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An Investigation of Mediator Roles and the Effects of Learning Organization Approach and Intellectual Capital on Organizational Ambidexterity and Organizations' Entrepreneurial Orientation: A Comparison of the Service and Production Sectors

Mehmet Sağlam¹ , N. Öykü İyigün² 

Abstract

In this study, it is aimed to investigate mediator roles and the effect of a learning organization approach and intellectual capital on organizational ambidexterity and entrepreneurial orientation for the service and production sectors. Snowball and judgemental sampling was used and an online survey form was created as a data collection tool. The data collection process took place between April 5 2019 and June 7 2019. The sample included 378 service and 324 production sector participants. SPSS 21, AMOS 20 and PROCESS 3.1 programs were used for data analysis.

In the results of the study, it is concluded that intellectual capital has a partial mediator role in the impact of a learning organization on organizational ambidexterity and the impact value is higher in the production sector. Organizational ambidexterity and intellectual capital have a partial mediator role in the impact of a learning organization on entrepreneurial orientation and the impact values are also higher in the production sector. Finally organizational ambidexterity has a partial mediator role in the impact of intellectual capital on entrepreneurial orientation and the impact values are higher in the service sector. When evaluated in terms of total effects, it was determined that the impact coefficients for the production sector were higher in all research models.

Keywords

Learning Organization, Intellectual Capital, Organizational Ambidexterity, Entrepreneurial Orientation, Mediator Role

Introduction

In changing market conditions, organizations have to learn and develop by sharing knowledge with their employees. In this context, understanding of organizational learning and being a learning organization that envisages the participation of all employees and increases competitive ability is needed. Organizations should prefer continuous learning in order to survive. Or-

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ganizations that prepare the necessary learning environment for their employees and increase their desire to learn continuously, will increase their chances of success in the market.

The increasing importance of knowledge in the process of change inevitably makes the individual who develops and uses information important. It will provide a competitive advantage to the organization that is open to change and constantly improves itself, attaches importance to its work and gives meaning to its work. Besides human capital, customer capital and structural capital, which are among the other dimensions of intellectual capital, are considered important in terms of transforming human capital into structural capital and using this structural capital in creating customer capital. In a changing environment, the use of intellectual capital in researching both existing resources and new opportunities in order to adapt to the conditions and gain a sustainable competitive advantage is important.

Besides the efforts to create a learning organization environment and to strengthen intellectual capital, rapidly changing environmental conditions and increasing competitive pressures force businesses to be agile, creative, flexible, versatile and make it necessary to identify different strategic alternatives. One of these alternatives is the organizational ambidexterity strategy, which is defined as the use of existing capabilities and research of new ones in order to sustain competitive power and survival, and has been frequently emphasized recently. The aim is to meet the needs of customers of today and tomorrow.

Organizations, with the aim of continuous learning, will try to balance their organizational ambidexterity levels with the aim of maintaining their current status and following innovations. Organizations that prepare the learning organization environment for their employees and share their knowledge will strengthen their intellectual capital structures, and strong intellectual capital will make it easier to reach organizational ambidexterity with the competent knowledge and learning structure of the employees and the organization.

Another factor necessary for businesses to survive in tough competitive conditions is the continuous encouragement of differentiation and innovation by creating new products and services (Khalili et al., 2013; Çömlek et al., 2012). At this point, we come across the concept of entrepreneurial orientation. Entrepreneurial orientation, which is the process that will lead businesses to become entrepreneurial enterprises, refers to businesses' being more innovative, adventurous and proactive, which is used to reflect the strategic orientation of businesses or their intensity or willingness to engage in entrepreneurial activities (Lumpkin and Dess, 1996). Businesses with a high entrepreneurial orientation will provide a competitive advantage by using this feature, if they are risk-taking, innovative, proactive, competitive, aggressive and autonomous. It is thought that companies with a high entrepreneurial orientation will also follow innovation with exploration activities, behave in an aggressive competitive structure, be predictable, and will have an autonomous organizational structure that can take risks by taking advantage of its current situation with exploitation activities.

It is a matter of curiosity for managers that enterprises which have limited resources, of how will use these resources in the process of entrepreneurial orientation, what is the effect of knowledge assets and learning levels on the process and how will exploitation and exploration strategies affect the entrepreneurial orientation. It can be said that the creation of a learning organization environment for the acquisition and use of information in organizations, the strengthening of intellectual capital with the effects of this environment and the effective use of these resources to achieve organizational ambidexterity, will represent important strategic results for enterprises with entrepreneurial orientation and are the key elements that enable the success of entrepreneurial orientation.

The aim of the study that prepared in this context is examination of

- the mediating role of intellectual capital in the effect of learning organization approach on organizational ambidexterity,
- the mediating role of organizational ambidexterity and intellectual capital in the effect of a learning organization approach on entrepreneurial orientation and
- the mediating role of organizational ambidexterity in the effect of intellectual capital on entrepreneurial orientation.

The study is important in terms of which dimensions of the learning organization should be given importance for organizations with a tendency to achieve organizational ambidexterity and entrepreneurship, to reveal in which dimensions more investment should be made for intellectual capital investments, and to be a guide for both sector managers.

Learning Organization

The concept of learning organization, which was first used by Peter Senge in his work titled “The Fifth Discipline” in 1990, was defined as organizations in which employees create the results they really want, continuously increase their capacity and competencies, adopt new thinking styles and learn how they will to learn together (Senge, 2002: 11).

Learning organizations can be defined as organizations that constantly acquire new information, have the ability to adapt and shape their activities according to this new information, and aim to achieve a competitive advantage by achieving continuous improvement with the information obtained.

It is accepted as the basis for the understanding of the learning organization that the employees of the organization create new information, share this information, and transform an organization’s knowledge and use it for solving problems. The understanding of the learning organization is formed at the end of a process that starts with the learning of the employee at

the individual level, continues with learning at the group level and ends with the learning of the organization (Atak and Atik, 2007: 64).

Learning organizations, which always prioritize learning, acquire a structure that will adapt itself to environmental change as a result of learning by enabling and facilitating the learning of all their employees and gain an advantage (Kingir and Mesci, 2007: 66). Organizations that make good use of human resources in order to survive in a changing environment and that are in contact with the environment in order to go beyond change, constantly collect information from this environment, and direct their activities by using this information, will be organizations that will guarantee their future and maintain their competitive advantages and their existence (Sayan, 2006: 15). The ability to obtain, evaluate and use knowledge is possible through organizational learning.

Organizations become learning organizations as a result of a development process. The learning organization is the last stage of this process. An organization's learning is about the organization's environment and its relationship with all organization members and its approach to these issues (Koç and Topaloğlu, 2010: 155).

Intellectual Capital

Intellectual capital refers to the sum of intellectual materials that represent all resources such as information, knowledge, experience and intellectual property used to create wealth in a business (Stewart, 1997: 20).

Intellectual capital has gained importance with the change in information technology and society, the increasing importance of knowledge and a knowledge-based economy, the effect of transition to the network society and the emergence of the need for factors such as innovation and creativity as the main reason of competition (İpçioğlu and Tunca, 2002: 22). Including innovation and creativity activities in businesses depends on the acquisition, access and production of new information. This situation is possible as a result of determining and managing intellectual capital. Intellectual capital is important because organizations are knowledge production facilities and are emerging as the most important processing center of innovation and creativity in order to produce knowledge.

The accumulation, transformation and value of knowledge are at the center of intellectual capital management (Dzinkowski, 2000: 2). The basis of the management of intellectual capital is the transformation of the knowledge of the members of the organization into knowledge that will provide value to the organization. In other words, the knowledge of the individual as human capital must be transformed into structural capital by transferring it to the organization.

It is possible to measure intellectual capital starting from human capital, structural capital and customer capital dimensions. In the model that expresses the interaction of the elements

of intellectual capital and is created on the basis of value, the dimensions of intellectual capital are discussed in three dimensions: human capital, structural capital and customer capital (Dzinkovvski, 2000: 32).

Human capital is the employees' ability and idea structure to produce solutions to meet the needs of customers. Structural capital is the capital that an enterprise has in relation to its organizational structure. Customer capital is about learning customer expectations and taking customer needs into account (Arikboğa, 2003: 130-137).

Organizational Ambidexterity

The concept of ambidexterity is used for individuals who have the ability to use both hands at the same time with equal skill. In the field of ambidexterity, organization and management Ambidexterity, which are expressed as human characteristics, was first published by Robert Duncan in 1976 in the field of organization and management (Lubatkin et al., 2006; O'Reilly and Tushman, 2008).

Tushman and O'Reilly (1996) defined organizational ambidexterity as using the metaphor of a "juggler", adapted the ability of the juggler to play with the ball using both hands at the same time, and the ability of an organization to simultaneously use its existing capabilities and to take advantage of new opportunities. (Tushman and O'Reilly, 1996).

Organizational ambidexterity arises when organizations have taken advantage of the opportunities and balanced exploitation and exploration activities while the organization continues on its way with the strategies which have previously been determined and planned (Bodwell and Chermack, 2010: 193). Organizations that can carry out these two activities in a balanced way are considered enterprises that have achieved organizational ambidexterity.

Companies that have reached the level of organizational ambidexterity will have scarce, valuable, unique and inimitable resources and capabilities that will provide a sustainable competitive advantage as a result of their effective adaptation to the environment and harmonization in line with the goals and objectives of the organization (Şimşek, 2009).

Lubatkin et al. evaluated organizational ambidexterity in two dimensions; exploratorion and exploitation ambidexterity (Lubatkin et al., 2006).

The exploration ambidexterity strategy is that businesses decide on which resources to invest in new product development (Atuahene-Gima, 2005). Unlike the exploitation strategy, this strategy focuses on the generation of new knowledge other than organizational knowledge, the development of new products, technologies and processes, and the creation of new markets and business opportunities (Benner and Tushman, 2003).

The main goal of the exploitation ambidexterity strategy is to meet existing customer needs and react to environmental conditions in this way by making use of existing technologies and knowledge. As a result, organizations will improve their competencies by focusing on their current capabilities and will improve existing advantages (Lubatkin, et al., 2006: 648).

Entrepreneurial Orientation of Organizations

An entrepreneurial orientation has been defined as a macro-level concept that measures the tendency of organizations and senior managers towards entrepreneurial activities and positions in a range that extends from very conservative organizations to more entrepreneurial organizations. While entrepreneurial organizations are described as innovative, risk-taking and proactive organizations, conservative organizations are described as less innovative, non-risk-taking, reactive and had a wait-and-see behavior (Fiş and Wasti, 2009: 131). Entrepreneurial orientation can be interpreted as a general or enduring thought, trend or direction of interest in entrepreneurial.

The existence of entrepreneurial orientation in organizations is possible if the processes and methods applied in the current situation include entrepreneurial behavior or develop strategies to obtain maximum benefit by exploring potential market opportunities. Entrepreneurial orientation requires that organization and senior management continue their efforts by displaying proactive, risk-taking and innovative behaviors in order to evaluate the opportunities in the environment. The success of the entrepreneurial orientation of organizations does not only depend on senior managers, but also requires the support of managers and employees at different levels (Stevenson and Jarillo 1990: 23-24).

The presence of entrepreneurial orientation in organizations is important in many ways due to its strong contributions and provides important outputs to organizations.

Organizations reveal skills and behaviors that will provide a competitive advantage by organizing their business processes effectively thanks to their entrepreneurial orientation studies. In the entrepreneurial orientation processes, the development of a flexible, dynamic, innovative and competitive organizational structure that can shape the environment is of great importance in terms of taking advantage of the opportunities in the environment, gaining a competitive advantage and protecting this advantage in the long term (Covin and Miles, 1999: 47).

Research Methodology

Population and Sampling

The population of the research consists of the managers of organizations operating in the service and production sectors. Since it is difficult to reach the entire population in terms of time and

cost, it has been attempted to collect data by using snowballs and judgemental sampling, which are among non-random sampling methods. Snowball sampling is the technique used to increase the data set in the form of a possible participant to share the research form with another possible participant and ask him/her to answer it. In the study, the social media platform LinkedIn has been used in order to reach the service and production sector managers. As the data collecting tool, Google Forms was used with an online survey preparation link. The use of judgemental sampling can be explained by the fact that the researcher acts according to his own judgment in determining the participants with manager titles on LinkedIn and sending them the survey link.

In the study sample, it was seen that nearly half of the service sector participants with a rate of 47.4% worked in medium-sized enterprises, 34.9% in large enterprises. Similarly, 38.3% of the participants in the production sector worked in medium-sized enterprises and 32.7% in small-sized enterprises. Study results should be evaluated in this respect because the research results will differ according to company sizes.

The Data Collection Process

The data collection process took place between April 5 2019 and June 7 2019. It was determined that the questionnaires had been sent to the managers of approximately 1000 LinkedIn users for both sectors and the number of participants were 378 for the service sector and 324 for the production sector after the specified date range and the data collection process was ended. When evaluated in terms of these rates, it can be said that the survey response rate was 37.8% for the service sector and 32.4% for the production sector.

Measurements

For the learning organization scale, a scale was used that was developed by Marsick and Watkins (2003) and translated into Turkish by Bayam (2016). The scale consists of 7 sub-dimensions of 43 items. These dimensions are continuous learning, dialogue and inquiry, team learning, embedded systems, empowerment, system connections, and strategic leadership.

For the intellectual capital scale, scales were combined and used that were arranged by Nazari, et al., (2011), Subramaniam and Youndt (2005), Chen, Zhu, and Xie (2004). The Turkish uses of the combined scale items were taken from the thesis of Kocapınar (2010) and Şahin (2012). The scale consists of a total of 24 items and 3 sub-dimensions. These dimensions are; structural capital, human capital, customer capital.

For the organizational ambidexterity scale, an ambidexterity scale was used that was developed by Lubatkin et al. (2006), whose validity and reliability was proven, adapted into Turkish by Attar (2014), and consists of 12 items and 2 sub-dimensions that measures the ambidexterity strategies of the exploration (6 items) and the exploitation (6 items)

For the entrepreneurial orientation scale, the scale used was developed and combined by Lumpkin and Dess (1996), Lumpkin and Dess (2009), and Li et al. (2009) and adapted into Turkish by Efe (2015). It consists of a total of 21 items and 5 sub-dimensions. These sub-dimensions are risk-taking, innovativeness, proactiveness, competitive aggressiveness and autonomy.

Hypothesis Development Process

In this part of the study, related studies are included in the light of the information in the literature to develop relationships between variables related to the purpose of the research and to form the hypotheses.

The Relationship Between Learning Organizations and Organizational Ambidexterity

The importance of increasing individual and organizational knowledge capacity, using and sharing knowledge widely in achieving and developing organizational ambidexterity has been confirmed in various studies (Lin and McDonough, 2011: 497; Yu et al., 2014: 102). Organizational ambidexterity promotes learning and knowledge sharing, whether they be the exploitation of existing resources, products and processes, or the exploration of new business areas and product range (Mische, 2001: 129). From this point of view, it can be said that the understanding of learning organization in organizations is effective in the formation of exploration and exploitation capacity. Accessing new knowledge and technology with the learning organization approach, increasing existing knowledge and competencies can be antecedents to the formation of organizational ambidexterity, which is also expressed as organizational learning capacity.

In the study conducted by Kitapçı and Çelik (2013), it was determined that organizational learning capacity positively affects organizational ambidexterity and firm performance, and organizational learning has a mediating effect on the effect of organizational ambidexterity on firm performance.

In a study by Gupta et al. (2006), it was suggested that organizational learning encourages the formation of organizational ambidexterity conditions.

The Relationship Between Learning Organization and Entrepreneurial Orientation

Hughes and Morgan (2007) stated that the two most important challenges faced by entrepreneurial enterprises are how to expand the knowledge base and how to manipulate this knowledge base. This result shows that organizational learning, which aims to expand the knowledge base, may be related to entrepreneurial orientation.

In a study conducted by Wang, (2008), entrepreneurial orientation was expressed as the primary determinant of the organizational learning level emerging in a business. In the study, it was suggested that organizational learning had a mediating role in the effect of entrepreneurial orientation on firm performance (Wang, 2008).

In the study conducted by Li et al., (2009), it was confirmed that the knowledge creation process, which refers to learning organizations, mediates the relationship between entrepreneurial orientation and firm performance.

In another study investigating how the organizational learning levels of SME enterprises affect the relationship between entrepreneurial orientation and innovation, it was concluded that risk-taking, innovativeness and proactiveness among entrepreneurial orientation dimensions are related to innovation and organizational learning had a mediating role in this relationship (Wang, et al., 2015).

The Relationship Between Learning Organization and Intellectual Capital

In order to develop human capital, organizations should primarily engage in activities aimed at increasing the knowledge levels of employees and create a learning organization environment to enable them to use what they know more (Dodgson, 1993: 378; Fettahlioğlu and Afşar, 2015: 288). The necessity of developing a learning organization environment for the development of human capital shows the contribution of the learning organization approach to the intellectual capital in organizations.

In the study conducted by Fettahlioğlu and Afşar (2015), it was determined that the perceptions of managers regarding the practices of businesses towards a learning organization approach have a positive effect on the intellectual.

Panagopoulos (2016) considered the factors affecting organizational ambidexterity as organizational, structural and learning factors (Panagopoulos, 2016). When learning organizations are evaluated in terms of learning factors and intellectual capital in terms of structural factors, it can be said that a learning organization approach and intellectual capital are both interrelated concepts in achieving organizational ambidexterity and are among the factors affecting organizational ambidexterity.

The Relationship Between Intellectual Capital and Entrepreneurial Orientation

Employees who are well equipped in terms of knowledge, skills and competencies in the organization will contribute to the entrepreneurial orientation of the organization. In addition to human capital, the organization's intellectual property rights, such as patents, trademarks, contracts and R&D activities, also contribute to the entrepreneurial orientation of the organization. When evaluated in terms of customer (relational capital) capital, which is another di-

mension of intellectual capital, the organization is expected to be more innovative, take risks, act proactively, act aggressively in competition and be an autonomous organization based on the strong capital it has established with its customers.

In a study examining the relationship of social capital, including the relational capital dimension of intellectual capital, with entrepreneurial orientation, social capital has been defined as the current and potential resources that an organization has through its network of relations, and it has been suggested that social capital may have an effect on the entrepreneurial orientation of an organization (Nahapiet and Ghoshal, 1998). Stam and Elfring (2008) also emphasized the importance of examining which conditions of social capital improve or limit entrepreneurial orientation and how they encourage (Stam and Elfring, 2008).

The Relationship Between Intellectual Capital and Organizational Ambidexterity

The development of ambidexterity in organizations is highly dependent on employees' knowledge, skills and abilities (human capital) as well as social capital (Wasko and Faraj, 2005). In addition, organizational structures that provide information flow between different organizational levels are important for organizational ambidexterity. When human capital is high in organizations, employees are creative, talented and gain expertise in their own roles and functions (Subramaniam and Youndt, 2005). Similarly, superior structural capital contributes to the display of efficient exploration and exploitation ambidexterity activities with systems such as effective internal processes within the organization.

