expertise and experience of the founder. However, the point that should not be forgotten is that the competencies to be addressed in the evaluation give an idea of how successful the performance evaluation system will be (Choi et al., 2020).

At this point, risks are minimized, and employees can be motivated in a performance evaluation application created by taking the opinions of the employees. For this, it is the right approach to get the opinions of the employees through a survey (Paraschi, Georgopoulos, & Kaldis, 2019). Another important issue is that the determined competencies should be compatible with the corporate objectives of the enterprise. In other words, individual performance evaluation and corporate performance evaluation should be compatible. After the competencies are determined, scales are created that can be easily scored by the evaluators to measure the degree to which people carry the competencies (Dincer, Yüksel, & Martinez, 2019).

After the performance data is collected, score calculation is made for each competency, considering all forms filled in for the person to be evaluated. For this, the scales marked are checked. A score is determined for each scale determined, and with its help, competency-based score calculation is made. The scales marked in each performance criterion are converted into points and the scores obtained by each competent person for each evaluator are deducted. Finally, the average of the scores obtained in all evaluation forms is calculated (Ruiz & Sirvent, 2019).

Corporate performance evaluation is an evaluation that will be used to measure and see the direction of the enterprise in a way that is integrated with the individual targets of the institution’s strategic goals (Dinçer, Hacıoğlu, & Yüksel, 2017). As can be understood from the definition, it is both a traditional and competency-based assessment method. However, it was developed inspired by the traditional method. That is to say, while performance evaluation in the traditional method is based on profit and efficiency, today it has turned into a form that includes the following elements (Chen, Li, & Lu, 2018):

- The power to see opportunities
- Learning speed
- Getting what’s new
- Quality
- Flexibility
- Security and responsibility

As can be seen from the elements it contains, it is based on the principle of measuring and improving the performance of all functions of the enterprise such as finance, accounting, production, and marketing. In this sense, when evaluating corporate performance, firstly, performance criteria including the objectives of all functions of the enterprise are determined. The feature of these criteria is that they are measurable, specific, accessible, relevant, and limited to a certain period. One of the points to be considered while determining the criteria is that the criteria comply with the mission, vision, and strategies of the enterprise. After the criteria are determined, a performance table is created to measure with a method called performance report (Kaplan & Norton, 2005).

Performance scorecard is a quality that enables everyone, who includes the long-term goals of the enterprise, to head towards the goals in a healthier way. Therefore, the values obtained because of the measurement in the future will be an indicator of how far the company has reached the place it wants to be in the future (Dincer, Gencer, Orhan, & Sahinbas, 2011). Creating a performance report can be briefly summarized as follows. Performance scorecard consists of four dimensions, each of which has equal weight as financial, customer, processes, learning, and development dimensions, and performance criteria are determined and weighted in themselves. Thus, a performance report is created. In the next step, data are collected and evaluated. The evaluation of corporate performances is done in the following way. The obtained value of the performance criterion determined for each dimension is entered in the table. The weighted scale values are obtained by multiplying the determined weights and the obtained criteria values. By adding these, the value of each dimension is reached. Finally, the weighted sum is obtained by multiplying the dimensional weights with these and the evaluation result is found (Hoque & James, 2000).

The evaluation of job performance is based on the evaluation of the performance of the relevant people as a group, based on the outputs of the work done within the company. For example, the main job for customer representatives is to evaluate the number of orders they receive. In this evaluation method, the works are analyzed, the main task of everyone is defined and the output results are collected and evaluated periodically while performing their duties. It is a traditional form of evaluation. In other words, an evaluation is made on the data received from a single source. The resource in question is the output amount of the work done (Budde, 2007).

Job performance evaluation is more suitable for employees who are in an operational position. Because it may not be possible to take a concrete output for a manager. It is easy to evaluate the performance of employees in an organization based on physical production (Grigoroudis, Orfanoudaki, & Zopounidis, 2012). Generally, the amount of production is counted, and this number is compared with the previous productions of the employees. This comparison can also be done by benchmarking with other organizations. Individual characteristics of the person are not considered in the evaluation of job performance. It is only measured to what extent or not. This is a weak aspect of evaluating work performance. Because when it comes to a person’s job performance, it is expected to be in a race with the people who do the same job. However, there may be some negativities caused by this competition. For example, a more experienced person doing the same job will likely achieve more results. This can lead to conflict for less experienced people doing the same job (Quezada, Reinao, Palominos, & Oddershede, 2019).