It is stated in some studies that human capital, which is the sub-dimension of intellectual capital and expresses the knowledge, skills and abilities of employees in organizations has an effect on organizational ambidexterity (Na, et al., 2016). In the studies conducted, it has been stated that intellectual capital is used and required in the process of using information through exploration and exploitation activities in order to achieve organizational ambidexterity (Kang, Snell, and Swart, 2012; Turner, Swart, and Maylor, 2013).

The Relationship Between Organizational Ambidexterity and Entrepreneurial Orientation

In a study conducted by Bierly et al., (2009), it was confirmed that entrepreneurial orientation has positive relationships with both exploration and exploitation organizational ambidexterity, the effect of entrepreneurial orientation on exploration ambidexterity is stronger, and if both dimensions of organizational ambidexterity are used together, entrepreneurial orientation will be more. Cai, Zhu, and Liu (2011) stated that in terms of exploration and exploitation ambidexterity, obtaining and using existing knowledge and new knowledge will contribute to entrepreneurial orientation.

In a study conducted by Hughes and Morgan (2007), it was accepted that entrepreneurial orientation has a relationship with exploration ambidexterity and when entrepreneurial orientation is combined with exploration ambidexterity, it will lead to an increase in firm performance.

Centobelli et al., (2019) determined that internal organizational and external environmental factors have an effect on university exploration and exploitation ambidexterity activities, the effect of exploration and exploitation ambidexterity activities on university ambidexterity level, and finally, university ambidexterity level has an effect on entrepreneurial university performance, and all hypotheses are accepted.

Research Hypotheses

In the light of this information and studies in the literature, the following research hypotheses have been formed.

► H₁: Intellectual capital has a mediating role in the effect of learning organization approach on organizational ambidexterity.

► H₂: Organizational ambidexterity has a mediating role in the effect of learning organization approach on entrepreneurial orientation.

► H₃: Intellectual capital has a mediating role in the effect of learning organization approach on entrepreneurial orientation.

► H₄: Organizational ambidexterity has a mediating role in the effect of intellectual capital on entrepreneurial orientation.

In this study, the main role of organizational ambidexterity is to investigate the effect of a learning organization approach and intellectual capital on the formation of organizational ambidexterity, and whether organizational ambidexterity structure has an effect on entrepreneurial orientation.

It is thought that the learning organization approach affects the intellectual capital, organizational ambidexterity and entrepreneurial orientation of the organizations, while the intellectual capital will contribute to the development of entrepreneurial orientation with its effect on organizational ambidexterity and entrepreneurial orientation.

Research Model

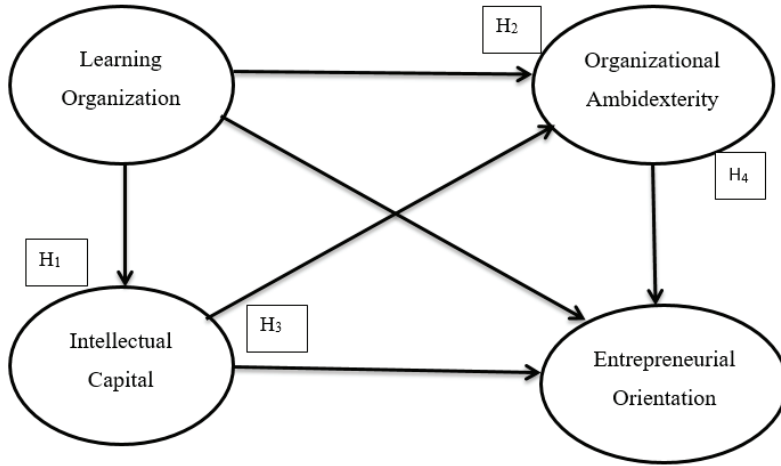


Figure 1. Research Model

Data Analysis

SPSS (Statistical Package for Social Sciences) 21, AMOS (Analysis of Moment Structures) 21 and PROCESS (Macro for SPSS) 3.1 programs were used to analyze the data. In the analysis of the data obtained, confirmatory factor analysis to verify the one-dimensional structures of the scales, the reliability test to determine the reliability of the scale, the construct validity to determine the validity, the combination validity and discriminant validity, and the regression-based Process model outputs to test the research hypotheses.

Investigation of Extreme Values

Extreme values are values whose existence should be investigated and removed from the data set due to its role in statistical tests (Hair et al., 2006). Box plot and stem-leaf charts created in SPSS are used to examine the extreme values (Mooi and Sarstedt, 2011). In the results of the analysis, no extreme value was found in the service and the production sector.

Non-Responding Bias Test Results

Mithcell and Carson (1989) stated that in an environmental comfort situation, participants who filled out the questionnaire would be more likely to respond to the questionnaire than those who did not, which would lead to sample selection bias and upward deviations in data analysis (Mitchell and Carson, 1989: 277). Due to the difficulty of reaching those who do not participate, the solution to this difficult process is to examine the difference of participant data that provides early and late submissions based on demographic features, institution

information or the scale data used. An independent sample t test is used to examine the difference (Tran, 2013: 101). In the study, an independent sample t test was conducted to eliminate sample selection bias and non-response bias. Due to the fact that all p statistics' significance values for both the service and the production sector are higher than 0.05 in the test results where the participants of the study are classified as early and late participation, learning organization ($p = 0.213$, $p = 0.103$) and intellectual capital ($p = 0.209$, $p = 0.473$), organizational ambidexterity ($p = 0.590$, $p = 0.775$) and entrepreneurial orientation ($p = 0.524$, $p = 0.257$) dimensions were found to be different. This result indicates that there is no sample selection bias and nonresponse bias in the study.

Examination of Common Method Variance Bias

Common method variance is the amount of artificial correlation revealed between variables when the same method is used in the same measurement environment from the same person in the measurement of research variables, and it expresses that this value is more or less than its true value (Fiske, 1982).

Some statistical techniques are used to examine the common method variance. These techniques are Harman's single factor test, interpretation of correlation values, and confirmatory factor analysis. When the factor structures formed in the Harman single factor test are not formed in a single factor structure, that all correlation coefficients between variables are not more than 0.90, and the after confirmatory factor analysis construct validity accepted there is no common method variance (Richardson, et al., 2009; Podsakoff et al., 2009). 2012; Özyılmaz and Eser, 2013: 505; Tehseen, Ramayah and Sajilan, 2017: 162). In this study, according to the Harman test value, the absence of a single factor structure for all of the scales and ensuring the construct validity with the second order confirmatory factor analysis show that there is no common method variance.

Confirmatory Factor Analysis Results

Confirmatory factor analysis is used to determine whether the factor structures are valid in the study sample, to verify the scale factor structures and to examine their validity values. One of the reasons for applying confirmatory factor analysis is to minimize the risk of encountering common method variance bias. In the examination of the significance of the results obtained from the measurement model and the structural model as a result of the confirmatory factor analysis, evaluation is made according to the value ranges that fit index values such as X^2 / df , GFI, AGFI, CFI, RMSEA should take (Jöreskog and Sörbom, 1984; Meydan and Şeşen, 2011). In case the fit index values are not in the appropriate range, covariances between terms with a high correlation coefficient are created between the error terms in the model to ensure that the fit index values are in the appropriate range (Özkoç, 2018: 176).

Since the scale factor structures of the scales used in the study were aimed to be used in a one-dimensional structure, second order confirmatory factor analysis was carried out. The results of the 2nd order factor analysis fit index obtained by creating some covariances between error terms for all scales and the required value ranges were obtained as in Table 1.

Table 1

Research Scale Dimensions Second Order CFA Fit Index Values

Variables	X ² /df	GFI	AGFI	CFI	RMSEA
Learning Organization Dimensions	3,78	0,85	0,88	0,96	0,06
Intellectual Capital Dimensions	3,21	0,90	0,86	0,96	0,07
Organizational Ambidexterity Dimensions	2,86	0,91	0,90	0,97	0,06
Entrepreneurial Orientation Dimensions	3,47	0,88	0,83	0,94	0,07
Fit indices	X ² /df	GFI	AGFI	CFI	RMSEA
Good	≤3	≥0,90	≥0,90	≥0,97	≤0,05
Acceptable	≤4-5	0,89-0,85	0,89-0,80	≥0,95	0,06-0,08

Source: Jöreskog and Sörbom, 1984, Meydan and Şeşen, 2011.

When the fit index values obtained for all of the scales in the study are examined, it is seen that all the values are in good and acceptable ranges and the scale factor structures are confirmed. Also this result also shows that there is no common method variance.

Reliability and Validity Test Results

A Cronbach Alpha Reliability test value is used to determine the reliability of scale factor structures, and a value of 0.70 and above indicates that reliability is ensured (Altunışık et al., 2012).

In determining the scale construct validity, combination and discriminant validity values are used (Chin, Gopal, and Salisbury, 1997). Obtaining the CR-composite validity value of 0.70 and above and the discriminant validity measured as the average variance extracted value (AVE) of 0.50 and above indicates that the validity values of the scales are provided (Fornell and Larcker, 1981; Henseler, Ringle and Sarstedt, 2014).

Table 2

Reliability and Validity Test Results

Variables	Cronbach Alpha	CR	AVE
<i>Learning Organization</i>	0,881	0,756	0,693
<i>Intellectual Capital</i>	0,793	0,723	0,628
<i>Organizational Ambidexterity</i>	0,805	0,737	0,594
<i>Entrepreneurial Orientation</i>	0,832	0,769	0,687

When Table 2 was examined it was shown that the Cronbach's alpha reliability value, combination and discriminant validity values were appropriate values for all scales.

Examination of Mediating Roles

The Baron and Kenny (1986) approach was used to investigate the mediating role. According to this approach, four steps should be taken in determining the mediatory role. These steps are; 1) The effect of the independent variable on the mediator variable 2) The effect of the mediator variable on the dependent variable, and 3) The effect of the independent variable on the dependent variable, 4) When the independent variable and the mediator variable are considered together, the effect on the dependent variable decreases or occurs due to the mediating effect (Baron and Kenny, 1986).

The results of the analysis performed on Model 4 with PROCESS macro software for testing the hypotheses created to examine the mediating effects in the research are shown below. The abbreviations in the tables are used as follows.

LO = Learning Organization

IC= Intellectual Capital

OA = Organizational Ambidexterity

EO = Entrepreneurial Orientation

When the mediating role of intellectual capital in the effect of learning organization approach on organizational ambidexterity is examined, all the steps take place according to the Baron and Kenny approach for the service and production sectors and the effect of the independent variable (learning organization) on the dependent variable (organizational ambidexterity) and when the mediator variable (intellectual capital) is added to the model (because of decreasing from 0.366 to 0.357 for the service sector, from 0.496 to 0.384 for the production sector) it indicates that the mediating effect has a partial mediatory role. When evaluated in terms of sectors, it is seen that the mediating effect is more for the production sector.

When the mediating role of organizational ambidexterity in the effect of the learning organization on entrepreneurial orientation is examined, all the steps take place according to the Baron and Kenny approach for the service and production sector and the effect of the independent variable (learning organization understanding) on the dependent variable (entrepreneurial orientation), when the mediator variable (organizational ambidexterity) is added to the model (because of decreasing from 0.443 to 0.150 for the service sector, from 0.472 to 0.183 for the manufacturing sector) it indicates that the mediating effect has a partial mediatory role. When evaluated in terms of sectors, it is seen that the mediating effect is more for the production sector.

When the mediating effect of intellectual capital on the effect of the learning organization on entrepreneurial orientation is examined, according to the Baron and Kenny approach for

the service and production sector, all the steps take place and the effect of the independent variable (learning organization understanding) on the dependent variable (entrepreneurial orientation) decreases when the mediator variable (intellectual capital) is added to the model (because of decreasing for the service sector, from 0.472 to 0.327, for the manufacturing sector, from 0.472 to 0.358) it indicates that the mediating effect has a partial mediatory role. When evaluated in terms of sectors, it is seen that the mediating effect is more for the production sector.

Table 3
Examination of Hypothesis Test Results

	Hypothesis	Direct Effect	Indirect Effect	Total Effect	Mediating Effect	
Service Sector	LO-->IC	0,731**				H ₁ , H ₂ , H ₃ , H ₄ , Hypothesis (Accepted)
	LO-->OA	0,366**				
	IC-->OA	0,488**				
	LO-->EO	0,443*				
	OA-->EO	0,411**				
	IC-->EO	0,448**				
	LO-->IC-->OA		0,357*	0,723**	Partial	
	LO-->ÖU-->EO		0,150**	0,593**	Partial	
LO-->IC-->EO		0,327**	0,770**	Partial		
IC-->OA-->EO		0,201**	0,649*	Partial		
Production Sector	LO-->IC	0,743**				
	LO-->OA	0,496**				
	IC-->OA	0,518**				
	LO-->EO	0,472*				
	OA-->EO	0,369**				
	IC-->EO	0,482**				
	LO-->IC-->OA		0,384**	0,880*	Partial	
	LO-->OA-->EO		0,183**	0,655**	Partial	
LO-->IC-->EO		0,358**	0,830**	Partial		
IC-->OA-->EO		0,191**	0,673*	Partial		

When the mediating effect of organizational ambidexterity on the effect of intellectual capital on entrepreneurial orientation is examined, according to the Baron and Kenny approach for the service and production sector, all the steps take place and the effect of the independent variable (intellectual capital) on the dependent variable (entrepreneurial orientation), when the mediator variable (organizational ambidexterity) is added to the model (because of decreasing for the service sector, from 0.448 to 0.201, for the production sector from 0.482 to 0.191) it shows that the mediating effect has a partial mediatory role. When evaluated in terms of sectors, it is seen that the intermediary effect is more for the service sector.

When the total effects are evaluated for all intermediation models, it is seen that the total effects are more for the production sector.

Conclusion and Suggestions

Investigation of the Mediating Role of Intellectual Capital in the Effect of Learning Organization on Organizational Ambidexterity

When the results are interpreted in terms of sectors, it is seen that all the degrees of effect are higher in the production sector, and when the mediator roles and total effects are evaluated, the mediating and total effect is higher for the production sector. These results are similar to the results obtained from the studies of Kitapçı and Çelik (2013), and Gupta et al. (2006) which examines the relationship between learning organizations and organizational ambidexterity, and Dodgson, (1993), and Fettahlioğlu and Afşar (2015), which examines the relationship between learning organizations and intellectual capital.

Investigation of the Mediating Role of Organizational Ambidexterity in the Effect of Learning Organization Understanding on Entrepreneurial Orientation

When the results obtained are examined, it is determined that only the effect of organizational ambidexterity on entrepreneurial orientation is less in the production sector compared to the service sector, the effect degrees for the production sector are higher in other interactions, when the mediator roles and total effects are evaluated, the mediating and total effect is higher for the production sector. . While this result is similar to the results obtained by Hughes and Morgan, (2007), Wang, (2008) and Li, et al (2009). It differs from the study of Bierly et al. (2009).

Investigation of the Mediating Role of Intellectual Capital in the Effect of Learning Organization Understanding on Entrepreneurial Orientation

When the results are interpreted, it is determined that the effect of only learning organization understanding on entrepreneurial orientation is less in the production sector compared to the service sector, the degree of effect is higher for the production sector in other interactions, and when evaluated in terms of mediator roles and total effects, the mediating and total effect for the production sector is higher. . These results are similar to the results of the study conducted by Leana and Van Buren (1999), Dodgson, (1993) and Fettahlioğlu and Afşar (2015).

Investigation of the Mediating Role of Organizational Ambidexterity in the Effect of Intellectual Capital on Entrepreneurial Orientation

When the results were evaluated, it was determined that only the effect of organizational ambidexterity on entrepreneurial orientation was less in the production sector, the degree of effect was higher for the production sector in other interactions, and when the mediator roles were evaluated, the mediating effect was higher for the service sector. When evaluated in terms of total effects, it is concluded that the total effect is more for the production sector.

These results are similar to the results obtained from the studies of Leana and Van Buren (1999), Kang, Snell and Swart (2012), and Turner, Swart and Maylor (2013).

Organizational ambidexterity and entrepreneurial orientation tendencies are possible by managing a dynamic process that enables organizations to adapt rapidly to the environment with advanced technologies and knowledge levels in a way to reflect the change in the operating and potential markets. This process will include practices for the creation of new knowledge with innovative approaches, the creation of a learning organization environment in which continuous learning, knowledge generation, dissemination and use takes place, and the strengthening of existing intellectual capital.

As a result of the study, it was concluded that learning organizations and intellectual capital are the driving forces in achieving organizational ambidexterity and creating entrepreneurial orientation. This result shows that in order for organizations to reach organizational ambidexterity and to have entrepreneurial orientation, it is necessary to create a learning organization environment and to develop intellectual capital. Increasing the diversity of the information resources owned by the enterprises with organizational learning, strengthening the intellectual capital and structuring them in a way to maximize the quality which will facilitate the achievement of organizational ambidexterity and the formation of entrepreneurial orientation. It should not be forgotten that different processes, different applications and different resources will be required to create such structures in the service and production sectors.

Suggestions for Researchers

In future studies, adding more variables to the model and investigating the antecedents of organizational ambidexterity and entrepreneurial orientation will provide important contributions for sector managers. By adding variables such as leader-member interaction that will increase the effectiveness of managers and affect organizational growth and organizational performance, organizational identification and supportive organizational climate, organizational ambidexterity and entrepreneurial orientation antecedents can be examined more comprehensively. Some variables in the research model can be considered in a single structure, some variables with sub-dimensions, and the antecedents can be investigated by adding parallel or series research models.

In addition to mediator variables, some variables can be added as moderator variables and analysis can be performed. With conditional process analysis, the scope of research can be expanded further and research models can be created in the form of moderated mediation or mediated moderation.

The model can be repeated according to the public and private sector distinction. Only an SME or small enterprise level model can be analyzed.

According to the demographic and institutional data, how the learning organization, intellectual capital, organizational ambidexterity and entrepreneurial orientation differ can be examined with difference tests.

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The Impact of Financial Drivers on Credit Default Swap (CDS) in Turkey: The Cointegration with Structural Breaks and FMOLS Approach

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Abstract

The CDS premium is considered to be an important criterion in the risk premiums of countries with emerging markets and it also provides important information about the credibility of these countries for investors. Decreasing the level of CDS for developing countries helps investors to work with the country and smoothes the way for investments in financial assets. Hence, determining the factors which can affect changes in the CDS of these countries has become crucial for their economies. Thus, the relationship between Turkey's CDS for 5 years and financial factors have been analyzed through the monthly data for the period between 2012 and 2020. For this purpose, the existence of the long-run relationship between the series was investigated by Gregory-Hansen (1996) and Hatemi-J (2008) and it was seen that the series are cointegrated. Afterwards, the long-run coefficients between the series were estimated by FMOLS. The results indicate that the BIST100 index and liquid liabilities have a positive effect on CDS and that the domestic credit volume of the banking sector has a negative effect on CDS. Furthermore, the estimated break dates suggest that significant events are occurring in the Turkish economy.

Keywords

Credit Risk, Financial Factors, Structural Breaks, Cointegration, Turkey

Introduction

Rational investors have a desire to predict the price fluctuations of potential investments to avoid future uncertainties and risks. Similarly, foreign investors consider not only the bond yield and return of the relevant country, but also whether or not the relevant debt can be repaid after they invest in a country. Issues such as macroeconomic stress and policy changes make it difficult to estimate the expected returns, thus making good risk management necessary. All these developments make it necessary for those market participants who desire to make investments to have adequate information related to local markets to make proper decisions. However, it is difficult and expensive for each market participant to access that information

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with their potentials (Dinc et al., 2018: 182). Additionally, fast-developing technologies and globalization have led to innovations in financial markets and have made the development of different financial instruments for several needs necessary. All of these factors have made investors apply for financial instruments to avoid risks (Baltaci and Akyol, 2016: 610). Hence, other financial instruments, which have emerged to assist in avoiding credit risk and are increasingly common, are credit derivatives.

It is increasingly common for companies and developing countries to apply for credit derivatives, which enable the trading of credit risk (in other words, aim to manage credit risks). One of the most widely sought after credit derivatives in financial markets has been the CDS (Hull et al., 2004: 2790; Hull and White, 2001: 12). The CDS, one of the most important credit derivatives within financial markets, has also become one of the main indicators that is used in evaluating the risk perception related to a country (Atmisdortoglu, 2019: 42). Policymakers and researchers have begun to carefully follow the mobility in CDS premiums. CDS protects the creditor party against the risk of non-repayment of a loan in return for a certain premium and undertakes the role of protection against the value loss or damage which may occur in the related asset. It was first introduced to the financial world by the US-based investment bank JP Morgan Chase in 1995 (Danaci et al., 2017: 68). CDS is a financial derivative product acting as a kind of insurance by providing protection against the risk of incomplete and deferred payments for debt instruments issued by a country or a company (Amato, 2005: 56; Sarigul and Sengelen, 2020: 206). Its purpose is to get rid of the risk of bankruptcy of the creditor and the debtor. The CDS vendor then bears this risk, which naturally requires a determined fee. The fees which are paid to third parties for insurance are called CDS premiums or CDS spreads (Akkaya, 2017: 130). The CDS premium is the rate that evens up the current values of the expected receipt and expected loss amounts and is mostly determined through the expectations of the market participants about the default potential of the financial assets. Thus, the creditors bear the risk of not being able to collect their receivables from the CDS vendor. In this respect, CDS ensures that the credit risk is transferred from the protection buyer to the protection seller in return for a determined payment (Fontana and Scheicher, 2010: 5).

The CDS premium provides important information on the performance of the real economy and helps early detection of possible risks and damages, especially in developing countries, with increasing risk premiums to the global financial system. The increase in the CDS premium causes an increase in macroeconomic uncertainty and may negatively affect the decision processes of direct or indirect investments proposed for a country. Due to its role in the financial markets, the number of studies conducted to determine the variables affecting CDS premium has increased in recent years, with an emphasis on analyzing the relationships between macroeconomic and financial variables. In this study, those financial variables in Turkey which may affect the CDS premium are analyzed. Within this framework, the aims of our study were to determine the dates of structural breaks on the monthly CDS premium,

which are determined by considering the 5-year CDS base ratings of Turkey between March 2012-2020, to reveal the economic and political factors causing those breaks, and to question whether the selected financial variables affect the CDS premium. In this research, in which the effects of financial variables on the CDS premium are analyzed, it is thought that studies which analyze the structural break models and the dynamic relationship between the variables are limited by considering the national and international literature and it is discovered that the studies analysing the risk perception for Turkey are conducted through weighted credit ratings and therefore it is understood that this study will contribute to the literature.

The structure of the paper is as follows: after the Introduction, Section 2 provides a brief literature review on financial and macroeconomic determinants of CDS premiums. Sources of the data as well as methodology are presented in Section 3. Section 4 presents the empirical results of the determinants of Turkey's CDS premium. In the last section, all findings are interpreted within the frame of the literature, and policy recommendations are proposed.

Review of Literature

In parallel with the increase in the transaction volume of the CDS premium in the financial markets, the importance of the CDS premium within the economic literature also increases. With the recent financial developments, those studies on the macroeconomic and financial variables related to the CDS premium and which affect those premiums have become popular. The key determinants of CDS premiums such as high volatility in global financial markets and frequent changes in risk appetite (Pan and Singleton, 2008, Longstaff et al., 2011; Fender et al., 2012; Fontana and Scheicher, 2016 are discussed in the current literature). A summary of those studies conducted on those relationships is provided below.

Chan et al. (2008) evaluated the dynamic relationship between sovereign CDS spreads and stock prices for seven Asian countries for the period from 2001 to 2007 using the Merton type structural model. They found that there is a strong negative correlation between CDS spreads and stock indexes for most Asian countries. Ersan and Gunay (2009) focused on examining the effects of the financial developments on CDS spreads. They applied VAR models. The results indicated that the Eurobond incomes and Dow Jones Index incomes variables were factors that had an affect on the country's spreads instead of local factors. Zhang et al. (2010) examined the CDS premium associated with exchange rates by using Granger causality and found that the CDS index differences provide carry-trade information. Longstaff et al. (2011) analyzed the sovereign credit risks through the CDS data obtained from developed and developing countries for the period between 2000 and 2010, and they found that the sovereign credit risk can be related to global factors instead of national factors. The results indicated that the CDS premium of the countries has a closer relationship with the volatility risk premiums expressed with the USA share market and higher-yielding markets as well as the VIX

index. Liu and Morley (2012) studied the connection between the CDS spread, exchange rate, and the financial stability for the United States and France by applying the Autoregressive (VAR) and Granger causality. The study reported that the exchange rate has significant effects on the CDS while the interest rate has a limited effect on the CDS. Coronado et al. (2012) aimed to explore the association between stock indexes and the sovereign CDS market. The results suggested that sovereign CDS has a negative correlation with stock indexes. Ertugrul and Ozturk (2013) have investigated the relationship between CDS spreads and financial market indicators for the selected emerging market countries. The results suggest that the CDS spreads have a cointegration relationship with the remaining financial market indicators. The results also reveal that the CDS spread is negatively related to market uncertainties. Aizenman et al. (2013) analyzed the factors affecting the CDS premium for Greece, Ireland, Italy, Portugal, and Spain in particular to estimate the credit risk pricing of sixty countries within the period between 2005 and 2010. The results of the analysis indicated that the TED margin, trade openness index, foreign debts, and inflation have important roles in the CDS premium. Eyssell et al. (2013) analyzed Chinese data to research the determinants of the CDS premium. In the research in which the VAR analysis method was used, data obtained from the stock index, real interest rate, and S&P 500 were used. It was discovered that the changes in the Chinese spreads affect the changes in the stocks. Hanci (2014) examined the existence of the relation between CDS spreads and the BIST100 index in Turkey between 2008 and 2012 by applying the GARCH method. The results revealed that the BIST100 index was associated negatively with CDS spreads. Koy (2014) analyzed the relationship between the CDSs and Euro bonds premiums of the eight countries through the daily data obtained from the period between 2009 and 2012 by applying Johansen cointegration and Granger causality tests. A causality relationship between the CDSs and Euro bond was detected. Yenice and Hazar (2015) used correlation analysis to examine the relationship between the stock exchange, exchange rate, and CDS premium, focusing on developing countries (including Turkey) from 2009 to 2014. The results showed that the CDS premium correlates with the stock exchanges and exchange rates of countries. Bozkurt (2015) examined the relationship between the CDS premium and financial stability using fuzzy regression analysis. The results indicated that there is a long-term relation between the NPLs and the macroeconomic variables, and the results of the Granger causality test indicated that the mentioned relations are dual. It was concluded because of the study that there is a negative relationship between financial stability and CDS premium. Gun et al (2016) focused on determining whether the 2013 Gezi Park events caused a significant impact on Turkish CDS spreads or not for the period between 2010 and 2015 by using the VAR method, Johansen cointegration test, and causality with the Granger test. They found a significant relationship between CDS spread Euro bond interest, BIST-100 index, foreign currency basket, and bond yield. The results also suggest that there were significant correlations between the Gezi Park events and CDS spread. Eren and Basar (2016) discovered that CDS premium affects the stock market prices positively in a long-term

period in the study where they analyzed the effects of the CDSs and macroeconomic factors on the BIST-100 index. The monthly data related to the variables of the ARDL model, inflation interest rate, foreign exchange rate, money supply, foreign trade balance, and CDS price for the period between 2005 and 2014. Baltacı and Akyol (2016) used the dynamic panel data method to examine the determinants of the CDS in developing countries (including Turkey) throughout quarterly data of 2004-2008. The results of the GMM analysis indicated that the CDS spreads are affected by many macroeconomic factors. Degirmenci and Pabuccu (2016) tried to explain the relationship between the Istanbul Stock Exchange and CDS premiums and they discovered a bilateral relationship between BIST-100 and CDSs for the period between 2010 and 2015. They applied VAR analysis, Granger causality analysis, and the Artificial Neural Network-based NARX method in their study. Kocsis and Monostori (2016) researched the relationship between the fundamental macro-financial indicators and the CDS premium of 13 Eastern European countries for the period between 2008 and 2014. In their study, in which they categorized macro-financial indicators as real growth, external position, financial status, banking sector vulnerability, and political-institutional development, they discovered that national factors are far more effective in explaining the CDS premium rather than the global factors. Aksoylu and Gormus (2018) studied the relation between the financial drivers and CDS premium in nine countries from 2005 to 2015. The results indicated that there is an asymmetric causality relationship between the CDS premium and the financial drivers. Munyas (2018) evaluated the connection between the CDS premium and the market data for Turkey by employing regression analysis. Their results suggest that the BIST-100 index is related negatively with CDS premiums while the Dollar exchange rate and bond interest rate are not statistically significant. Mateev and Marinova (2019) studied the relation between the CDS and market price of Markit iTraxx Europe index companies between 2012 and 2016 using linear and non-linear models that allowed for structural breaks. The results indicated that CDS spreads and stock prices are cointegrated and there are long-run relations between the CDS spreads and stock prices. Kilci (2019) analyzed the relationship between the foreign debt/GDP rate and countries' CDS premium for the period between 2000Q1 and 2018Q2. In the analysis, the Fourier cointegration test and Granger causality test were applied through the data obtained from the quarter periods. The results indicated that there is a positive relationship between the variables. Atmisdortoglu (2019) conducted research to determine the stock exchange, interest rate, and exchange rate of CDS premiums using data of the emerging markets over the period 2010-2019 and employed VAR analysis. The results revealed that the stock exchange had the largest effect among the selected variables, whereas the exchange rate and interest rate had no significant effect. Avci (2020) studied the association of the CDS spreads with equity markets in Turkey between 2003 and 2018 using cointegration with structural breaks and causality methods. The results suggested that there is cointegration among the variables and unidirectional causality from BIST-100 to CDS premium. Sevil and Unkaracalar (2020) examined the link between CDS spreads for Turkey and portfolio investments

for the period of the quarterly data from 2010 to 2018 using the FMOLS test. The findings suggest that there is a negative relationship between portfolio investments and CDS spreads.

Data and Methodology

In this study, the relationship between Turkey's 5-year CDS premium and the BIST100 index, the domestic credit volume for the banking sector, exchange rate, and liquid liabilities are analyzed. The data collected comprises monthly data between March 2012 and March 2020 and consists of 97 observations. The reason for applying the five-year CDS premium is because it are more liquid compared to the ten-year CDS premium (Hull and White, 2001; Longstaff et al., 2011; Hull, 2012). The data was obtained from the Central Bank of the Republic of Turkey and investing.com. Since the results of the logarithmic form are better than the linear form, all data are further expressed in their natural log forms.

Reasons such as economic crises, changes in the economic policies, political instability financial instability, and natural disasters can cause structural breaks on the economic time series (Bozkurt and Okumus, 2015: 27). Hence, structural breaks on the time series are investigated in the cointegration analyses in which the balanced relationship between the economic variables is common (Altay and Yilmaz, 2016: 80). Several social and political issues such as economic crises in Turkey have been effective on the macroeconomic variables. Those effects created a change on the average or variance of the time series variables or sometimes on both their average and variance (Caglar and Mert, 2017: 25). Therefore, the cointegration tests with structural breaks in the study consider those effects. In the study, the relationship between the variables through applying cointegration and causality tests test the financial relationship.

The empirical analysis of the study consists of three main parts. Firstly, the Phillips-Perron (PP) (1988) unit root test and the Lee and Strazicich (2003) with two structural breaks unit root test are applied to test the unit-roots and stationarity of the variables. Without taking the existence of the structural breaks in the cointegration equation, the cointegration tests can provide deviant results. Therefore, since the existence of structural breaks can affect cointegration relationships, the cointegration tests developed by Gregory-Hansen (GH) (1996) and Hatemi-J (2008) which take the structural breaks into consideration are applied at the second stage of the analysis. When the findings are evaluated, considering the structural breaks for modelling the long-term relationship of cointegration relationship will make the results more significant. In case the relevant variables are cointegrated, the long-term estimate coefficient will be obtained through the fully modified least square (FMOLS) methods which were suggested by Stock and Watson (1993).

GH (1996) is a test in which the structural breaks are determined internally, and which allows a single structural break (Gregory and Hansen, 1996: 555). Another important point of

this test is the ability to treat the issue of a break (which can be determined endogenously) and cointegration together (Le and Chang, 2012: 89). In the GH (1996) test which is the extension of the Zivot-Andrews (1992), single-equational regression models were developed to analyze the cointegration relationship considering the structural breaks (Yilanci and Ozcan, 2010: 26). To account for one endogenous break, Gregory and Hansen (1996a, 1996b) propose the following three models which are level shift, level shift with the trend, and intercept with slope shifts (Gregory and Hansen, 1996: 102-103):

Model C (level shift)

$$y_t = a_1 + a_2\vartheta_{1\tau} + \delta_1 y_{2\tau} + e_t, \quad t = 1, \dots, n \quad (1)$$

Model C/T (level shift with trend):

$$y_t = a_1 + a_2\vartheta_{1\tau} + bt + \delta_1 y_{2\tau} + e_t, \quad t = 1, \dots, n \quad (2)$$

Model C/S (regime shift):

$$y_t = a_1 + a_2\vartheta_{1t} + \delta_1 y_{2\tau} + \delta_2 y_{2\tau}\vartheta_{1\tau} + e_t, \quad t = 1, \dots, n \quad (3)$$

where α_1 is the intercept before the break and α_2 is the change in intercept at the time of the break, $y_{2\tau}$ is an m-dimensional vector of explanatory variables and e_t is the disturbance term. In the 3rd Model, δ_1 is the cointegrating slope coefficient before the shift and δ_2 is the change in the cointegrating slope coefficient at the time of the break (Gregory and Hansen, 1996: 102-103). In equations (1), (2) and (3), $\vartheta_{1\tau}$ is a dummy variable. To model the structural change, GH (1996) defined the indicator variable as follows:

$$\vartheta_{1\tau} = \{0, t \leq [n\tau] \ 1, t > [n\tau] \} \quad 0.15 < \tau < 0.85 \quad (4)$$

Here, $\vartheta_{1\tau}$ is a dummy variable, n is the number of observations, τ is the unknown parameter (0, 1) denotes the relative timing of the break point and $[]$ denotes integer part.

For each of the above three models, unit root tests are applied on the residuals series employing ADF^* , Z_t^* ve Z_α^* tests. Here, to test the cointegration relationship GH (1996) propose the following tests (Mert and Caglar, 2019: 378):

$$\begin{aligned} ADF^* &= ADF(\tau) \\ Z_t^* &= Z_t(\tau) \\ Z_\alpha^* &= Z_\alpha(\tau) \end{aligned} \quad (5)$$

The Z_α statistic can be defined as follows:

$$Z_\alpha(t) = n(\hat{\rho}_t^* - 1) \quad (6)$$

Finally, the Z_t statistic can be defined as follows

$$Z_t(\tau) = \frac{(\hat{\rho}_t^* - 1)}{\hat{s}_\tau} \quad (7)$$

For the GH (1996) cointegration test with a break, the single possible regime change (single break) is taken into consideration; however, multiple breaks on the cointegration coefficient during the period under analysis can cause changes in the long-term relationship between the series. In cases of multiple breaks in those variables, the test results with a single break will be weaker. To solve this problem, Hatemi-J (2008) contributed to the literature by developing the GH (1996) method through the existence of two breaks and by considering two possible regime changes (double break). Therefore, the Hatemi-J (2008) cointegration test is an extended version of the GH (1996) cointegration test by allowing two structural breaks. With the Hatemi-J (2008) test, the breaks can be modeled through only the regime change (C/S) model and the break point is determined internally in the test strategy.

The first of them is the GH (1996) cointegration model, which contains an endogenous break. Hatemi-J (2008) considers only a model with regime shift in which two endogenous breaks affect both the intercept and the slopes coefficients. Here, he revealed that cointegration analysis can be performed even in the presence of two breaks in the series

The model which is identified as C/S is presented by:

$$y_t = a_0 + a_1 D_{1t} + a_2 D_{2t} + \beta'_0 x_t + \beta'_1 D_{1t} x_t + \beta'_2 D_{2t} x_t + u_t \quad (8)$$

where, a_0 indicates the first structural break, a_1 indicates the break caused by the first structural break, and a_2 indicates the break caused by the second structural break. While β_0 indicates the slope parameter before the structural changes, β_1 indicates the effect of the first structural change on the slope, and β_2 the effect of the second structural change is the parameter. In equation (8), D_{1t} and D_{2t} are dummy variables which include the effects of structural breaks in the model and are defined as follows (Mert and Caglar, 2019: 379):

$$D_{1t} = \{0, t \leq [n\tau_1] \ 1, t > [n\tau_1]\} \text{ ve } D_{2t} = \{0, t \leq [n\tau_2] \ 1, t > [n\tau_2]\} \quad (9)$$

In equation (9), the unknown parameter τ_1 and τ_2 indicate the breakpoints. Three different statistics are proposed to test the null hypothesis. The null hypothesis shows that there is no cointegration. These are the test statistics for ADF^* , Z_t^* and Z_α^* . Here, the ADF test statistic is calculated based on the t test value, which is the slope u_{t-1} . In order that Z_a , Z_t values can be calculated $\hat{\rho}^*$. The $\hat{\rho}^*$ term is calculated by the formula below (Hatemi-J, 2008: 499):

$$\hat{\rho}^* = \frac{\sum_{t=1}^{n-1} (\hat{u}_{t\tau} \hat{u}_{t+1} - \sum_{j=1}^B w(j/B) \hat{\gamma}(j))}{\sum_{t=1}^{n-1} \hat{u}_t^2} \tag{10}$$

After the coefficient $\hat{\rho}^*$ is estimated,

$$Z_\alpha = n(\hat{\rho}^* - 1) \tag{11}$$

$$Z_t = \frac{(\rho_t^* - 1)}{\left(\hat{\gamma}(0) + \frac{2 \sum_{j=1}^B w(j/B) \hat{\gamma}(j)}{\sum_{t=1}^{n-1} \hat{u}_t^2} \right)} \tag{12}$$

Here, the term $\hat{\gamma}(0) + 2 \sum_{j=1}^B w\left(\frac{j}{B}\right) \hat{\gamma}(j)$ is the long-term variance of the residues obtained from the regression of \hat{u}_t on \hat{u}_{t-1} indicates the forecast.