The stage of evaluation of job performance is as follows. The daily work outputs for each job determined are collected every day and processed on a performance evaluation form. Weekly evaluations are calculated at the weekend and it is checked whether the intended value has been achieved. Jobs with low and high performance are detected. In this way, the evaluation takes place every week and the monthly performance is checked at the end of the month. In the same way, low and high performances are determined by comparing the intended values with the actual values. The period in which the awards and incentives will be made after the evaluation is determined by the performance evaluator. If it is held weekly, awards are given according to the values obtained every week or according to the values obtained at the end of the month if it is done monthly (Shen, Chen, & Wang, 2016).

2.2 *Efficiency*

If a general definition is made, efficiency is the relationship between the output produced by a production or service system and the input used to create that output. For this reason, efficiency is defined as the use of resources, labor, capital, land, material, energy, information-factor in the production of various goods and services. High efficiency means producing more with the same amount of resources or obtaining more output with the same input. This relationship is commonly expressed as follows (Román-Collado & Colinet, 2018):

$$\text{Efficiency} = \text{Output}/\text{Input}.$$

The importance of the social aspect of efficiency is increasing day by day. A survey of executives and unions at some American firms found that the vast majority of executives (78%) and union leaders (70%) did not use a definition of efficiency based solely on quantitative assessment. They prefer a broader, more qualitative definition of efficiency in their business. Management and trade union policymakers understand the effectiveness and performance level of the entire organization when it comes to efficiency. This includes intangible features such as workers' turnover, absenteeism, and even customer sentiment. It is understood that policy makers are linking worker sentiment, customer sentiment, and productivity with this comprehensive definition of efficiency. Generally speaking, efficiency is a comprehensive measure of how well an organization can approach the following criteria (Baležentis, Li, & Chen, 2020).

Objectives: The degree to which these are realized.

Efficiency: The extent to which resources are used effectively to provide useful output.

Effectiveness: Actual compared to what is possible.

Comparability: The state of productivity performance over time.

2.2.1 Importance of Efficiency

During social and economic development, efficiency is more important than many factors because there is no human activity that does not benefit from the increase in productivity. One of the various criteria of being successful in business and evaluating success is efficiency. Efficiency increase directly raises living standards. Therefore, today, efficiency is the only source of real economic development, social progress and increase in living standards all over the world (Kim & Hong, 2020). The reasons that make efficiency important can be discussed in terms of individuals, businesses, and countries.

The awareness of the problem of efficiency increases in developed and developing countries, and the need for productivity measurement and productivity-increasing techniques to be developed and widely used is a relatively new development. The increasing scarcity of factors used in production for the purpose of producing for national and international markets and the resulting costly factor prices have brought up the problem of more efficient use of resources, especially in developed countries (Murakami & Kato, 2020).

Every business that manufactures for the purpose of selling in the national and international markets has the option to use all kinds of resources more efficiently than other businesses after a certain point (Herman, 2020). Only in this way, businesses can survive, gradually expand and reproduce themselves. Likewise, it is only possible to increase the welfare level of societies and to ensure that countries can preserve their economic and therefore political independence only if that society and country use its resources more efficiently than other communities and countries. On the other hand, various studies conducted in the USA, for example, clearly show that the economic growth in developed countries can be achieved by increases in total productivity rather than increases in input quantities. Therefore, intensive efforts are being made in these countries to increase the efficiency level in the use of all kinds of resources (Herrera-Restrepo & Triantis, 2019).

Making new investments in countries managed by a free-market economy is directly related to the economic results achieved by businesses. This situation enables a country to compete with other countries (Ma, Zhang, & Yin, 2020). On the other hand, in determining productivity, investment, and income policies, it is an important tool for timely detection of fluctuations in production factors and taking necessary measures. In addition, productivity is the primary means used in economic comparisons between countries in accelerating country development, lowering inflation rates, sharing national income, rational processing of businesses, and planning investments (Alam, Miah, Hammoudeh, & Tiwari, 2018).

2.2.2 Factors Affecting Efficiency

Productivity is defined as obtaining good results by using all the resources the business has effectively. Benefiting from modern technology, developing effective methods and techniques are reasons to increase productivity for an enterprise. In this case, the inputs should be reduced, and the outputs should be increased in order to increase the efficiency (Glocker & Wegmüller, 2018).