As the test method is based on the minimum achievement of the three test statistic depending on the τ_1 and τ_2 values, Hatemi-J (2008) suggests the following tests:

$$ADF^* = ADF(\tau_1, \tau_2) \tag{13}$$

$$Z_t^* = Z_t(\tau_1, \tau_2)$$

$$Z_\alpha^* = Z_\alpha(\tau_1, \tau_2)$$

In order to calculate the long-term estimate coefficient, the FMOLS estimator method is employed. The FMOLS method was developed by Phillips and Hansen (1990) to administer an optimal cointegrating regression estimation that has a combination of $I(1)$. This test explicates problems such as endogeneity, serial correlation, measurement errors and allows for the heterogeneity in the long-run parameter (Phillips and Hansen, 1990: 120; Bashier and Siam, 2014; Adom et al., 2015). Therefore, the FMOLS method is preferred to estimate the long-term and short-term coefficients in which the structural breaks can be included in the model as dummy variables.

When the mathematical form $(n+1)$ of this model is expressed with the dimensional time series vector, it is presented with the following equation (Phillips and Hansen, 1990):

$$y_t = X_t' \beta + D_{1t}' \gamma_1 + u_{1t} \tag{14}$$

Here y_t is the dependent variable $I(1)$. $D_t = (D_{1t}', D_{2t}')$ indicates deterministic trend variables, u_{1t} indicates zero mean and error term with covariance (Ω) . The n stochastic variables are determined by the X_t equation.

$$X_t = \Gamma_{21}' D_{1t} + \Gamma_{22}' D_{2t} + \varepsilon_{2t} \tag{15}$$

$$\Delta \varepsilon_{2t} = u_{2t} \tag{16}$$

The FMOLS estimator is given by:

$$\theta_{FMOLS} = [\hat{\beta} \ \hat{\gamma}_1] = [\sum_{t=1}^T \quad Z_t Z_t']^{-1} \left[\sum_{t=1}^T \quad Z_t y_t^* - T [\hat{\lambda}_{12} \ 0] \right] \tag{17}$$

Here $Z_t = (X_t' D_t')'$ and $y_t^+ = y_t - \hat{\omega}_{12} \hat{\Omega}_{22}^{-1} \hat{u}_2$ represent the converted data. Estimation with long-term variance-covariance matrices and related elements are estimated using the equation $\hat{\lambda}_{12}^+ = \hat{\omega}_{12} \hat{\Omega}_{22}^{-1} \hat{u}_{12}$ and $u_t = (\hat{u}_{1t}^{-1}, \hat{u}_{2t}^{-1})'$ is the deviation correction term (Adom et al., 2015; Mehmood and Shahid, 2014: 60).

Empirical Results

In the study, the unit root test and cointegration test methods are applied to test the relationship between the variables within the frame of the risk premium. The empirical analysis consists of three sections. First, the stationarity of the series is analyzed through a unit root test. Then, the cointegration test method is used to test the long-term relationships. Finally, the elasticity of the variables is calculated through the long-term coefficient estimator. Before the analysis, the characteristics of the variables included in the model are mentioned. Descriptive statistics are used to control the behavior of financial variables. Table 1 shows the descriptive statistics for the data set employed in this study.

Table 1

Descriptive Analysis of the Variables

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Jar-Bera
CDS Premium	246.6651	233.8300	546.2300	121.1300	83.48122	30.42602*
BIST100 Index	86,032.40	83,268.04	119,528.8	55,099.33	14,997.71	3.480335
Credit	1,54E+09	1,45E+09	2,72E+09	6,17E+09	6,16E+08	6.747303*
Exchange (\$)	3.343141	2.938345	6.344575	1.763170	1.434790	11.13840*
Liquid	1.41E+09	1.28E+09	2.78E+09	6.97E+09	5.49E+09	8.828315*

Source: Computed by the Author using Eviews 10. * indicates no normal distribution.

In the descriptive statistics table, the mean, median, standard deviation, and Jarque-Bera are provided. The result of descriptive statistics indicated that the average CDS premium is 246.66 with standard deviation 83.48, whereas the minimum value of CDS is 121.13, and the maximum is 546.23. The average of BIST100 index is 86,032.40, the average domestic credit volume for the banking sector is 1,5E+09, the average foreign exchange rate for USD is 3,34, and the average of liquid liabilities is 1.41E+09. According to the maximum and minimum, it is seen that all the data is in the positive range. In addition, the Jarque-Bera statistics suggest that the variables do not follow a normal distribution - except for the BIST100 index.

In the sequence, Figure 1 presents the plot graphs of the variables in the sample.

Figure 1 indicates the plots of variables over time in movements. The progress of the variables, which monotonically display a mixture of upward and downward sloping trends in terms of the existence of possible structural regimes, can be observed. It is observed in the graphics that none of the variables are in a distribution around a specific mean, therefore none of them are stationary. In general, these graphs indicate that in some periods, the variables

appear to have strong relationships. The upward and downward trends in 2018 facts give us an idea of the close relationship between the CDS premium and financial variables in Turkey. As can be seen in Figure 1, and when the distribution of the CDS levels of Turkey from the second half of 2017 up to the present are analyzed, it can be observed that it is above level 500 for short intervals and also that it is not normal, it is right-skewed instead. It is observed that the CDS premium of Turkey has been in a continuous increase for the last 3 years despite the political uncertainties and the fluctuations during the year. The highest value of the monthly CDS premium is about 546 in the August 2018. CDS premium had returned to its pre-down-turn rate at the end of 2018. CDS premium showed signs of a slight recovery at the end of 2018 and until the beginning of 2019. The political tensions that occurred between the US and Turkey, presidential elections, and political uncertainty can be considered as reasons for the sudden rise of the CDS premium between 2017 and 2018.

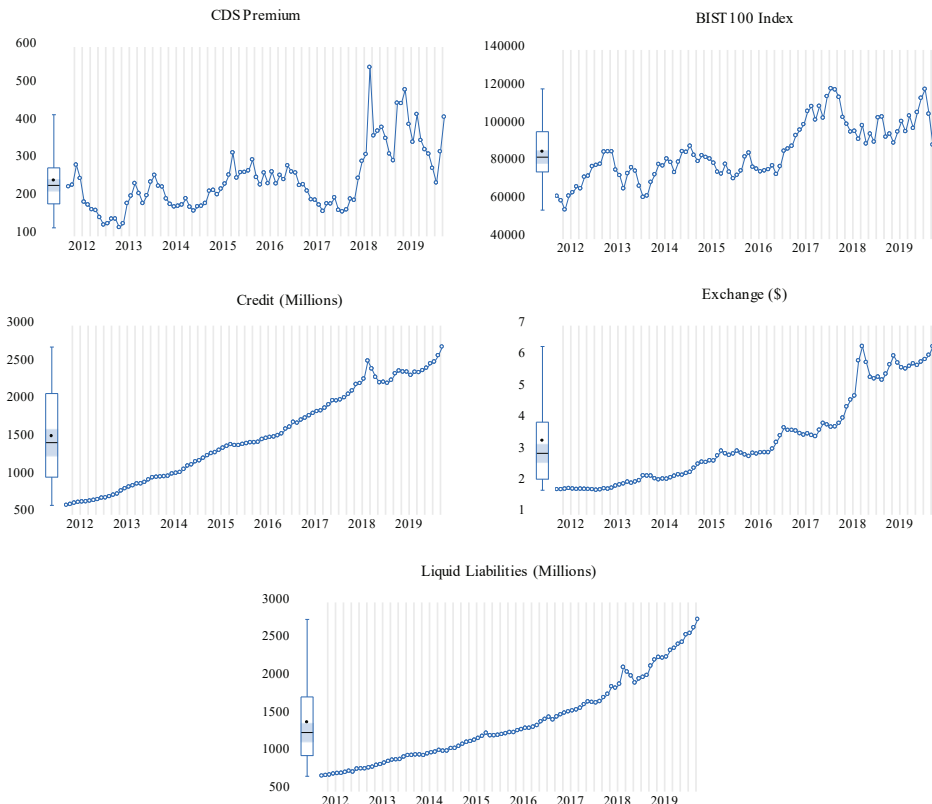


Figure 1. The Plot of the Data of Selected Financial Variables
Source: Research data.

It is necessary to determine the stationarity levels of the series to decide on the tests which will examine the cointegration relationship between the variables. Therefore, the PP (1988)

and Lee and Strazicich (2003) unit root tests are used in the study. The results of the PP (1988) unit root test and Lee and Strazicich (2003) with two structural breaks unit root test on the selected variables are presented in Table 2 and Table 3, respectively.

Table 2

The Results of PP (1988) Unit Root Test

Variables	Intercept Model		Trend and Intercept Model	
	Level	1st difference	Level	1st difference
CDS premium	-1.950281	-10.20684*	-3.145966	-10.21187*
BIST100 index	-2.209543	-9.139444*	-2.913550	-9.151096*
Credit	-1.820150	-7.680017*	-1.583931	-7.764755*
Exchange (\$)	0.196739	-6.334209*	-3.015902	-6.326625*
Liquid	1.645157	-10.26629*	-1.995939	-10.70617*

Source: Computed by the Author using Eviews 10.

Notes: *, ** and *** denote the rejection of the null hypothesis at 1%, 5% and 10% level of significance respectively. MacKinnon (1996) critical values with constant are -3.499 (1%), -2.891 (5%) and -2.583 (10%), MacKinnon (1996) critical values with constant and linear trend are -4.056 (1%), -3.457 (5%) and -3.154 (10%). It was also determined that the series contain unit root in the level, and they are stationary for the first differences.

In the Table 2, it can be observed that the PP (1988) unit root test fails to reject the null hypothesis of a unit root at 1% and 5% significance levels in all variables in both the intercept model and the intercept and trend model. All of the variables have a unit root, in other words variables are not stationary at their level. However, they all become stationary at their first differences. The results of the unit root test implies that examination of possible cointegration relationship among the variables should occur.

The results of the two structural breaks unit root test of Lee-Strazicich (2003) can be observed in Table 3. The results revealed that the selected financial factors of Turkey are higher than the critical table values in the study of Lee-Strazicich (2003) for the A and C models, therefore they are non-stationarity at the significance levels of %1 and %5. It was observed that all series became stationary after their first difference. Thus, it was concluded that all variables have a unit root. During the period, it is observed that significant regime shifts occurred in the specified dates. The estimated breakpoints have been identified as 2015 and 2018 for the CDS premium, 2016 and 2017 for BIST100 index, 2015 and 2018 for the credit, 2017 and 2018 for the exchange, and 2015 and 2018 for the liquid liabilities. Within this frame, it is possible to say that the breaks on the CDS premium and other financial variables are considered as an important indicator related to the events in the economy. In other words, the estimated break dates suggest that important incidents are occurring in the Turkish economy.

According to the results of both unit root tests, all the variables are stationary at their first difference, the necessary condition for the test for cointegration has been fulfilled. After examining the stationarity test of the series and breaking dates, the next step involves applying the GH (1996) and Hatemi-J (2008) tests cointegration test to check whether there is a long-term cointegration relationship with structural breaks between the variables in the model. The

GH (1996) test statistics are applied through two different models, and in the Hatemi-J (2008) two breaks test they are applied through a single model. Table 4 reports the results of this test for examining the long-run relationship between CDS premium and financial variables.

Table 3
The Results of Unit Root Test with Two Structural Breaks

Variables	Lee and Strazicich (2003) LM Test									
	Model A		Breakpoints (TB ₁ -TB ₂)			Model C		Breakpoints (TB ₁ -TB ₂)		
CDS premium	-3.566		2015:M02-2018:M08			-3.855		2015:M09-2018:M08		
BIST100 Index	-3.746		2016:M12-2017:M06			-4.489		2015:M09-2017:M05		
Credit	-2.156		2018:M08-2018:M10			-5.081		2015:M09-2018:M07		
Exchange (\$)	-3.826		2017:M10-2018:M05			-5.163		2018:M06-2018:M12		
Liquid	-2.959		2014:M09-2015:M09			-5.191		2018:M01-2018:M09		
Critical values for the LM unit root test statistic based on Model C										
λ_2	0.4		0.6					0.8		
λ_1	%1	%5	%10	%1	%5	%10	%1	%5	%10	
0.2	-6.16	-5.59	-5.27	-6.41	-5.74	-5.32	-6.33	-5.71	-5.33	
0.4	-	-	-	-6.45	-5.67	-5.31	-6.42	-5.65	-5.32	
0.6	-	-	-	-	-	-	-6.32	-5.73	-5.32	

Source: Computed by the Author using Gauss 21.

Notes: Lee and Strazicich (2003) indicate the LM-type two break unit root test. TB₁ and TB₂ are the break dates. The Model A and C denote the breaks on the intercept and the breaks on the intercept and trend, respectively. Critical values for the LM test based on Model A at 10%, 5% and 1% significant levels are -3.504, -3.842 and -4.545 respectively. Critical values for the other coefficients follow the standard normal distribution. λ_j denotes the location of breaks.

Table 4
The Results of GH (1996) and Hatemi- J (2008) Cointegration Tests

Test	Model	ADF*	TB	Z _t *	TB	Z _a	TB
GH	C	-7.161*	2016:M07	-7.725*	2018:M06	-74.04**	2018:M06
GH	C/S	-7.703*	2014:M04	-7.743*	2014:M04	-75.20***	2018:M05
HJ	C/S	-8.702*	2013:M12 2017:M03	-9.121*	2014:M01 2015:M07	-98.141	2014:M01 2015:M05

Source: Computed by the Author using Eviews 10.

Notes: The GH test critical values are from Table 1 of GH (1996, p. 109), and HJ test critical values are from Table 1 of HJ (2008, p. 501). TB denote the break points. 15% trimming region is used for the tests. The lag length was selected using Akaike Information Criterion out of a maximum lag of 12. * and ** denote the rejection of null hypothesis of no cointegration at the 1% and 5% significance levels, respectively. The 5% critical values for ADF (and Z_t) are -5.56, -5.83 and -6.41, respectively while the Z_a for the same equations are -59.40, -65.44 and -78.52, respectively. C, C/T and C/S denote level shifts, level shift with trend and regime shifts, respectively.

According to the results of the GH (1996) test; Model 1 (C), which allows for breaks in the intercept, and Model 3 (C/S) where regime change is tested ADF^* , Z_t^* ve Z_a^* at a significance level of 10% or better; the absolute value of the test statistics was less than the table critical values for both models. Table 4 reports the results for the three models, indicating that when the CDS premium is the dependent variable the null hypothesis of no cointegration relationships is rejected and it is accepted that there is a long-term relationship between the series. According to the analysis results, it can be said that there is a long-term cointegration relationship between the CDS premium and the BIST100 index, credit, exchange, and liquid liabilities in both models. In other words, the cointegration relationship indicates that the relevant variables are effective on the CDS premium. When the results of the Hatemi-J (2008)

structural break cointegration test are examined, the ADF^* and Z_t^* test statistics reject the null hypothesis at the 1% significance level. However, with the Z_α^* test statistic, the null hypothesis is accepted. Since the dimension feature of the ADF^* test statistic is close to the nominal significance level, it can be observed that the dimension distortions are less. The ADF^* test statistic and the Z_t^* test statistic have the same asymptotic distribution (Mert and Caglar, 2019: 380). Therefore, it is observed that the results of the ADF^* and Z_t^* test statistics are lower than the table critical values in the regime change (C/S) test. In this case, the null hypothesis indicating that there is no cointegration relationship between the variables is rejected and it is concluded that there was a long-term relationship between the series. This result is in parallel with the GH (1996) cointegration test result, which takes the single structural break into account. The break dates were found because of both cointegration tests in which the relationship between the CDS premium and financial factors are determined as close dates. For the found break dates, 2014 and 2018 are both significant and remarkable. When the break dates corresponding to those years are analyzed, it is possible to say that they are related to the 17/25 December coup attempt and the following events, and the elections in 2018. It is possible to say that they are in parallel with the current condition of the Turkish economy since those break dates come after those events. As a result, the 17/25 December coup attempt, the political uncertainties after the 7 June elections, political tension between the US and Turkey, and the economic developments afterward caused the Turkish Lira to significantly lose its value and affected the CDS premium negatively. Consequently, the recent economic and political events in Turkey have caused the CDS premium to increase swiftly. Given the cointegration relations between the CDS premium and financial drivers, the findings comply with the studies of Gun et al. (2016). After the cointegration relationship between the variables is found, the long-term analysis is started by the FMOLS estimator.

In the long-term, the model estimated to observe how financial drivers affect Turkey's CDS premium is provided below.

$$CDS_t = b_0 + b_1 BIST_t + b_2 CREDIT_t + b_3 EXC_t + b_4 LIQ_t + e_t \quad (18)$$

Here, *CDS* indicates credit default swaps, *BIST* indicates BIST-100 index, *CREDIT* indicates domestic credit volume in the banking sector, *EXC* indicates dollar exchange rate, and *LIQ* indicates the liquid liabilities. Finally, b_0 and e_t is the constant and error term, respectively.

At this stage. 01/2014 and 07/2015, which are the dates of breaks for the Z_t^* statistic are included in the model as $d1$ and $d2$ dummy variables by taking the regime change (C/S) which is based on the Hatemi-J (2008) cointegration test into consideration. In the study, the long-term cointegration coefficients and the model in which the dummy variables provided in equation (18) as independent variables are estimated through FMOLS. The variables which have cointegration relationships between each other and the results of the FMOLS model which is formulated with the break dates are presented in Table 5.

Table 5
The Results of FMOLS Estimator

Dependent Variable	Coefficient	Std. Error	t-Statistic	Prob.
BIST100 index	-1.630801	0.382762	-4.260612	0.0001*
Credit	3.847111	1.436125	2.678813	0.0089*
Exchange rate (\$)	1.130966	1.520638	0.743745	0.4592
Liquid liabilities	-5.200600	2.060450	-2.524012	0.0136**
C	50.73411	17.56854	2.887782	0.0050*
d ₁	23.96213	39.54010	0.606021	0.0546***
d ₂	5.251749	35.87711	0.146382	0.8840

Source: Computed by the Author using Eviews 10.

Notes: *, ** and *** indicate 1%, 5% and 10% level of significance, respectively. Intercepts and linear trends are included in the regressions. Barlett Kernel with a fixed bandwidth of 4 was used following. The model has good explanatory power: R² is calculated as 0.9342, meaning that approximately 93.42% of the total sample variation of the CDS premium is explained by the independent variables.

When the coefficients in Table 5 are analysed, it can be observed that the coefficients of the variables, except for the d₂ dummy variable which is included in the model as the representative of the 07/2015 break period and the foreign exchange variable, are found as statistically significant at the 1% and 5% significance levels.

According to the results obtained from the FMOLS model, it can be concluded that in a long-term period, changes in the BIST100 index and liquid liabilities affect the CDS premium significantly and negatively. On the other hand, changes in the banking sector credit volume affect the CDS premium significantly and positively. According to the results of the FMOLS, there is an opposite relationship between the CDS premium, BIST100 index and liquid liabilities. No type of relationship of CDS premium with the foreign exchange rate and d₂ dummy variables is found. The BIST100 index and liquid liabilities affect the CDS premium negatively and statistically significantly as expected with theoretical expectations. Accordingly, a 1% increase in the BIST100 index causes a 1.63% decrease in the CDS premium in the long-term period. Another result is that there is a negative relationship at the 5% significance level, determined between the CDS premium and liquid liabilities. According to this result, a 1% increase in liquid liabilities causes a 5.20% decrease in the CDS premium in the long-term premium. Another result is that the banking sector domestic credit volume affects the CDS premium positively and statistically significantly, in line with theoretical expectations. According to the result, a 1% increase in the banking sector's domestic credit volume causes an increase of 3.84% on the CDS premium in the long-term period. Additionally, while a 1% increase in the exchange rate reduces the CDS premium by 1.13%, the coefficient is insignificant.

The FMOLS estimator also reveals the effects of the shocks within the structural break dates on the long-term relationships between the series. When the dummy variables representing the periods 01/2014 and 07/2015 are analysed, while the d₁ dummy variable representing the period 01/2014 is statistically significant, the d₂ dummy variable is statistically

insignificant. The effect of the economic and political events in the period 01/2014 (which is one of the structural break dates on the long-term relationship between the series) is statistically significant and positive. With this result, the significance of the d_1 dummy variable used in the cointegration coefficient estimations is important in terms of verifying that the determining date is the year when important changes occurred in the Turkish economy. On the other hand, the coefficient values related to the FMOLS estimator indicate that liquid liabilities are the most important variable affecting the CDS premium in Turkey among the macro-financial factors analysed in the study. As a result, the increasing level of liquid liabilities, and BIST100 index in a long-term period in Turkey will decrease the CDS premium and the increasing level of banking sector domestic credit volume will increase the level of CDS premium. In the study, in which the relationship between the BIST100 index, liquid liabilities and banking domestic credit volume is determined, the explanation power of the model formed through the results of the FMOLS analysis is found as 92%. Those findings are consistent with the theoretical expectations. The opposite relationship between the BIST100 index and CDS premium can be explained as follows: when the fact that the stock market gains value which we used for explaining the sovereign risk premium is considered, it is possible to say that the entrances caused by the progress on the domestic and foreign risk desire have a decreasing effect on the risk premiums. This is because the stocks gaining value can cause lower borrowing costs for the investors. Moreover, the stock markets are the markets in which the marketable securities can be turned into cash. Thanks to this characteristic of the stock markets, the hesitation of the investor for investing in the stock markets decreases. This is because, the high number of sellers and buyers within the stock markets enables the progress of the stock markets swiftly and with high cash flow. Also, it is observed that the investors of the Istanbul Stock Exchange have determined their positions depending on the CDS values recently. In periods when the risk perception is lower, i.e. when the CDS premium is lower, it is observed that the value of the Istanbul Stock Exchange gets higher. It is possible to say that a great share of the foreign investors in the stock markets has a role in this parallelism between the stock market and the risk perception. As a result, the stock markets contribute to decreasing the sovereign risk premium of the relevant country with their role in enabling the protection, purchasing and sale transactions to be carried out within a frame of specific rules. The opposite relationship between the liquid liabilities and the CDS premium can be explained as follows: the money supply is the total amount of money that can be used by the economic units within an economy to perform their short-term obligations. Within this frame, it is observed that in case the money supply decreases in an economy, the interest rates increase and the prices and the production decreases. This causes insufficient use of the production capacity and a decrease in investments. Similarly, the investments increase when the interest rates decrease because of the increase in the money supply, and the increase in the investments increases the product. Therefore, absence of the liquidity in the markets has an important role in the decrease in the CDS premium. Finally, the positive relationship

between the banking sector domestic credit volume and CDS premium can be explained as follows: the banks cannot collect the cash receivables caused by the credits and marketable securities, either completely or partially. Eventually, the non-performing loans arise. When it is considered with the perception of the borrowing company, the new funding and investment opportunities become limited since the transformation of the borrowed credit to the non-performing loan bind the deposit. The investment desire and credit demand of a company whose debts are accumulated decrease. This can cause a great block in the country's economy and increase the sovereign risk premium. As a matter of fact, in several studies, it was concluded that there is a significant relationship between non-performing loans and banking sector total credit volume and this relationship is positive (Vazquez et al., 2012; Messai and Jouini, 2013; Ahmad and Bashir, 2013; Vithessonthi, 2016; Kara and Bas, 2019). In other words, an increase in non-performing loans is observed in parallel with the increasing credit volume. The increase in non-performing loans will cause a decrease in their performance by decreasing their profitability. The performance of the banking sector has an important role in the change of the CDS premium. Therefore, it is not surprising that a shock to the banking system of a country has important effects on the sovereign default risk. An increase in the performance of the banking sector causes a decrease in the CDS premium, the decrease will cause the CDS premium to increase. This result is consistent with the result of Telek and Sit (2017).

When all of the results obtained from the FMOLS are evaluated, it is concluded that liquid liabilities have the greatest effect among the selected factors, the banking sector domestic credit volume and BIST-100 have less effect on the CDS premium when they are compared with the liquid liabilities. The results are consistent with theoretical assumptions in most of the cases. The coefficients found related to the variables and direction of the relationships are in parallel with the studies conducted by Pan and Singleton (2008), Longstaff et al. (2011), Liu and Morley (2012), Ertugrul and Ozturk (2013), Hanci (2014), Eren and Basar (2016), Basarir and Keten (2016), Yenice and Hazar (2015), Akkaya (2017), Munyas (2018) and Sadeghzadeh (2019).

Conclusion and Policy Recommendations

Political and economic uncertainties in a country and tensions in foreign relations can be effective in the increase of the CDS premium. With the deterioration of economic and financial indicators experienced in a country and the existence of political instability, an increase in CDS premium will be observed. The higher the CDS premium is paid for a country's borrowing tool indicates the higher the risks for that country. Countries with high CDS premiums must bear higher costs. Similarly, countries with low CDS premiums borrow at lower costs. At the same time, the higher the CDS score, the more likely that country will not pay its debts. Therefore, the CDS are of great importance for both investors and countries in need

of capital. Countries with low CDS premiums can obtain funds from international markets both more easily and at a lower cost. Investors, on the other hand, can direct their investments more safely and suitably by comparing country CDS premium between countries. Accordingly, finding appropriate determinants and understanding their effect on CDS premiums is crucial and beneficial for investors, analysts, or policymakers.

This study has two aims. The first aim of the study is to determine the structural breaks in the CDS premium calculated for Turkey and the economic and political reasons underlying those breaks. The second aim of the study is to analyze the effect of financial factors on the CDS premium and to reveal the relationship between financial stability and the CDS premium.

When the FMOLS test results are analyzed, it can be observed that there is a statistically significant relationship between the CDS premium and the BIST100 index, liquid liabilities, and banking domestic credit volume. There is a negative relationship between the CDS premium and BIST100 index and liquid liabilities, and there is a positive relationship with the banking domestic loan volume. In other words, an increase in the BIST100 index and liquid liabilities decreases the CDS premium, while an increase in the banking domestic loan volume increases the CDS premium. However, it is observed that the most important factor among the financial factors analysed in this study affecting the CDS premium of Turkey is the liquid liabilities in terms of the coefficient values related to the FMOLS. The FMOLS also reveals the effect of shocks at the dates of the structural break on the long-term relationship between series. The effect of the 17/25 December coup attempt in 01/2014, which is one of the structural break dates, on the long-term relationship between the series is statistically significant and positive. The break dates determined by the cointegration method indicate that there has been a significant change in the economy.

The CDS premium reflects the economic and financial performance of a country and directly affects the costs of using external financing. If the CDS premium increases, the country's economies will have to borrow with much more interest both abroad and domestically. It is known that with the increase in risk premiums, international investors tend to exit their markets. Consequently, liquidity problems increase in the markets. Additionally, international investors may cause a decrease in their risk desire for the financial assets of the countries with high CDS premiums. For this reason, it should be concluded that economies with a desire to reduce the CDS premium or sovereign risk should intensify efforts to ensure financial stability. Accordingly, it is necessary to carry out empirical studies related to the usage of the micro and macro drivers the minimize the CDS premium in emerging countries. For future research, investigating the effects of different variables with different econometric methods such as the Maki (2012) test might also be considered. However, the proliferation of the COVID-19 pandemic process, which started in January 2020 in many countries, caused changes in the fields of political, social, economic, and cultural. Countries have put into effect imperative new

applications in many fields. Hence, it is recommended to consider the effects of the economic conjuncture and global crises such as pandemic for the studies to be conducted and investigate their impact on the business world in the future. The findings of this study are expected to offer insight into the financial policymakers and for future studies.

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The Role of Competitive Strategies in the Effect of Entrepreneurial Mindset and the Entrepreneurial Leadership on Business Performance*

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Abstract

The main purpose of this study is to examine the role of cost leadership and differentiation strategies in the relationships among entrepreneurial leadership, entrepreneurial mindset, and business performance. The sample of the study consists of 443 managers working in 8 sectors affiliated to the Erzurum Chamber of Commerce and Industry. The data were collected with the help of a survey consisting of Entrepreneurial Leadership Scale developed by Renko et al. (2015), Entrepreneurial Mindset Scale developed by Mathisen and Arnulf (2014), Competitive Strategies Scale developed by Espino-Rodríguez and Lai (2014), and Business Performance Scale adapted to Turkish by Zehir (2016). The data were analyzed by structural equation modeling. According to the research findings, while entrepreneurial mindset has a positive effect on entrepreneurial leadership and business performance; it has been determined that it has no significant effect on cost leadership and differentiation strategies. However, entrepreneurial leadership has a positive effect on business performance, cost leadership, and differentiation strategies. Also, it was concluded that cost leadership and differentiation strategies should not be used together..

Keywords

Entrepreneurial Leadership, Entrepreneurial Mindset, Cost Leadership Strategy, Differentiation Strategy, and Business Performance

Introduction

With the development of technology and increasing competition, the business environment has changed rapidly and has become complicated. Increasing the performance and continuity of the businesses depends on their perception of environmental changes and developing strategies suitable for these changes. In this context, there is a need for entrepreneurial leaders and entrepreneurial mindset that can direct the organization and employees to perceive the developments and changes in the economic and technological fields in recent

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years. However, there is a limited number of studies on both entrepreneurial leadership and entrepreneurial mindset.

It is important whether competitive strategies can play an effective role in the impact of entrepreneurial leadership and entrepreneurial mindset on business performance, especially in a business environment dominated by chaos and complexity. As competition is intense in today's business world, managers need to determine the right strategies. In this context, there is a need for an innovative, entrepreneurial, visionary, and bold leader model that can adapt to the conditions required by age. Entrepreneurial leaders have the ability to determine the best strategies suitable for today's global economy with their entrepreneurial features and strategic perspectives. These leaders are people who can provide a competitive advantage to the company through their entrepreneurial activities. Because entrepreneurial leaders have the capacity to evaluate the entrepreneurial opportunities that will give the company a competitive advantage.

Another important issue emphasized in the research is that there are two different views in the literature on whether cost leadership and differentiation strategies can be applied simultaneously. While Porter (1985) has argued that businesses should choose and implement only one of their generic strategies (cost leadership and differentiation strategy) to improve their performance; Hill (1988) and Murray (1988) have argued that cost leadership and differentiation strategies are strategies that can be used together.

In this study, the literature was examined and answers to the following questions were sought. How and in what way do the entrepreneurial mindset and the entrepreneurial leadership affect the business performance? Does this impact change if a business adopts cost leadership and differentiation strategies? Can businesses use cost leadership and differentiation strategies together? Based on the findings found in previous studies, the hypotheses of the research have been developed and then research has been conducted on managers working in 8 sectors of the Erzurum Chamber of Commerce and Industry to test the research model and hypotheses. Accordingly, the aim of the research is to reveal the mediating role of cost leadership and differentiation strategy, in the effect of the entrepreneurial mindset and entrepreneurial leadership on business performance. It is also to determine whether cost leadership and differentiation strategies can be used together.

Theoretical Explanations

Entrepreneurial Mindset

Entrepreneurial mindset is the accumulation of knowledge that provides the advantage of instant decision-making to adapt quickly to environmental changes that are not foreseen in an organization (Antoncic & Hisrich, 2004: 521). Ireland et al. defined entrepreneurial mindset

as a growth-oriented perspective that encourages individuals towards flexibility, creativity and continuous innovation (Ireland et al., 2003: 968). Entrepreneurial mindset focuses on identifying and evaluating opportunities (Obeng et al., 2014: 503). Therefore, entrepreneurial mindset is a way of thinking that provides a competitive advantage to businesses, especially in environments where the speed of competition and change is high.

Entrepreneurial mindset, which is important for managers and employees as well as individual entrepreneurs, is a set of creative thoughts that contribute to the development of society (Ireland et al., 2003: 967). These creative ideas contribute to the development of society after the industry. In this context, it is important to institutionalize the entrepreneurial mindset as an essential element of entrepreneurial and strategic management in businesses (McGrath & MacMillan, 2000). As a result, the entrepreneurial mindset is a series of thoughts developed by businesses or individuals in terms of capturing opportunities and taking advantage of these opportunities in uncertain environments where change is very fast.

According to McGrath and MacMillan (2000), the entrepreneurial mindset is a way of thinking that exists in businesses that see uncertainty as an advantage. Businesses with an entrepreneurial mindset successfully overcome uncertainty and perform better (Roomi and Harrison, 2011: 23). Besides, the entrepreneurial mindset ensures the growth of the business with its competitive advantage and contributes to the development and growth of the country's economy (Ireland et al., 2003: 968).

Entrepreneurial Leadership

Entrepreneurial leadership refers to the process of contributing to the firm by constantly creating value within the firm and improving the skills of the employee (Gupta et al., 2004: 243). Ireland et al. (2003: 977) described entrepreneurial leadership as the ability to influence others to manage resources strategically. According to Thornberry (2006), entrepreneurial leadership includes inspiring others, ambition, vision, capturing and developing new business opportunities.

Entrepreneurial leaders are individuals who help employees for the development of the organization and focus on new opportunities and new solutions (Darling & Beebe, 2007: 78). Renko (2015) states that entrepreneurial leadership enables to influence and manage the performance of group members by realizing and benefiting from entrepreneurial opportunities to achieve organizational goals (Renko et al., 2015: 55). Entrepreneurial leaders are creative people who can see opportunities that others cannot see (Zijlstra, 2014: 13).

Business Performance

Performance is a tool to evaluate whether an individual or organization is using resources effectively (Lee et al., 2001). Performance is often defined as measuring the contribution of

members of the organization to the organization's goals (Zhang, 2012: 16). Business performance refers to the ability of an organization to achieve its goals by using its resources effectively and efficiently (Daft, 2010: 9). Therefore, business performance measures organizational success and shows how efficiently and effectively the organization uses scarce resources to achieve organizational goals (Iqbal et al., 2018).

Business performance, on the other hand, shows the extent to which an organization has achieved its market and financial goals (Chavez et al., 2017: 33). Overall, business performance is a measurement tool that shows the extent to which an organization has achieved its goals through the use of all its assets, including human, physical and capital resources (Iqbal et al., 2018).

Competitive Strategies

There are three basic competitive strategies developed by Porter in the literature. These are cost leadership, differentiation strategy, and focus strategy. In this study, cost leadership and differentiation strategies, which are more commonly used strategies, were included. The reason for this is that the research focused on the difference of opinion as to whether cost leadership and differentiation strategy can be used together.

Cost Leadership Strategy

Cost leadership strategy means that the company produces and sells similar goods or services at a lower cost than its competitors (Naktiyok, 2016). A company that applies a cost leadership strategy focuses on gaining a competitive advantage by producing a lower-cost product than its competitors without falling below the standard quality level (Barney & Hesterly, 2012: 122). The company that follows this strategy aims to be the company that produces the lowest cost goods or services in the industry (Bordean et al., 2010: 174). The company, which is the cost leader by producing low-cost products, can achieve a satisfactory profit even if it sells its products at a lower price than its competitors (Liu et al., 2018: 5).

Cost leadership is a strategy that emphasizes producing low-cost standard products per unit for price-sensitive consumers (David and David, 2016). A company that implements cost leadership must first establish its production areas and facilities based on economies of scale (Linton and Kask, 2017: 169). Subsequently, it is important to minimize costs in areas such as R&D, service, sales force and advertisements. At this point, the experiences of the companies will contribute to the reduction of costs significantly (Dinçer, 2013: 200).

Differentiation Strategy

Differentiation strategy is a competitive strategy that allows a price above the average

price level in the market by adding a number of new features to products or services (Barney and Hesterly, 2012: 150). A company that applies a differentiation strategy aims to be unique in the eyes of its customers (Ortega, 2010: 1275). Thus, the company may request higher prices for its product. (David and David, 2016: 136).

The differentiation strategy aims to create brand loyalty by making small innovations in the product. With the creation of brand loyalty, the price sensitivities of customers can be reduced and thus increasing costs can be transferred to customers (Kavale et al., 2016). The company, which wants to take advantage of the differentiation strategy, uses elements such as product design, quality, ease of use, speed, and flexibility to meet customer demands (Linton and Kask, 2017: 169). Thus, these companies can gain a competitive advantage thanks to the innovations they apply to their products or services.

Development of Hypotheses

The Relationship Between Entrepreneurial Mindset and Entrepreneurial Leadership

Entrepreneurial leaders are people engaged in entrepreneurial activities, capturing opportunities and leading innovation. With the increasing competition, businesses need managers who think entrepreneurial and exhibit entrepreneurial leadership behaviors to ensure their continuity. According to Newman (2013), students should be taught entrepreneurial mindset and entrepreneurial leadership at universities.