However, it cannot be said that this principle is always valid and correct. Because there are other factors that affect efficiency in the production of services or goods. These are time, quality, and economy. Many factors affect productivity positively or negatively. These can be summarized as follows (Bjuggren, 2018):

- The type of government (classical, liberal, and democratic government),
- The way of implementation of planning, organization, coordination, and control functions,
- Division of business–expertise relationship,
- Time and resource losses,
- Moral status,
- Education status,
- Wage system,
- Laws that are difficult to implement,
- Physical conditions (light, ventilation, humidity, heat, sound-noise conditions in offices),
- Aesthetic and decorative conditions (color, music, trinket, painting, decor, cleaning, flower use in offices, etc.),
- Age of working methods (adherence to traditional methods).

3 A Research on Effect of Performance Evaluation and Efficiency on Work Life

3.1 Research Subject and Problem

In this study, the answer to the question of how effective performance evaluation and productivity are in work life has been sought.

3.2 Purpose and Scope of the Research

The aim of this study is to determine whether performance evaluation and productivity influence work life in enterprises. This study has been applied to university graduates in a private company in Istanbul.

3.3 Research Method

The data required for the research has been collected using face-to-face questionnaire method. Face-to-face questionnaire method has been preferred due to its high response rate and the possibility to ask many questions. Employees have been asked questions about the fairness, results, and efficiency of performance evaluation in the questionnaire form. The survey has been conducted with 250 university graduates working in private companies in Istanbul. 15 questions have asked in the applied questionnaire. In order to ensure that employees give more impartial answers to the survey questions, no names have been asked in the survey. The data obtained from the survey analyzed with SPSS program.

4 Findings

This part has been prepared to determine whether university graduates working in private companies in Istanbul are subjected to a fair performance evaluation and whether they work efficiently. 250 questionnaires given to employees have been evaluated. The data collected from these surveys have been analyzed by statistical methods and the findings obtained have been interpreted. The distributions of the participants in the study regarding the questions specified in the questionnaire have been examined and comments on the results have been included.

Below statements have been given to employees in private companies and they have been asked to evaluate them choosing the appropriate answer among; I strongly disagree/I do not agree/I am indecisive/I agree/Absolutely I agree.

- Individual performance assessment is made fairly, objectively.
- All kinds of promotions are based on individual performance evaluation results.
- The criteria used by the manager in evaluating the employees are announced to the employees.
- Managers investigate causes affecting employees’ performance.
- Managers take necessary precautions to increase employees’ performance.
- I consider myself a valuable member of the company.
- I enjoy my job and I love my job.
- My salary is sufficient.
- Managers’ attitudes and behaviors are motivating employees.
- I am proud to work in this company.
- Company management supports me in fulfilling my task.
- Company manager rewards employee (or team) who performs well with monthly awards, appreciation, etc.
- Managers appreciate staff/team who performs well by announcing them at meetings.

- Fairness, impartiality, and objectivity are essential in all kinds of rewards and promotions.
- Positive work done in the company is appreciated.

As a result of the survey, it has been found out that most of the private company employees surveyed do not rely on the performance evaluation made in their companies. The vast majority have no idea about being promoted or rewarded. Furthermore, participants of the survey state that most of the private company managers do not announce the performance evaluation criteria to their employees. Employees do not investigate the reasons that affect the performance of the employees, and this reduces the reliability of the employees to the performance evaluations.

Moreover, the findings suggest that managers have not taken any measures to increase the performance of the employees. With this result, employees cannot provide sufficient efficiency until they find the right measure by finding methods on their own. Also, participants indicate that they are not made feel valuable for the company. This result is thought to partially reduce the productivity of the employees.

The results show that most of the private company employees participating in the study love and enjoy their work. This can be thought to be shown as a factor in efficient work. It is assumed that works done with pleasure are done less erroneously and willingly. It seems that more than half of the private company employees working in the survey have no idea of satisfaction with their wages. Managers of most of the private company employees surveyed are thought to display motivating attitudes and behaviors to their employees. This of course affects efficiency and performance positively.

It is also understood that most of the private company employees surveyed are undecided to be proud of the company they work for. This sometimes leads to reluctant work and degrades performance. Survey results show that most private company employees are unsuccessful and unstable in their management to support their employees in the performance of their duties. It is also found out that the managers of most of the private company employees do not reward their well-performing, successful employees in any way, which negatively affects the motivation and productivity of the employees.

Finally, participants think that rewards and promotions made in companies are not fair. This situation changes the attitude of the employees towards those people and disturbs the peace within the company, and the productivity decreases considerably. According to the answers given to the statement “Positive work done in the company is appreciated,”, it is seen that the positive work done by most of the company employees is not appreciated. This negatively affects the efficiency and performance of the employees.