According to the model developed by Ireland et al. (2003), entrepreneurial mindset and entrepreneurial leadership affect each other mutually. Similarly, the model developed by Lassen (2007) shows that entrepreneurial mindset and entrepreneurial leadership indirectly affect each other. In the model developed by Altuntaş (2010), it is assumed that entrepreneurial mindset and entrepreneurial leadership affect each other mutually; however, as a result of the analyzes, a new model had to be developed since there was a problem of multiple linearities between these two variables in his study. As a result, an entrepreneurial mindset can affect the behavior of entrepreneurial leaders.

Based on the above studies, we have predicted that entrepreneurial mindset will have a significant impact on entrepreneurial leadership, and therefore we have developed the H1 hypothesis.

H1: Managers' entrepreneurial mindset has a significant and positive effect on their entrepreneurial leadership behaviors.

The Relationship Between Entrepreneurial Mindset and Business Performance

The relationship between entrepreneurship and business performance has been the subject of many studies. As a result of many of these studies, entrepreneurship-themed issues have been found to have a positive effect on organizational performance (Covin and Slevin, 1991; Zahra and Garvis, 2000; Lee et al., 2001; Rauch et al., 2009). Based on these studies, it is estimated that entrepreneurial mindset, one of the important issues of entrepreneurship, will have a positive effect on performance.

As a result of his research, Kimuli (2011) found that there is a positive and significant relationship between performance and entrepreneurial mindset, entrepreneurial personality traits, entrepreneurial leadership, strategic orientation, and entrepreneurial orientation. Neneh (2012) conducted research to identify the entrepreneurial mindset of small and medium-sized enterprises (SMEs) in South Africa and it was stated that the performances of entrepreneurial mindset organizations increased. Similarly, Njeru (2012) reported in his study that entrepreneurial mindset has a significant impact on performance.

Based on the above studies, it can be considered that an entrepreneurial mindset will have a direct positive effect on business performance.

H2: Managers' entrepreneurial mindset has a significant and positive effect on business performance.

The Relationship Between Entrepreneurial Mindset and Competitive Strategies

Firms should follow entrepreneurial strategies in a competitive environment. Because firms that determine strategies from an entrepreneurial perspective will be able to gain a competitive advantage (Miles et al., 2000). Research conducted in recent years has shown that an entrepreneurial mindset is necessary for successful entrepreneurial activities (Kimuli, 2011). One of the important features of entrepreneurs is that they perceive uncertain environments as opportunities. Therefore, an entrepreneurial mindset can provide companies with a competitive advantage (Miles et al., 2000). As a result of their research, Kriewall and Mekemson (2010) reported that entrepreneurial mindset is an important factor in producing new products.

Managers' entrepreneurial thinking skills will be effective in determining and implementing the best and most correct strategies in uncertain environments. Thus, managers' entrepreneurial thinking skills are expected to have a significant impact on competitive strategies.

H3: Managers' entrepreneurial mindset has a significant and positive effect on the cost leadership strategy.

H4: Managers' entrepreneurial mindset has a significant and positive effect on the differentiation strategy.

The Relationship Between Entrepreneurial Leadership and Business Performance

Entrepreneurial leaders direct the innovation process and innovation performance especially in SMEs (Fontana et al., 2017). Mgeni and Nayak (2015) showed that there is a strong positive relationship between entrepreneurial leadership and business performance in their study. Chheda and Banga (2013) conducted a study on SMEs in India and found that variables such as continuous improvement, proactivity, innovation, and resource allocation have a positive effect on performance. Fontana et al. (2017) examined the relationships among entrepreneurial leadership, innovation process, and innovation performance within the scope of innovation management, and the results showed a positive relationship between entrepreneurial leadership and innovation process. Kesidou and Carter (2014) stated that entrepreneurial leadership will have a positive impact on firm performance and growth.

Entrepreneurial leaders are people who can take risks, are brave, agile, perceive opportunities, and have entrepreneurial alertness. These people have an important role in determining the strategies of companies and increasing their performance. It is very important for organizations to make the right decisions at the right time in environments where competition is intense and uncertainty and risk is high. Entrepreneurial leaders who can make the right decisions will contribute to increasing the performance of the organization. In light of these opinions, it is predicted that the entrepreneurial leadership behaviors of the managers will have a positive effect on the performance of the company.

H5: Managers' entrepreneurial leadership behaviors have a significant and positive effect on business performance.

The Relationship Between Entrepreneurial Leadership and Competitive Strategies

Entrepreneurial leaders play an important role in determining the right strategies for a firm's growth and profitability. (Leitch and Volery, 2017). In the study of Ling and Jaw (2011), it has been determined that entrepreneurial leadership has a positive effect on global competitiveness indirectly. Bagheri and Akbari (2017) revealed that entrepreneurial leadership has a significant and positive effect on the innovative behavior of nurses in their research. Newman et al. (2017) stated that entrepreneurial leaders have a positive effect on innovative behavior. Bagheri (2017) showed that entrepreneurial leadership has a positive impact on seeking opportunities and innovative behavior.

Entrepreneurial leaders are brave leaders who are not afraid to take risks (Currie et al., 2008: 3). Entrepreneurial leaders determine the right strategies in an uncertain environment, as they perceive turbulent environments as an opportunity. At this point, managers who can exhibit entrepreneurial leadership behavior can determine the right strategies at the right time. Therefore, it can be thought that the entrepreneurial leadership behaviors of the managers will play a determining role in the competitive strategies.

H6: Managers' entrepreneurial leadership behaviors have a significant and positive effect on determining cost leadership strategy.

H7: Managers' entrepreneurial leadership behaviors have a significant and positive effect on determining differentiation strategy.

The Relationship Between Competitive Strategies and Business Performance

There are two different views in the literature on the use of cost leadership and differentiation strategies. *The first of these views* is that it is inconvenient to apply these two basic strategies together. For this reason, one of the most appropriate of these strategies should be chosen and applied. According to Porter (1980-1985), companies need to choose one of the cost leadership and differentiation strategies to be successful in the long run (Panwar et al., 2016: 579). Because cost leadership and differentiation strategies conflict when they are used together. The reason for this conflict is that differentiation is usually a costly strategy. According to Miller, the cost leadership strategy is incompatible with innovation (Linton and Kask, 2017: 170). Also, Kumar et al., (1997) and Thornhill et al. (2007), as a result of their research, found that organizations that use a single competitive strategy are more profitable than the organizations that use these strategies together. Josiah and Nyagara (2015) also gave an opinion that the cost leadership strategy may negatively affect innovation-business performance.

The second view on the use of cost leadership and differentiation strategies is that, contrary to Porter's view, both of these strategies are compatible strategies and can be successfully applied together. Some researchers, such as Hill (1988) and Murray (1988), have argued that differentiation and cost leadership strategies are not opposite strategies, rather they are compatible strategies and should be used together (Li and Li, 2008: 1-2). When the literature is examined, it is seen that there are many studies that support the use of two strategies together, at least in some cases (Phillips et al., 1983; Beal and Yasai-Ardekani, 2000; Spanos et al., 2004). On the other hand, Li and Li (2008) have reported that the performances of companies that use differentiation and cost leadership strategies both separately and together are positively affected.

Yamin et al. (1999) stated in their study that the companies performing medium level cost leadership increased their financial performance and the companies applying medium level differentiation strategy increased their organizational performance. Gyampah and Acquah (2008) could not find a direct relationship between competitive strategies and firm performance. Teeratansirikool et al. (2013) determined that competitive strategies positively affect firm performance, and Ortega (2010) found that there was a positive relationship between cost leadership-differentiation strategies and performance.

Therefore, it is predicted that competitive strategies will have a significant impact on business performance and the following hypotheses have been developed.

H8: Cost leadership strategy has a significant and positive effect on business performance.

H9: Differentiation strategy has a significant and positive effect on business performance.

Materials and Methods

Strategic entrepreneurship literature advocates that businesses should use entrepreneurship and strategic activities together to gain a competitive advantage (Ireland et al., 2003). In this research, a model is designed that shows the role of cost leadership and differentiation strategies in the effects of the entrepreneurial mindset and entrepreneurial leadership on business performance. Thus, a different combination of entrepreneurial and strategic activities is tried to be obtained. It is hoped that this study will contribute to the literature in terms of presenting a different combination and giving a new idea.

Another important issue emphasized in the research is that there are two different views in the literature on whether cost leadership and differentiation strategies can be applied simultaneously. First, Porter (Cited by Panwar et al., 2016: 579) and some other researchers, Miller (Cited by Linton and Helmet, 2017: 170), Thornhill (2007), Kumar (1997), Josiah and Nyagara (2015) argue the view that businesses should choose and implement only one of their generic strategies (cost leadership and differentiation strategy) to improve their performance. On the other hand, Hill (1988) and Murray (1988) believe that cost leadership and differentiation strategies are strategies that can be used together. Li and Li (2008) argue that when these two strategies are applied both together and separately, they increase the business performance.

In this research, it is aimed to determine whether cost leadership and differentiation strategies can be used together. Therefore, the focus strategy is not included in the model. Also, another aim of the research is to reveal the role of cost leadership and differentiation strategies in the effect of the entrepreneurial mindset and entrepreneurial leadership on business performance.

It is aimed to apply the research in a suitable sample where the variables in the model can be measured. Small and newly established entrepreneurial businesses are relatively skilled at identifying entrepreneurial opportunities, while they are less skilled at maintaining competitive advantage. Besides, large businesses are more capable of maintaining their competitive advantage while they are less capable of capturing opportunities. For this reason, newly established small businesses tend to seek opportunities, while large businesses tend to seek competitive advantages (Ireland et al., 2003: 967). In this context, it is predicted that it would be more beneficial to select the sample of the research among medium-sized businesses to evaluate both entrepreneurial and strategic situations at the same distance.

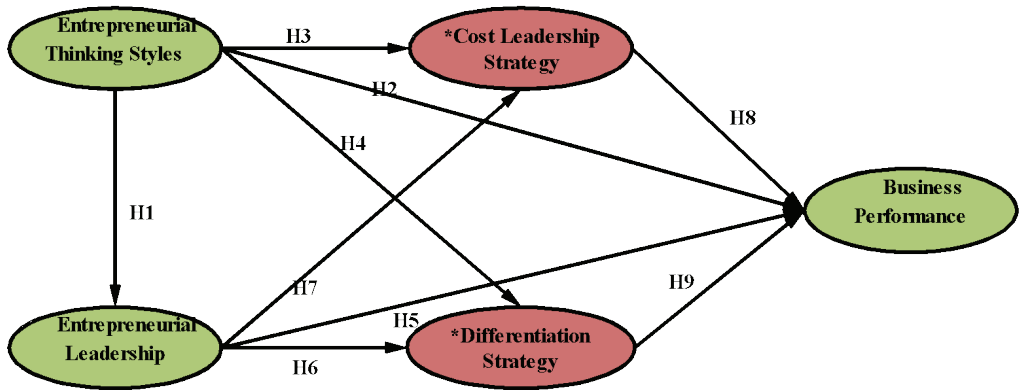


Figure 1. Model Of The Study

The universe of the research consists of the founders or managers of 1473 medium-sized businesses operating in eight sectors (furniture, construction, auto spare parts, auto sales, markets, textiles, bakery sellers, training courses) in Erzurum-2017. The sample size selected from the universe of this research was calculated as 305, within the confidence limits of 95%, with an error of 5% (<https://www.surveysystem.com/sscalc.htm>) (Kurtulus, 2006). 500 surveys were distributed to businesses and 467 of these surveys were returned. However, 443 surveys were used in the study because 24 surveys were incorrect.

Entrepreneurial Mindset Scale

In this study, the entrepreneurial mindset (EMS) scale developed by Mathisen and Arnulf (2014) was used to measure the entrepreneurial thinking abilities of the managers. The scale consists of three dimensions: Elaborating mindset (EM), Implemental mindset (IM), Compulsiveness mindset (CM). There are 8 items about each dimension and the scale consists of 24 items in total.

As a result of the exploratory factor analysis, IM1, IM7, and CM1 items were removed from the scale because the factor loads of the items were less than 0.40 and exploratory factor analysis was repeated for 21 items. Then, it was observed that the factor loads of none of the 21-items scale were not less than 0.40 and that all items were collected under relevant factors. Besides, the three factors explained 60.569% of the total variance, KaiserMeyer-Olkin (KMO) value was 0.912, Bartlett's test of sphericity was significant (bartlett's test: 5367.089 $p=0.000$) and Cronbach alpha value was 0.868. Confirmatory factor analysis was also performed for the scale after the exploratory factor analysis. As a result of the analysis, three factors were linked to a single factor as an entrepreneurial mindset (EMS). All of the fit indices for the second level confirmatory factor analysis (CMIN/DF: 2.997; GFI: 0.895; AGFI: 0.867; NFI: 0.907; IFI: 0.936; TLI: 0.926; CFI: 0.936; RMSEA: 0.067; RMR: 0.046; SRMR: 0.057) are within the acceptable range.

Entrepreneurial Leadership Scale

In this study, the entrepreneurial leadership scale developed by Renko et al. (2015: 67) was used to measure the entrepreneurial leadership skills of managers. The entrepreneurial leadership scale has one dimension and consists of 8 items. We have used the EL code for the entrepreneurial leadership variable. Item analysis, exploratory and confirmatory factor analysis were performed to ensure the validity and reliability of the scale.

As a result of the exploratory factor analysis, EL6 and EL7 items were removed from the scale. After exploratory factor analysis for six items was performed again, it was found that the single factor explained 45% of the total variance, KMO value was 0.757, Bartlett's test of sphericity was significant (bartlett's test: 618.872 $p=0.000$) and Cronbach alpha value was 0.749. Confirmatory factor analysis was performed after the exploratory factor analysis. As a result of the analysis, the EL8 item was removed from the scale because the standardized regression load of EL8 was less than 0.50. The confirmatory factor analysis was performed again after EL8-item was removed from the scale. All the fit indices of the scale (CMIN/DF: 2.390; GFI: 0.991; AGFI: 0.968; NFI: 0.983; IFI: 0.990; TLI: 0.974; CFI: 0.990; RMSEA: 0.056; RMR: 0.019; SRMR: 0.024) are within acceptable limits.

Competitive Strategies Scale

The competitive strategies scale has two-dimension: cost leadership and differentiation strategies. The differentiation strategy dimension has 5 items and the cost leadership strategy dimension has 4 items. The scale consists of 9 items in total. We have used the DS code for the differentiation strategy variable and the CL code for the cost leadership in this study. The competitive strategy scale developed by Gilley and Rasheed (2000) and Acquaaah et al (2008) was taken from the work of Espino-Rodríguez and Lai (2014) (Espino-Rodríguez and Lai, 2014: 14). Item analysis, exploratory and confirmatory factor analysis were performed to ensure the reliability and validity of the scale.

As a result of the item analysis, the total score correlation of the DS1 item was found to be less than 0.30. Thus, the item was removed from the scale and the analyzes were repeated. Then, exploratory and confirmatory factor analysis were performed for 8 items. As a result of the exploratory factor analysis, the KMO value was 0.746, and Bartlett's test of sphericity was significant (Bartlett's test: 1091.722 $p=0.000$). It was determined that the cost leadership strategy explained 30.5% of the total variance and that the Cronbach alpha value was 0.777. It was also understood that the differentiation strategy explained 29.94% of the total variance and that the Cronbach alpha value was 0.766.

Also, the confirmatory factor analysis showed that the regression load of the DS3 item was less than 0.50 and the item was removed from the scale since this value was not considered statistically significant. The confirmatory factor analysis was repeated after the item was

removed from the scale. All of the fit indices for confirmatory factor analysis (CMIN/DF: 3.351; GFI: 0.971; AGFI: 0.938; NFI: 0.956; IFI: 0.969; TLI: 0.950; CFI: 0.969; RMSEA: 0.073; RMR: 0.042; SRMR: 0.048) are within acceptable limits.

Business Performance Scale

In the literature, it is emphasized that the financial, market, and innovation performances of the organization should be evaluated together in measuring the business performance (Keskink et al. 2016). For this reason, two different scales have been used to measure business performances. The first of these scales are related to the financial and market performances and consist of 12 items. The second scale is related to the innovation performance and consists of 7 items. The business performance scale (BP) consists of 17 items in total. Both scales were developed by Zehir (2016) based on the studies of researchers such as Zahra et al., Baker and Sinkula, Lynch et al., Prajogo and Sohal. Item analysis, exploratory and confirmatory factor analysis were performed to ensure the reliability and validity of the scales.

FMP code was used to indicate 12 items related to the Financial/Market Performance scale, and IP code was used to indicate 7 items related to the Innovation Performance scale. The Cronbach alpha value for the Financial/Market Performance scale was 0.960 and the Cronbach alpha value for the Innovation Performance scale was 0.947. As a result of exploratory factor analysis of the 19-item business performance scale, KMO value was 0.960 and Bartlett's test of sphericity was significant (Bartlett's test: 8304,453 and $p=0.000$). The Cronbach alpha value of the business performance scale was 0.961. Also, the factor explained 72,446% of the total variance. Confirmatory factor analysis was performed after exploratory factor analysis. As a result of the confirmatory factor analysis, it was found that the regression load of any item was not less than 0.50. In addition, all of the fit indices for confirmatory factor analysis (CMIN/DF: 4.644; GFI: 0.847; AGFI: 0.808; NFI: 0.917; IFI: 0.934; TLI: 0.925; CFI: 0.933; RMSEA: 0.091; RMR: 0.028; SRMR: 0.0381) are within acceptable limits.

Analysis and Findings

The main statistical values and correlation coefficients for the variables in the study are shown in Table 1. When the correlation coefficients are examined, It has been observed that there is a positive and significant relationship between entrepreneurial leadership and entrepreneurial mindset ($r=0.360$), entrepreneurial leadership and cost leadership ($r=0.112$), entrepreneurial leadership and differentiation strategies ($r=0.247$), and entrepreneurial leadership and business performance ($r=0.237$). It has been observed that there is a positive and significant relationship between the entrepreneurial mindset and differentiation strategy ($r=0.154$), the entrepreneurial mindset, and the business performance ($r=0.103$). Also, the cost leadership strategy negatively affected the business performance ($r=-0.210$); Differentiation

strategy positively affected the business performance ($r=0.248$). It can be thought that this situation is caused by the innovation performance questions within the business performance.

Considering the average of the variables of the study, it is seen that the average of entrepreneurial leadership is high and the cost leadership strategy has a higher average than the differentiation strategy. According to these results, it can be said that the business managers participating in the research see themselves as entrepreneurial leaders and prefer cost leadership more than differentiation strategies.

Table 1

Relationship Between Variables

	\bar{X}	S.D.	1	2	3	4	5
EL1	4.39	0.59	1				
EMS2	3.91	0.50	0.360**	1			
CL3	4.01	0.75	0.112*	0.055	1		
DS4	3.39	0.94	0.247**	0.154**	-0.241**	1	
BP5	3.68	0.65	0.237**	0.103*	-0.210**	0.248**	1

The path coefficients and the variance parameter values among the variables of the structural model are shown in Figure 2 and the estimation results for the model are shown in Table 2.

When Figure 2 and Table 2 are examined together, the relationships between entrepreneurial mindset and entrepreneurial leadership, entrepreneurial leadership and differentiation strategy, cost leadership strategy and business performance, differentiation strategy and business performance, entrepreneurial mindset and business performance are meaningful (respectively; $p=0.000$, $p=0.000$, $p=0.000$, $p=0.007$ and $p=0.001$). However, the relationships between entrepreneurial mindset and cost leadership, entrepreneurial mindset and differentiation strategy, entrepreneurial leadership and cost leadership strategy, and entrepreneurial leadership and business performance are meaningless (respectively; $p=0.133$, $p=0.553$, $p=0.743$ and $p=0.050$). For this reason, the meaningless relationships were removed from the model and improvements were made to the model.

As a result of the improvements made in the model, the relationships between entrepreneurial leadership and cost leadership, entrepreneurial leadership and business performance were found to be significant; so these relationships were not removed from the model. Also, the fit indices of the model shown in Figure 2 (CMIN/DF: 2.735; GFI: 0.923; AGFI: 0.892; NFI: 0.877; IFI: 0.919; TLI: 0.897; CFI: 0.918; RMSEA: 0.063; RMR: 0.078; SRMR: 0.0779) are within acceptable limits.

As a result of the improvements made on the model of the research, it has been observed that the entrepreneurial mindset has a positive effect on entrepreneurial leadership (0.617 $p < 0.001$). In addition, entrepreneurial leadership has a positive and significant effect on cost

leadership (0.135 $p < 0.05$), differentiation strategies (0.253 $p < 0.001$) and business performance (0.173 $p < 0.05$). Upon examining the effects of cost leadership and differentiation strategies on business performance, we find out the existence of a negative impact of cost leadership strategy (-0.308 $p < 0.001$) and a positive impact of differentiation strategy (0.146 $p < 0.05$) on business performance. Also, fit indices of model shown in Figure 3 (CMIN/DF: 2.705; GFI: 0.923; AGFI: 0.894; NFI: 0.877; IFI: 0.918; TLI: 0.899; CFI: 0.918; RMSEA: 0.062; RMR: 0.080; SRMR: 0.0796) are within acceptable limits.

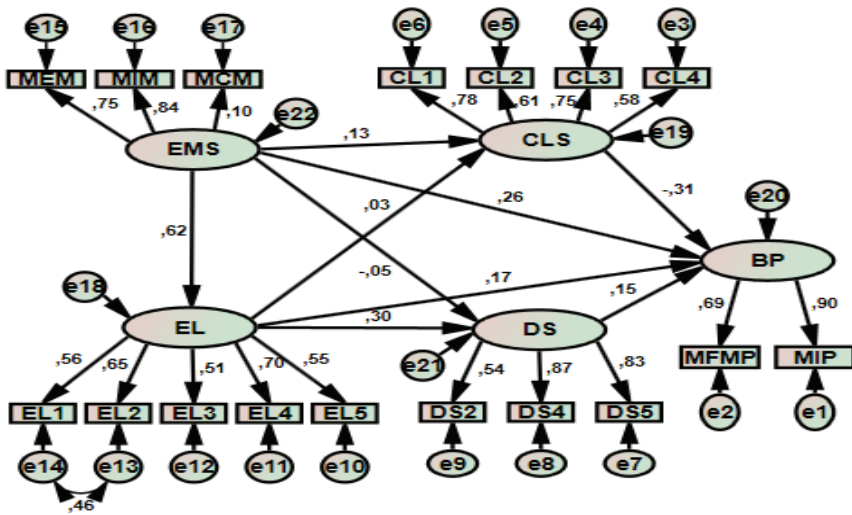


Figure 2. Standardized Estimation Results of the Structural Model

Table 2

Estimation Results of the Model

Variables		Standardized Regression Weights	S.E.	C.R.	P
EL	<--- EMS	0.619	0.094	7.631	***
CLS	<--- EL	0.029	0.093	0.327	0.743
CLS	<--- EMS	0.132	0.104	1.503	0.133
DS	<--- EMS	-0.050	0.193	-0.594	0.553
DS	<--- EL	0.303	0.182	3.315	***
BP	<--- CLS	-0.311	0.073	-5.285	***
BP	<--- DS	0.094	0.035	2.676	0.007
BP	<--- EMS	0.264	0.118	3.284	0.001
BP	<--- EL	0.169	0.110	1.962	0.050

In the model, it has been revealed that entrepreneurial mindset has a positive and significant effect on entrepreneurial leadership (0.619; $p < 0.001$) at 95% significance level. Also, as a result of the improvements made on the model (removing meaningless relationships), it

has been observed that the entrepreneurial mindset has a positive effect on entrepreneurial leadership (0.617; $p < 0.001$). Therefore, H1 is supported. Besides, in the main model, it was determined that entrepreneurial mindset had a positive effect on business performance (0.264 $p < 0.001$). As a result of the improvements made to the model, it has been determined that the entrepreneurial mindset has a positive effect on business performance (0.255 $p < 0.001$). Thus, H2 is supported. However, as seen in the research model, the entrepreneurial mindset of managers does not have a significant effect on cost leadership (0.132; $p > 0.05$) and differentiation strategies (-0.050; $p > 0.05$). According to these results, H3 and H4 are not supported.

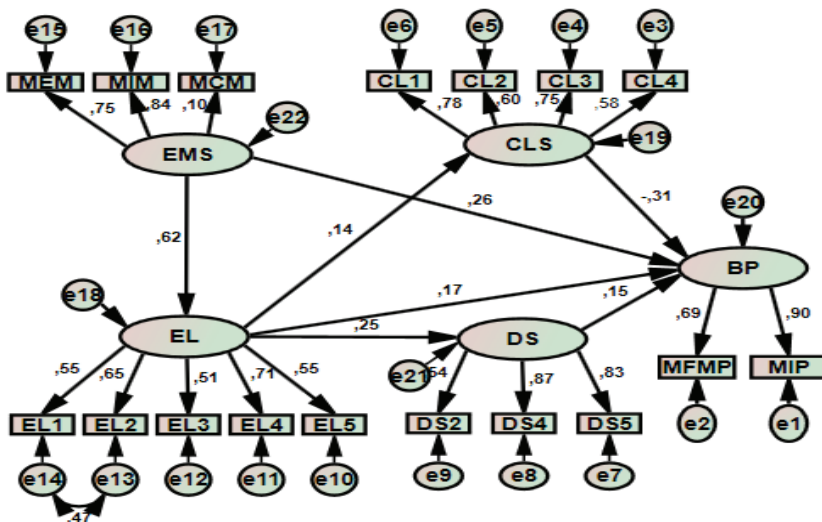


Figure 3. Standardized Estimation Results of The Improved Model

Table 3

Estimation Results of The Improved Model

Variables		Standardized Regression Weights	S.E.	C.R.	P
EL	<--- EMS	0.617	0.094	7.648	***
CLS	<--- EL	0.135	0.064	2.153	0.031
DS	<--- EL	0.253	0.124	4.029	***
BP	<--- CLS	-0.308	0.073	-5.270	***
BP	<--- DS	0.146	0.035	2.716	0.007
BP	<--- EL	0.173	0.108	2.043	0.041
BP	<--- EMS	0.255	0.116	3.254	0.001

In the main model, the entrepreneurial leadership did not have a significant effect on business performance (0.169; $p = 0.05$), but as a result of improvements made by removing me-

aningless relationships, the entrepreneurial leadership has a positive and significant effect on business performance (0.173; $p < 0.05$). Therefore, H5 which was rejected by the main model is supported by improvements. In the model, the entrepreneurial leadership has no significant effect on cost leadership (0.029; $p > 0.05$); however, as a result of the improvements made in the model, it is determined that entrepreneurial leadership has a positive effect on cost leadership (0.135; $p < 0.05$).

H6 which was rejected in the main model is supported by improvements. Also, entrepreneurial leadership has been found to have a positive effect on differentiation strategies (0.303; $p < 0.001$). Therefore, H6 is also supported.

In the main model, it was observed that cost leadership had a negative effect on business performance (-0.311; $p < 0.001$). As a result of the improvements made on the model, the negative effect of the cost leadership on the business performance (-0.308; $p < 0.001$) has continued. According to these results, H8 is rejected. Similarly, it has been observed that the differentiation strategy variable has a positive and significant effect on business performance (0.094; $p < 0.05$). As a result of the improvements made on the model, the positive effect of differentiation strategy on business performance (0.146; $p < 0.05$) has increased. Therefore, H9 is also supported. Moreover, the fact that cost leadership has a negative while differentiation strategy has a positive effect on business performance supports the view of Porter, who argues that these two strategies should not be used together.

Conclusion

In this research, entrepreneurship constructs such as entrepreneurial leadership and entrepreneurial mindset are combined with strategic constructs such as cost leadership and differentiation strategies, and the effect of these variables on business performance is examined. After reviewing the related literature, a model that shows how cost leadership and differentiation strategies affect the relationships among entrepreneurial mindset, entrepreneurial leadership, and business performance has been developed. Thus, we tried to present a model different from the existing strategic entrepreneurship models in the literature.

Our study focuses on two different views in the literature regarding cost leadership and differentiation strategies. Porter (1980-1985) believes that businesses need to choose and implement only one of the generic strategies (cost leadership and differentiation strategy) to improve their performance (Panwar et al., 2016: 579). On the other hand, Hill (1988) and Murray (1988) advocate that businesses can use cost leadership and differentiation strategies together. With the strategic entrepreneurship model designed in this research, we aimed to determine which view to support between Porter's and Hill and Murray's. To achieve this goal, the conceptual framework of the research was determined and the model of the research was tested.

As a result of this research, when cost leadership and differentiation strategies are used together, cost leadership strategy affects business performance negatively while differentiation strategy affects business performance positively. These results support the opinion of Porter and other researchers (Linton and Helmet, who transferred from Miller, 2017: 170; Thornhill, 2007; Kumar, 1997; Josiah and Nyagara, 2015). Cost Leadership Strategy advocating reducing costs and differentiation strategy advocating innovation practices that increase costs may be conflicted with each other. In the analysis made on the sample data, the negative relationship between the cost leadership variable and the business performance variable supports this idea.

Before testing the hypotheses, the correlation relationship between the variables and the means of the variables were examined. The average of the variables of the study was examined and it was determined that the average of entrepreneurial leadership and entrepreneurial mindset was high. This research was conducted in medium-sized businesses, and their managers said they had a sufficient level of the entrepreneurial mindset and entrepreneurial leadership. In other words, the managers participating in the research see themselves as entrepreneurial leaders who are open to innovations, have a vision, and can take risks. Also, the analysis results showed that the cost leadership strategy has a higher average than the differentiation strategy. According to these results, it can be said that the business managers participating in the research prefer the cost leadership strategy more than the differentiation strategy. This may be because the differentiation strategy is costly. There is economic instability in Turkey and innovating is a costly strategy. For this reason, managers may have directed the implementation of the cost leadership strategy.

When the correlation relations between the variables are examined, it is seen that there is a positive and significant relationship between entrepreneurial leadership and cost leadership, entrepreneurial leadership and differentiation strategy, entrepreneurial leadership, and business performance. This situation shows us that entrepreneurial leaders are very important people for businesses. Nowadays, it is obvious that everything is changing rapidly and businesses that cannot adapt to change are disappearing. For this reason, there is a need for entrepreneurial leaders who are open to innovations and can think strategically. Especially medium-sized businesses need innovative, visionary, risk-taking, entrepreneurial, and brave managers to grow and make a profit.

Upon examining the corresponding literature, it was predicted that cost leadership and differentiation strategies may have an important role in the effect of entrepreneurial leadership and entrepreneurial mindset on business performance, and analyzes were made on the model developed based on this information. In the model, the entrepreneurial mindset is an independent variable; entrepreneurial leadership, cost leadership strategy, differentiation strategy, and business performance are considered as dependent variables. As a result of the analysis made on the research model, improvements have been made on the model since the relationships

between entrepreneurial mindset and business performance, entrepreneurial mindset and cost leadership, entrepreneurial mindset, and differentiation strategy are meaningless. Analysis results were interpreted considering both the research model and the improved model results. As a result, the entrepreneurial mindset has positively affected both entrepreneurial leadership and business performance; however, it has no significant effect on differentiation and cost leadership strategies. Also, it has been determined that entrepreneurial leadership has a positive effect on business performance, cost leadership, and differentiation strategies. Although cost leadership negatively affects business performance; differentiation strategy positively affects business performance. One of the reasons that cost leadership negatively affects business performance may be innovation performance questions within the business performance scale.

Due to cost and availability, this research data was collected from a single city. Therefore, the sample of the research is limited to managers of medium-sized businesses in Erzurum. For this reason, it is recommended to conduct the research in different cities to generalize the study results. Also, it is suggested that other variables should be included in the research in order to evaluate the subject more comprehensively. In particular, environmental uncertainty, which is thought to have an impact on competitive strategies and performance, can be added to the model as an important variable.

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RESEARCH ARTICLE

Workforce Analysis from an Accounting Perspective: What Do the Determinants Really Demand?

Tuğba Koç¹ , Bilge Katanalp² , Adem Akbiyik³ 

Abstract

Each profession has its own criteria. Of all the management disciplines, the employment trend in the field of accounting best reflects the state of recruitment of professionals. Thus, we need to examine what each profession expects from accountants. Using text analysis via Wordstat, we analyze 7,320 pre-accounting job advertisements to find the overall job specification of the sector for a pre-accounting employee. Of the 25 criteria identified, 12 were found common in the literature, local standards, and the sector. From our findings, the Turkish sector is more adapted to international than local standards, indicating that local standards were set without consulting the employers. This study further confirms that soft skills are as important as technical skills. Additionally, women are more likely to be recruited to a pre-accountant position during their 10-year study period. Turkey is a Eurasian country that is influenced by both Asian and European countries and their respective profession-related norms and practices. Thus, our findings may be generalizable. Overall, policymakers need to pay attention to the employers' opinions before establishing local standards..

Keywords

Job Ads Analysis, Accounting Graduate Competencies, Text Mining

Introduction

University business departments are strongly related to the management side of organizations. Management is considered to be a science rather than a series of actions (Hughes et al., 2008). Business departments generally focus on theoretical aspects rather than practical implications. They help to develop rigor, but not relevant real-world applications (Bennis and O'Toole, 2005; Augier and March, 2007). Thus, the essential skills that employers expect are not easy to acquire, especially for business students. Kaplan (2011) considers it critical to reveal the expected competencies of an accounting graduate because, of all the management disciplines, employment trends in the field of accounting best reflect the state of recruitment

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of professionals. The literature claims a general dissatisfaction with the profile of accounting graduates due to the gap between their acquired and required skills (Lin, Xiong, and Liu, 2005; De Lange, Jackling, and Gut, 2006; Kavanagh and Drennan, 2008). However, recent studies do not agree on how to fix this gap. Some studies (Webb and Chaffer, 2016; Bayerlein and Timpson, 2017) have proven the existence of the gap, but with the claim that it is not as pervasive as was once thought (Low, Botes, Rue, and Allen, 2016). Low et al. (2016) point out that universities are doing their best in academic terms to train their accounting students adequately. Nevertheless, the required skills and competencies for accounting graduates remain a critical issue in the Turkish business sector. Employers find the universities' academic accounting departments inadequate in providing practical training (Coşkun, Kır, and Coşkun, 2017; Yıldız, 2017).

Bui and Porter (2010) identified four main reasons why accounting graduates fail to gain the desired competencies: (a) students' dissatisfaction with accounting education, (b) conflict between what is taught and ongoing research, (c) traditional educators and an outdated curricula, and (d) fast changes in the global market but slow changes in accounting education (i.e., expectation–performance gap). These four reasons are logically linked. As examples for reasons (b) to (d), if an academician has positioned himself/herself as a researcher (b), he/she will not want to become an innovative educator. Such academicians may even be resistant to new educational approaches. Thus, their (c) students will inevitably be dissatisfied (a). Finally, when these dissatisfied students graduate, they will not be able to meet the expectations of potential employers (d). To overcome this situation, researchers have over the last three decades made several attempts to identify the competencies that employers expect of an accounting student (Tan and Laswad, 2018). The problem is that most of the related studies were conducted in the setting of developed countries. To address this concern, Kenny and Larson (2018) categorized 411 papers published in one of the top accounting journals—*Advances in International Accounting*—during the 30-year period from 1987 to 2016 by researchers' focus and methodology, chosen country, and authorship diversity. They found that while the origin of the studies was predominantly in the United States initially, other European countries such as France, Germany, and the United Kingdom started their research after 1999, causing the total percentage of studies in the United States to drop from 57.5% to 37.2%. They found that only 0.4% of the studies were conducted in Turkey, all of them in early 1999. Moreover, a general need and ongoing call arose for empirical studies on accounting graduate requirements in the context of developing countries (Ahmad and Gao, 2004; Awayiga, Onumah, and Tsamenyi, 2010). Additionally, Norain et al. (2018) emphasized the need to identify the expected competencies of accounting graduates and understand the evolving requirements of the industry in developing countries. This required consistent engagement with the industry. Therefore, research should be conducted with real, up-to-date, and longitudinal data. This leads us to another problem. Accounting studies generally use traditional methods such as

surveys, focus groups, and interviews. Rebele and St. Pierre (2015) lamented the stagnation of accounting research and its loss of “hype”; most of the studies they examined used the survey research method and focused on the same general topics.

To avoid this conventional approach, researchers are now using different methods to identify the employability skills required in accounting. Content analysis is an unobtrusive technique used popularly in recent years when more detailed information is required on different categories (Willcoxson, Wynder, and Laing, 2010). France (2010) collected 335 accounting job ads from Australasian organizations and analyzed them using this technique. The results contradict contemporary pedagogical assumptions, emphasizing the need for communication and problem-solving skills. Dunbar, Laing, and Wynder (2016) conducted a similar study to investigate the expected technical and soft skills of accounting graduates from the employers’ perspective. They collected 1,594 job advertisements from 2006 to 2009 from a major newspaper in Queensland, Australia. They used content analysis to find that soft skills are more important than technical skills. Tan and Laswad (2018) also used a novel content analysis approach to find the employability skills required for accounting graduates in Australasia. They provided evidence that strong team work and good communication skills are the most valuable behavioral skills employers perceive. Although their findings slightly differ for the five accounting occupational subgroups, interpersonal and personal skills commonly appear to be the most sought-after requirement. They stated that this finding emphasizes the changing nature of the accountant’s job profile from an occupation to a more “respected” profession. They made several recommendations for accounting academics, including helping students to develop appropriate soft skills. Although their research allows for a comprehensive comparison between two different countries and accounting subgroups, the dataset covers only one year (July 2015 to June 2016). While some attempts have been made in the Turkish literature to identify the expected competencies of accounting graduates (Yürekli and Gönen, 2015; Coşkun et al., 2017; Yıldız, 2017), only one of them focused on job advertisements, but this followed a structured methodology (Şengel, 2011). Şengel (2011) presents the descriptive statistics of accounting job ads, and nothing more.