5 Conclusion

Performance evaluation and efficiency are not only a measurement technique that helps employees to see how successful they are while performing their jobs, but also have effects on working life. Some of the most important effects of performance evaluation and productivity in work life are factors such as wages and working environment. As efficiency increases, wages increase. As the peace at work increases, performance increases. Also, performance and efficiency increase if performance evaluation is fair. Of course, the higher the performance is, the higher the wages are.

In the survey conducted in the research part of this study, 15 questions about working life, from the fairness of performance evaluation to its results, wage adequacy, and enjoyment of the job have been asked. These responses were interpreted after statistical analysis in the SPSS program, and it is seen that most of the people surveyed do not say that performance evaluation is fair. They even argue that the effects of its results are unfair. Many people are undecided about whether they enjoy their job and thus cannot work efficiently. The impact of efficiency and performance evaluation on working life is enormous.

Today, performance evaluation is applied in almost every business as a measurement technique. No business manager can ignore the effects of efficiency and performance evaluation on business life. Of course, working life can be affected by anything, but efficiency and performance evaluation are among those that have the most impact.

In the study, it has been examined whether they have only effects or not, and which effects are positive and which effects are negative could be examined and investigated. At the same time, these effects can be examined separately.

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Proactive Marketing Decision-Making in Digitalization Age: How Can Data-Based Methodologies Help to Marketing Research?

Fatih Pinarbasi

Abstract The advancements in the marketplace and reactions of market actors are the key factors in the history of marketing research and decision-making. The various changes in the market environment play a crucial role in understanding and reacting to different marketing situations. From this perspective, the new data sources, contexts, and methodologies have been instrumental in understanding cases in the market environment and marketing-related concepts. Examining the marketplace and understanding the market cannot be sufficient for proactive marketing management, since the new marketplace requires a sophisticated approach evaluating the market actors and acting regarding the changing market variables. As the popularity of social media platforms and data-based technologies increase in the marketplace, the amount of produced data, the variety of data contexts, and the need to use new data-based methodologies increase. The "new" marketplace uses many social media and digital platforms daily and produces a large volume of data in different formats surrounding the customers and businesses in the marketplace. Digital platforms have begun to offer innovative data formats for internet users to express themselves as ephemeral media or multimedia formats, and these data formats as contexts require different data-based methodologies for understanding. The study seeks to examine the current data-based methodologies concept for marketing decision-making and marketing research. For this purpose, the study employs a review approach to evaluate the data-based methodologies for marketing research and decision-making context. The study evaluates the topic in three sub-sections: the big data, emerging data contexts and data-based methodologies. The comprehensive approach included in the study will contribute to a better understanding of current data-based methodologies and how can they be used for marketing decision-making.

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1 Introduction

Marketing science, whose origins are based on the science of economics, has gone through many different stages called production, product, sales and marketing through history. Elements of the marketing environment could be summarized as; the exchange transaction between the seller and the buyer, which is the subject of a benefit, the product or service subject to the exchange, a market where the exchange transaction takes place, and the seller and buyer actors performing the exchange transaction. The marketing periods are affected by many factors from various market characteristics such as production quantities, sales of products or services produced, competitiveness. Today, the elements in the market environment witness change in the markets. Nowadays, online platforms are used as the "market," buyers and sellers come together through online channels, and competition conditions are affected by digital platforms' conditions.

The evaluation of Web's history indicates three main period: Web 1.0, Web 2.0 and Web 3.0. According to Curran, Murray, and Christian (2007), Web 1.0 refers to read-based usage, content created by authors of websites and tend to be static. However, Web 2.0 mostly relies on writing and contribution, content created by everyone and has the dynamic characteristic. Web 2.0 can be defined as "*a collection of open-source, interactive and user-controlled online applications expanding the experiences, knowledge and market power of the users as participants in business and social processes*" (Constantinides & Fountain, 2008. The difference between the Web 2.0 and Web1.0 indicates how content produced, how it is used and the characteristics of the content. In addition to these periods, Web 3.0 is another topic for Web technologies, and it includes semantic web concept. According to (Yu, 2007) "*It is about having data as well as documents on the Web so that machines can process, transform, assemble and even act on the data in useful ways.*" The three web concepts can be summarized as the beginning of web content by individuals, improving web content by people online and enhancing of Web by machines.

Following digital platforms and technology, one of the most important factors for today's marketing decision is consumers. Today's consumers intensely experience traditional purchasing behaviour and socialization behaviours through digital platforms, along with digital platforms and technology. If the consumer, which was the subject of marketing 30 years ago, is compared with the consumer that will be the subject of today; differences can be seen in terms of (1) the form and frequency of shopping, (2) the technological tools used in their daily life, (3) the way they interact with their immediate surroundings and social environment, (4) their interaction with businesses, and (5) the information they share with businesses. Today's consumer is different in all these aspects, and this difference should be carefully evaluated in terms of marketing decision-making.

Understanding the data is the key to understanding the "new" customer. According to we are Social and Hootsuite (2020), the total population is 7.75 billion people, and internet users refer to 4.54 billion people while active social media users refer to 3.80 billion. A consumer with a smart mobile phone with mobile applications can use chat apps for interacting with other people, social media apps for expressing themselves, location-based apps to share the locations they visit and multimedia apps for listening music or watching movies. All these consumer behaviours can lead to data production in different forms, and business can use the data for marketing decision-making. The data topic in marketing environment could be examined in three main topics: the produced data (big data), the data contexts and the requirement of new data-based methodologies. From this point, the study aims to address the data-related issues with these topics and employs a review approach to investigate the sub-topics. The study consists of two main sections: strategic marketing management section which examines the current business environment in the digital age by management approach, data-based methodologies and marketing research section which evaluates the methodologies in three sub-sections. The final part of the study proceeds with a summary of the conclusion and future research directions for marketing research.

2 Strategic Marketing Management in Digital Age

Strategic decision-making and proactive approach concepts within management science scope are essential for today's marketing decision-making, especially in a digitalized market environment where competition is increasing. When the proactive approach is evaluated from a marketing perspective, it refers not only to identify or interpret market-related variables but also refer to take actions to direct them. At the same time, it could also include making predictions for the future by going beyond understanding the current situation. Hence, today's market environment requires an advanced research approach to understand the current market variables and make future predictions.

In today's digitalized marketing environment, strategic thinking and strategic decision-making are essential for competitive advantage and survival in the market. From this point of view, it can be concluded that a successful marketing strategy requires following the developments in the market, analysing them with appropriate methods and reacting accordingly. When the proactive strategy is examined in terms of social media communication, tracking social media posts about the brand and spotting anomalies is an example of a reactive marketing approach. On the other hand, by reacting according to the customers' reactions, directing these reactions in favour of marketing management is an example of a proactive approach.

In today's digital world, brand-consumer communication has a very dynamic structure. Customers react to brands using many different digital channels, competitors in the market make competitive moves using differentiated digital advertising strategies, and many different actors shape digital markets. At this stage, some issues need to be evaluated strategically in marketing decision-making. These issues can be listed as: (1) a clear definition of the presence of the business in digital environments and the structure of business-consumer communication channels, (2) measurements related to the marketing activities in the market, determining the "normal/average" metric values for the detection of abnormal cases can take place in future, (3) identification and listing of the types and contexts of data produced related to the activities in the market, (4) decision of choosing the appropriate methods for processing the listed data types.

In addition to the requirements for understanding the current situation, predicting the future of market variables has become one of the critical issues with the use of data mining methods, which have become widespread in recent years. It is very beneficial for strategic marketing management and proactive approach, making inferences about the next actions to take place in the market by recording market variables' current situation as numerical metrics or lexicon-based interpretation structures.

Proactive marketing strategy and complex market structure require a comprehensive approach as the market environment includes various sub-contexts and variables. The employed approach in the study refers to the data side of the market environment, and the next section presents an overview regarding data-based methodologies in marketing research as listing three sections for data-based approach. The sections will evaluate "what?" question by the big data section, "what/how?" questions by the data contexts section and "which?" section by the data-based methodologies section.

3 Data-Based Methodologies and Marketing Research

The data concept in the digital world has a crucial role for industries and marketing decision-making, while the scope of the content is quite broad with sub-components. The study evaluates the complex data concept from a marketing perspective with a proactive approach and divides the concept into three main sections: big data, data contexts and data methodologies. Big data section simply refers to the amount of produced data in the marketplace which consists of text-based, multimedia and other types of data. On the other hand, the data contexts section is related to new data contexts emerging in recent years. The contexts included in the section are mostly related to the changes of social media usage patterns, as it includes ephemeral media, prominently visual media and multimedia content. The final section has a complementary role in understanding the data-based methodologies approach since it focuses on different data methodologies for the data produced in digital platforms. Marketing decision-making must evaluate the data included in digital platforms, the data contexts/types in the platforms and employing of different methodologies for the data.

3.1 The Contribution of "Big Data" to Marketing Research

Big data is defined by Gartner (2020) as "*high-volume, high-velocity and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation*". The amount of data refers to "high-volume" part and high-velocity refers to the speed/rapidity of the data in the digital platforms, while the different types of data like text-based, multimedia based content refer to high-variety of information. As Fan and Bifet (2013) point out, variability refers to the changes in data structure and the way of interpretation of data by users, while the value is related to the value of competitive advantage that is given to businesses regarding using the data and benefit regarding decision-making.

The presence of big data in the marketplace must be considered for today's marketing. The growing popularity of the social media platforms and using of technology makes the social media channels as a crucial part of consumers' daily lives. As time passed in the digital world increases, the amount of data produced by consumers and brands also increases and it becomes a crucial part of marketing decision-making. The consumers today share the micro-moments of daily lives on social media as "Story"/"Snap" or other types of ephemeral media, write their opinion in text format on Twitter, send the location of the place they visit on Swarm and use Spotify and Netflix for their multimedia preferences. All of the elements surrounding the customers on the web make the data potential for marketing research, as the marketing research could employ these data for market insights.

For the academic side of big data-marketing relationship; Amado, Cortez, Rita, and Moro (2018) examine the big data literature in the marketing area with the 1560 articles published between 2010 and 2015 and they conclude that although there are lots of researches for big data in the marketing area, there are limited studies pointing the advantages related using big data in marketing. It can be concluded that big data has popularity as a concept in marketing research; however, the benefits of using the concept could be more emphasized.

For the business side of the big data-marketing relationship, a marketing mix framework for big data management concept is presented in the study of Fan, Lau, and Zhao (2015), the framework consists of three main parts (data, method and application) with the 5 marketing P's (people, product, promotion, price and place). The data section of the framework includes various data types for the big data management: demographics, social networks, customer review, product characteristics, location-based social networks, promotional data, and transactional data. On the other hand, the application section of the framework signals how marketing decision-making can use big data concept for business cases. Some of the applications included in the study refer to customer segmentation, customer profiling, promotional marketing analysis, recommender systems, location-based advertising, and community dynamic analysis. Big data concept presents an opportunity for marketing decision-making with providing a large quantity of data and different application opportunities.

For the strategy side of big data analytics and marketing strategies relationship, Ducange, Pecori, and Mezzina (2018)'s analysis on social big data focusing on the literature with 52 studies concludes four clusters for social big data and marketing strategies: (1) integration of traditional market research and strategies with defining new scenarios, innovating products and services or analysing competitors, (2) development of online and off-line advertisement campaigns, (3) analysis of perception and reputation management in terms of brand, products or services for a specified company, (4) managing of customer relationships. For the implementation or processing the big data side; Erevelles, Fukawa, and Swayne (2016) examine the big data consumer analytics concept and employ resource -based theory to present a conceptual framework. Physical, human and organizational capital are included in the framework and the processes of collecting and storing consumer activity data, extracting consumer insight from big data and utilizing the insight for improving adaptive capabilities are moderated by these resources.

Recent studies in big data concept in marketing include a variety of contexts such as CRM information systems (Talón-Ballestero, González-Serrano, Soguero-Ruiz, Muñoz-Romero, & Rojo-Álvarez, 2018), production success (Saidali, Rahich, Tabaa, & Medouri, 2019), real-time big data processing (Jabbar, Akhtar, & Dani, 2020), sales in B2B (Hallikainen, Savimäki, & Laukkanen, 2020), B2B analytics (Holland, Thornton, & Naudé, 2020), commercial social networks (Kauffmann et al., 2020) and so forth. In the first part of the study, the subject of big data, which has been an essential topic of agenda in recent years, and its place in terms of businesses are examined, the next section will examine the subject in the context of data types.

3.2 Emerging of New Data Contexts

The traditional data contexts are the subjects of a large and growing body of literature in the last 20 years with the popularity of social media and internet platforms. There are many studies in the literature which focus on different types of platforms like Twitter (Lahuerta-Otero & Cordero-Gutiérrez, 2016) and the content on social media (Smith, Fischer, & Yongjian, 2012; Swani, Brown, & Milne, 2014). However, the subject of new data contexts is mostly concerned with competition and marketing activities related to businesses that have occurred in the market in recent years.

The first topic in new data contexts refers to ephemeral media content type, as the popularity of "Snap" concept by Snapchat platform continues with "Instagram Stories" concept in Instagram platform and other platform products. The ephemerality concept included in the different product names refers to time-constrained social media content enriched with interactive and graphical elements. This new concept indicates a different customer behaviour related to self-expression and could be evaluated for different segments of customers.

The second topic in the new data contexts refers to the multimedia side of the content, as the social media platforms offer a wide range of interactivity in the content. Yu, Xie, and Wen (2020) focus on the visual side of social media content and examine the Instagram content in terms of colour psychology, while they evaluate the colours with Instagram post popularity. In another study, Park and McMahan (2020) study the YouTube content with content analysis while they include different variables including video types, message tones and message appeals.

The final topic in the new data contexts refers to sub-elements included in the data on web platforms. These could refer to interactive elements, emojis or any specific communication element in the data. For example, McShane, Pancer, Poole, and Deng (2021) evaluate the emoji element with brand engagement on Twitter while they conclude a positive relationship between emoji use and brand engagement. In another study, Xu and Zhou (2020) study on hashtag homophily in Twitter networks and uses topic modelling approach to examine more than 100.000 tweets.

The new data contexts in the marketplace could be employed in two perspectives: (1) understanding the data-specific characteristics, (2) evaluating the engagement side of the data (consumers in the market). The first perspective contains a data-based approach and focuses on the technical/structural side of the data context which could refer to sub-elements or unit-based characteristics. The questions in the first perspective could lead to:

- What are the main characteristics of the new data context? (for example, ephemeral media)
- What are the dominant characteristics included in the specific platform for the new data context? (for example, top used multimedia elements in video marketing)
- How can the characteristics of the new data context be clustered?

On the other hand, the second context focusing on the engagement side leads to consumer-data engagement questions:

- What are the optimal characteristics of the new data context? (for example, detection of the most liked elements in the audio-based content)
- Which relations/causalities can be estimated between the data context and consumer engagement? (regression-correlation based studies focusing on engagement factor with different elements of the data context)
- How can the current relations/causalities be used for forecasting/estimating the future actions of consumers?

Recent studies in the new data contexts discuss many contexts including audio attributes of songs by Spotify API (Pinarbaşi, 2019), video mining (Li, Shi, & Wang, 2019), the role of colour psychology (Yu et al., 2020), mobile application reviews (Dinçer, Yüksel, Canbolat, & Pınarbaşı, 2020; Pınarbaşı & Canbolat, 2018). As the big data concept and new data contexts are discussed in the first two sections, the next section will focus on "how can data be used with different methodologies?" question for marketing decision-making.

3.3 Employing of Data-Based Methodologies

Big data requires marketing science to employ different disciplines including data science, audio-processing, text-processing and machine learning (Chintagunta, Hanssens, & Hauser, 2016) and there are lots of data-based methodologies and approaches in the literature and the marketplace, however, a generalization would help to a better understanding of data-based methodologies. For this purpose, the data mining models structure in the Ngai, Xiu, and Chau (2009) study is employed for the base structure of this section, as the authors include the models mentioned in previous studies with data mining models. The seven models include association, classification, clustering, forecasting, regression, sequence discovery and visualization. The models could be employed in the study with various sub-methodologies/algorithms, Ngai et al. (2009) include some examples for data mining algorithms as association-rule, decision tree, neural networks, k-nearest neighbour, linear/logistic regression and genetic algorithm.

Association models are related to finding the association between the items in the specified context. Market basket analysis and cross selling programs could be example for the association models (Ngai et al., 2009). Solnet, Boztug, and Dolnicar (2016) study the market basket analysis in tourism context and they conclude that existing data could help to tourism operators with the approach. Classification refers to detecting the significant distinctions between variables and assigning them to specific classes. The engagement status of a consumer regarding a tweet could be an example of classification task, if users take the actions of liking or retweeting functions, the classification can be assigned to “engaged”. Sánchez-Franco, Navarro-García, and Rondán-Cataluña (2019) use the classification approach for customer satisfaction and focus on detecting the attributes linked to customer satisfaction in hospitality context. Clustering process is related to grouping the dataset/items into distinct groups regarding different attributes. Employing demographics and social media related behaviours to group the consumers could be an example of clustering process. Regression as a common methodology between traditional methods and data mining evaluates the variables with causal links which refer to a causality between variables. The interactivity of social media posts could be the reason for post-engagement and this causality can be examined in regression-based studies.

The data-based approaches can be used for (1) understanding the existing marketplace, (2) prediction of future actions. The marketplace can be identified as the networks of variables regarding market, consumers or companies and the variables related to these actors could be examined with correlation/regression or clustering methodology. The data-based methodology approach must be aligned with the aim of marketing decision-making.

Beyond the general approaches/data models, there are popular approaches in the marketing research related to social media data. Text mining approach has a growing interest in marketing research recent years and it simply refers to examine the text-based content for interpretation. Text mining could be used for detection of significant/meaningful patterns from the large data of text or examines the content with different aspects. For example, topic modelling methodology could be used in text mining when the context or research question mostly depends on detection of topics in the conversation of text-based content. Topic modelling can be also helpful for large size of jobs. Bastani, Namavari, and Shaffer (2019) study the consumer complaint narratives for The Consumer Financial Protection Bureau (CFPB) with topic modelling approach, as they indicate manual evaluation of narratives is not feasible. Online reviews are one of the topics in the topic modelling research. Wang, Feng, and Dai (2018) use latent Dirichlet allocation as topic modelling methodology for investigating online consumer reviews regarding two competitor products. They present the unique topics, competitive superiorities, and weaknesses with the help of the framework. Another topic in the topic modelling research refers to Twitter posts as they reflect the expression of social media users. Prabhakar Kaila and Prasad (2020) focus on Twitter in Covid19 context and use sentiment analysis and topic modelling together to evaluate that topics in #coronavirus hashtag.

The other methodology—sentiment analysis—can be used for evaluating the consumers' reactions to market actors. Sentiment analysis simply means detecting the sentiments or emotions from the text content. Sentiment analysis can use pre-built lexicons or machine learning approach to detect the sentiments and this approach is useful for understanding consumers reactions in different cases including online reviews with customer satisfaction and product attributes (Wang, Lu, & Tan, 2018), tourists' sentiments (Liu, Huang, et al. 2019), e-WOM (Canbolat & Pinarbasi, 2020). As the data-based methodologies include various methodological/variable-based approaches, there are many methods/variable-based approaches examining marketing contexts, network analysis (Pinarbasi, 2020a), language style matching variable (Liu, Xie, and Zhang 2019).

Marketing decision-makers could start the marketing research process either by model-based approach or specific methodological approaches. The preference of the starting relies on several conditions like the scope of the problem (large-small), the aim of the research (identification/optimization) or the data characteristics (text-based, visual-based). All the three sections in the study would help marketing decision-makers to understand: (1) what does the big data concept mean for marketing, (2) what are the data contexts for research and (3) how can data be used for marketing intelligence.

4 Conclusion

The study sets out to examine the marketing decision-making through the marketing research perspective, and the study evaluates the current state of the marketing decision-making in terms of data-based methodologies and their contribution to marketing research with example studies. The study highlights the proactive management approach in the first section of the study and concludes three different ways for the contribution of data-based methodologies; the contribution of big data, emerging of new data contexts and employing of new data methodologies.

The first issue addressed in the study refers to the “Big Data” concept as a popular topic recently. Marketing decision-making could employ the concept surrounding the customers in the digital world to have better insights related to market and consumers. Today’s customer produces different types of data related to themselves, such as daily moments, photos, videos, and information of visited locations. The marketing research could focus on one or many content types to evaluate the customers in different approaches. For example, the traditional approach in CRM systems which evaluates the standard information related to customers could be enhanced by providing social media-based customer information. The second issue in the study refers to new data contexts emerging in the social media platforms in recent year. Ephemeral media or audio-based content could lead to new research questions in terms of customers and brand sides. Expression of selves in social media through new data contexts could require new methodological approaches, while brand communication is also affected through these types of contexts. The final issue in the study focuses on the data-based methodologies, and it integrates with the previous issues. The big data and new data types could contribute to marketing research by employing new data-based methodologies. Detecting the corresponding research methodology for the individual data types or contexts is crucial for this step. Marketing decision-makers should evaluate the marketplace about the data types and contexts and investigate the best matching solutions for marketing intelligence.

Future research might explore one or many of the three issues highlighted in the study and investigate them in specific contexts. For example, big data issue for marketing research could lead to innovative research questions in various marketing contexts like apparel or e-commerce. Using big data and consumer data to predict the fashion-related consumer-behaviours could be the agenda of marketing in future. On the other hand, the market environment has different contexts like sharing economy (Pinarbasi, 2020b), ephemeral content (Kircova, Pinarbaşi, & Köse, 2020) emerging in the recent years which can be used for marketing research. Besides, the combination of the issues could also contribute to new research approaches. Using Instagram as the data source and employing ephemeral media content as a new data type with a relatively new methodology approach (like object detection or visual analysis) could lead to new marketing research questions. As another example, audio-based social media data could require audio mining methodologies, and this has the potential for marketing researchers. In conclusion, understanding “new” marketing in terms of data would help marketing decision-making either academic or industrial knowledge.

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