In addition to the literature, the accounting professional bodies of different countries, namely, the Accounting and Auditing Standards Authority (Turkey), CPA Australia, the Accounting Standards Committee (Germany), and the Accounting Association Pathways Commission (United Kingdom), have also tried to identify the skills that accounting graduates must have to satisfy their own countries’ conditions and to guide the universities’ accounting departments. This indicates that accounting curricula can be designed in accordance with the determined needs.

The original aspects of this study include its data coverage (nine years data and 7,320 job adverts), chosen country (in response to Awayiga et al, 2010; Turkey is a developing co-

untry), methodology (content analysis), and interpretation of results, thereby identifying the employers' expectations. We also compared the identified skills with findings in the literature and the local standards' suggested skills (Table 6). The particular aspect that makes this work internationally significant relates to Turkey's efforts to create and extend local professional standards—a process influenced by both Western and Eastern cultures. This situation is expected to lead to differences in interactions between professional standards, sector expectations, and education curricula.

As regards to these concerns, we highlight the competencies required for accounting graduates in the context of Turkey, a developing country, using an unobtrusive technique. Unlike most previous studies, which used surveys, interviews, and focus groups, we adopted content analysis, focusing on 7,320 job advertisements posted from 2008 to 2016. Dunbar et al. (2016) used a small number of data samples, while Tan and Laswad (2018) covered only one year. We made a significant effort to gain insight into the alleged gap between accounting standards and employers' expectations in Turkey. This is a relatively new research area, especially in developing countries. We focused primarily on the pre-accounting position since this is considered an initial step toward an accounting career in Turkey (Atagan Çetin, 2017). We also examined whether the required skills uncovered matched the findings in the literature and the local, vocational accounting standards (i.e., the Vocational Qualifications Authority for Accounting Professional Standards, VQAAPS) in Turkey. For this, we formulated the following three research questions:

RQ1: *What job skills do employers expect accounting graduates to possess to hold an entry-level pre-accounting position in Turkey?*

RQ2: *Do the employers' expected entry-level job skills of accounting graduates in Turkey differ from the literature's suggested skills?*

RQ3: *Do the employers' expected job skills for the accounting profession in Turkey differ from those of the VQAAPS?*

The remainder of this paper is organized as follows. We briefly introduce the Turkish VQAAPS in Section 2. We then discuss the accounting graduates' skills and attributes and summarize our analysis of the literature in Section 3. We discuss our research methodology and the dataset in Section 4. Our results are presented in Section 5. We summarize our findings and compare the three perspectives (the literature, local standards, and the sector) in Section 6. We discuss our conclusions in Section 7, and finally present the study's limitations and recommendations for further studies in Section 8.

Turkish VQAAPS

The International Labor Organization (ILO) created the International Standard Classification of Occupations, gathering data of the three segments of the labor market: employers,

employees, and governments. With 187 member states, the ILO sets standards for the labor sector and guides governments to develop appropriate policies (ILO, 2019). According to the ISCO-08 published by ILO, a job is “a set of tasks and duties performed, or meant to be performed, by one person, including for an employer or in [the context of] self-employment” (ILO, 2016). The ILO has created a list of English job titles to match the different ISCO-08 codes. For example, eight different job titles for pre-accounting jobs match code ISCO-08-4311, which we examine in this study. This is important because employers use different job titles in their job advertisements. The ILO list helps us to understand which job title relates to which standard. However, the VQAAPS provides only one job title for the pre-accounting profession. This indicates that the international vocational standards (the International Standard Classification of Occupations by ILO) are too general, with no specific features for comparison but general codes and classifications. National standards are generally derived from this and yet are more specific. This is the main reason why we focused on the VQAAPS rather than international vocational standards.

A foundation in Turkey called the “professional competency board” formed the VQAAPS based on the ILO standards. Figure 1 illustrates how national standards are formed.

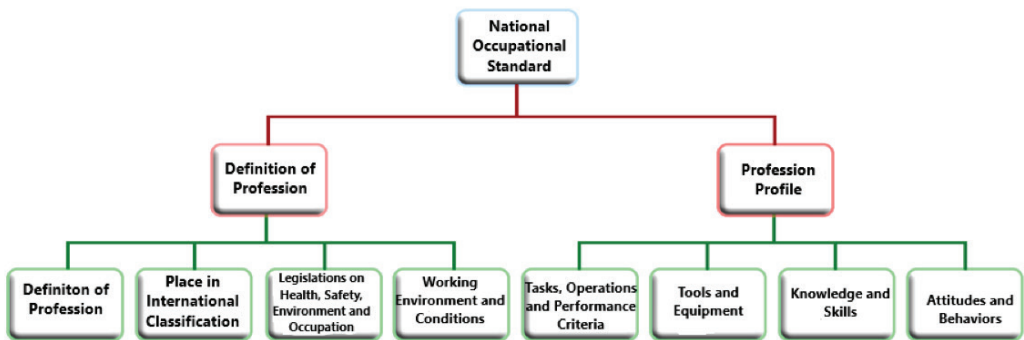


Figure 1. The VQAAPS framework

The scope of this study allows us to investigate only the professional profiles of pre-accounting employees. A professional profile refers to the job skills of an employee, and captures four different criteria, as can be seen in the figure.

Skills And Attributes of Accounting Graduates

Value-added activities, quick and accurate decision making, real-time data acquisition, decisive action, and many other technology-related competencies have become more relevant to companies than ever before. Rapidly developing technologies and the widespread adoption of new, existing technologies have significantly changed the structure of business (Shankar

et al., 2010), with the employers' expectations evolving simultaneously (McMurray et al., 2016). According to Bancino and Zevalkink (2007), necessity for improvement to the bottom line, increasing competition, and globalization are the three main forces behind employers' demand for a broader skill-set for employees. According to Mohamed and Lashine (2003), rapid changes in the business environment have created an "expectation–performance gap" (Bui and Porter, 2010) between the fast changes in the global market and slow changes in accounting education. This implies the need to enhance the competence level of accountants.

Stone et al. (2013) suggested that global economies and technology force accountants to gain new competencies, of which communication skill is the most essential. However, accounting education worldwide is failing to keep pace with today's dynamic, global business expectations (Awayiga, Onumah and Tsamenyi, 2010). Both early (Simons and Higgins, 1993; Morgan, 1997) and recent (Abayadeera and Watty, 2014; Tempone et al., 2012; Paguio and Jackling, 2016) studies have suggested that employers are generally satisfied with the technical skills or cognitive intelligence levels (e.g., computer-related skills, accounting problem analysis, and specific knowledge on financial matters) of accounting graduates. However, when it comes to soft skills, employers' expectations are seldom met. According to CPA Australia (2019), soft skills can be categorized into four groups: intellectual (e.g., unstructured problem solving and logical and analytical thinking), organizational and business management (e.g., leadership and decision making), interpersonal and communication (e.g., teamwork and verbal/written communication), and personal (e.g., self-management and initiative) skills. Employers can generally assume that every accounting graduate has gained some basic accounting skills from their education. However, soft skills are rarely found, making them more critically required (Atanasovski, Trpeska and Lazarevska, 2018). Yaşar (2019) strongly suggests that soft skills are a "must have," and not just a "nice to have," indicating their importance. Similarly, a recent study evaluated the employers' expectations of skills held by accounting graduates. The study found accounting graduates lacking in social and communication skills (Coşkun, Kır and Coşkun, 2017). Employers expect accounting graduates to improve their critical soft skills and become competent.

With the increased reliance on information technology (IT), the necessity of soft skills is growing, to become as important as technical skills (Crawford, Helliard and Monk, 2011). De Villiers (2010) explored the balance between technical and soft skills in terms of employment in the accounting field. They suggested five main soft skill types: communication, problem solving and critical thinking, leadership and teamwork, ethical and moral values, and self-management. According to de Villiers (2010), the importance of soft skills is increasing, with the stakeholders considering these abilities as critical as technical skills in the recruitment process. Jones and Abraham (2009) examined the expanded role of accountants, to find that some particular soft skills are important for workplace success. According to the International Federation of Accountants (IFAC, 2003) standards, accounting graduates should be required

to fulfill ten main criteria (i.e., communication, intellectual, interpersonal, technical, personal, organizational and business management, and IT skills; and general, organizational and business, and accounting and auditing knowledge) that employers seek during recruitment. In Australia, practitioners reported that communication, teamwork, and self-management are the most critical skills for accounting graduates for recruitment, training, and ongoing employment purposes (Tempone et al., 2012). However, Coetze and Oberholzer (2009) found the accounting graduates unable to apply their newly acquired knowledge and abilities in the workplace. This is a real problem for employers, and it is contrary to Jackling and De Lange's (2009) new definition of accounting professionals as "knowledge specialists" (Tempone et al., 2012). From the practitioners' perspective, soft skills for accounting graduates are more an obligatory rule than necessity. However, soft skills are rarely embedded in higher accounting education curricula in Turkey. In this context, Yaşar (2019) uncovered the inadequacies in the accounting education curriculum in Turkey, suggesting a new competency-focused education framework comprising soft skills as well as technical skills (Başar, 2005).

Ahmad and Gao (2004) suggest that the accounting curricula's design has often been ignored, because no evidence seems to suggest that sufficient attention has been given to the necessary general skills as identified by the IFAC (2003). The curricula in universities focus on technical skills, and so the accounting graduates throughout their university years diverge from lifelong learning. This is often accepted as a key learning outcome (Hancock, Howieson and Kent, 2009), and students neglect to improve their soft skills. Similarly, Millard (2003) found that students consider accounting work dull and uninteresting. This is also related to the expectation–performance gap between the value judgment of students and their employers (Marshall, Dombroski, Garner, and Smith, 2010; Low et al., 2016). A detailed and comprehensive study conducted by Kim, Ghosh, and Meng (1993) suggests that motivation or interest in the job is the most dominant factor from the employers' perspective. However, for students, their examination results are the most important criterion for a successful accounting career. As Kavanagh and Drennan (2008) stated, students are becoming more aware of their employers' expectations in terms of analytical, professional, and teamwork skills. However, the curricula do not sufficiently meet these expectations. In their study, Francisco and Kelly (2002) extended Albrecht and Sack's (2000) approach, agreeing that accounting students concur with their employers on the skills necessary for accounting graduates. Furthermore, Oussii and Klibi (2017) empirically found that even though students know the importance of developing their soft skills, they often feel that they cannot develop their aptitudes under the current education system, and that it is unlikely for them to ever find an opportunity to develop their soft skills efficiently. In short, while technical skills development is always part of a well-rounded accounting education, there is no doubt that soft skills are also necessary in today's business environment. According to Jackling and Watty (2010) and Tempone et al. (2012), the literature suffers from lack of studies on the relationship between contextual

issues and soft skills in the accounting field. Thus, we cannot say that the employers' expectations on soft skills development in accounting education have been adequately considered. Tempone et al. (2012) encouraged researchers to take up this issue in a more nuanced manner. Thus, we present our first research question below:

RQ1: What job skills do employers expect accounting graduates to possess in order to hold an entry-level pre-accounting position in Turkey?

However, no consensus has been reached on the accounting graduates' expected skills. Table 1 summarizes the relevant literature on the suggested vocational skills that an accounting graduate should have from various country perspectives with the recommended attributes, differences, and similarities.

Table 1
Summary of recommended skills for accounting students from different perspectives

Study	Country	Method	Participants	Required skills
Kavanagh & Drennan ((2008	Australia	Quantitative ((Survey Qualitative (Focus group (and interview	Accounting students	Continuous learning, decision-making, verbal communication
			Employers	Analytical problem solving, business awareness and real life experience, technical knowledge
(Lin (2008	China	Quantitative ((Survey	Accounting students Employers Educators	Core accounting knowledge, business skills, personal characteristics, business knowledge, basic techniques, general knowledge
Wells, Gerbic, Kranenburg, & Bygrave ((2009	New Zealand	Quantitative ((Survey Qualitative ((Interview	Experienced accounting graduates Employers	Personal, intellectual and interpersonal abilities such as pressure management, respond to clients' requirements in a timely manner
Jackling & de Lange ((2009	Australia	Quantitative ((Survey Qualitative ((Interview	Accounting graduates	Accounting problem analysis, technological skills, technical skills
			Employers Educators	Technical accounting knowledge, leadership, verbal communication, interpersonal and team skills Technical knowledge, intellectual capability, thinking skills
Bui & Porter ((2010	New Zealand	Qualitative ((Interview	Employers	Technical accounting knowledge, verbal communication, writing skills, interpersonal skills, teamwork, advanced technological skills, lifelong learning, self-confidence
			Accounting students Accounting graduates	Communication skills, team-work, real-word practice, intellectual abilities Writing skills, applying knowledge to practical situations
Awayiga, Onumah, & Tsamenyi ((2010	Ghana	Quantitative ((Survey	Employers	Analytical and critical thinking, computing technology, professional demeanor
(Jones (2011	America	Quantitative ((Survey	Accounting graduates Employers	Analytical and critical thinking, communication skill, professional demeanor Writing skills, effective documentation

Study	Country	Method	Participants	Required skills
Tempone, Kavanagh, Segal, Hancock, Howison, & Kent ((2012	Australia	Qualitative ((Interview	Employers	Communication, teamwork, self-management, initiative and enterprise, problem solving and planning
(Jones (2014	UK	Qualitative ((Case study	Employers	Communication, technical skills, team working, commercial/business awareness, professional credibility, and X .factors skills such as confidence, common sense etc
Tanaka & Sithole ((2015	Swazi-land	Quantitative ((Survey	Employers	Technical knowledge and technological skills
Ali, Kamarudin, Suriani, Saad, & Af- (andi (2016	Malaysia	Quantitative ((Survey	Educators	Writing skill, analytical/critical thinking, teamwork, financial accounting
Hancock, Freeman, Watty, Birt, & Tyler ((2016	Australia	Qualitative ((Report	Accounting academics	Resource management, foreign language, risk management, financial accounting
Low, Botes, Rue, & Allen ((2016	New Zealand	Qualitative ((Interview	Employers	Possible solutions to routine problems (judgement), integrate theoretical and technical knowledge, critical analysis and problem solving, communication, teamwork, self-management
Lim, Lee, Yap, & Ling **((2016	Malaysia	Quantitative ((Survey	Employers	Interpersonal and social skills, fit within team and culture, oral/written communication, common sense, openness to change, problem solving
			Employers	Oral/written communication, problem solving, analytical skills and critical thinking, time management
			Auditor	Analytical skills, time management, pressure management, team work, critical thinking
			Lecturer	Team work, analytical skills, pressure management, interpersonal skills, oral/written communication
			Accounting students	Problem solving, team work, decision making, analytical skills, pressure management
Howcroft ((2017	UK and Ireland	Quantitative ((Survey Qualitative ((Interview	Accounting professional body	Critical thinking, creative problem solving
			Educators	Problem solving, critical analysis, critical reading, technical knowledge
			Employers	Bookkeeping, verbal/ written communication and interpersonal skills
Oussii & (Klibi (2017	Tunisian	Quantitative ((Survey	Accounting students	Verbal communication, interpersonal skills
			Employers	Computer-related skills, foreign language, ethical, life-learning, credibility
Atanasovski, Trpeska, & Bozinovska Lazarevska **((2018	Macedo- nia	Quantitative ((Survey	Accounting students	Problem solving, oral communication, foreign language, personal characteristics, time management, team work

*Table 1 captures the selected studies which have used primary data. Studies have used job ads as a secondary data are discussed at the end of our introduction chapter.

** If there are lots of skills detected in the study, the most five importants are shown in the Table.

Table 1 shows that technical skills for accountants in the current business climate is still pertinent. However, an increasing need has arisen for accountants to develop soft skills. From

a recent study, most of the key employers in the accounting sector in New Zealand believe that technical skills can be gained through “on the job training.” They do not have much expectation that a new graduate would have the necessary core knowledge (Low et al., 2016). From a different perspective, Daff, De Lane and Jackling (2012) show that the current combination of soft and technical skills does not meet the expectations of several employers. Thus, they settle for a less stringent skill set. In summary, by repositioning the current accountants as knowledge professionals instead of accounting technicians, the required soft skills can be given more focus (Jones and Abraham, 2009). This leads us to our second research question:

RQ2: Do the employers' expected job skills of accounting graduates in Turkey differ from the literature's suggested skills?

The accounting profession is defined in the VQAAPS as follows: “*The pre-accountancy employee (level 4) is a qualified person who carries out activities related to occupational health safety and environmental precautions. They write the working organization's pre-accountancy reports, prepare documents that are the basis for accounting, conduct things related to any papers needed, and handle the accounts pursuant to the relevant quality standards.*” (Mesleki Yeterlilik Kurumu, 2015). This definition implies that technical skills are the only requirement for pre-accountants. However, to keep abreast of technological developments, besides economic and societal changes, pre-accountants in Turkey need to have soft skills as well (Demir, 2005). In addition, as Figure 1 illustrates, the VQAAPS includes the positioning of professions as well as information on how a professional profile should appear. Thus, we present our third research question, RQ3, to investigate whether the four sub-dimensions related to a professional profile agree with the pre-accounting job advertisements of the sector.

RQ3: Do the employers' expected job skills for the accounting profession in Turkey differ from those of the VQAAPS?

Methodology

Job advertisement (job ads) analysis is an unobtrusive approach to discover the competencies of jobs in different fields, such as librarians (Lopatovska and Baribeau, 2017), business managers (Bennett, 2002), and information system professionals (Todd, Mckeen, and Gallupe, 1995). Text analysis (TA) and content analysis (CA) are the most common methods to create meaningful texts from a dataset, including job advertisements. TA and CA are generally used interchangeably in the literature, although they have some key distinctions (Bauer, Biquelet and Suerdem, 2014). Since we did not use abductive modeling techniques such as corpus linguistics, automatic pattern detection, and bottom-up categorization, we might say that we used text mining methods through TA via Wordstat. Restricting ourselves to within the scope of this study, we followed Chakraborty, Pagolu, and Garla's (2013) text-mining framework as shown in Figure 2.

Data collection: We retrieved a total of 58,952 accounting job ads from an employment service platform in Turkey during the period 2008–2016. We considered only those job ads with the word “pre” in their job title, because, according to the VQAAPS, a level-4 accountant’s basic priority should consist of pre-accounting tasks. Finally, we ended with 7,320 usable ads for further analysis.

Text parsing: In text parsing, also called the pre-processing phase, we used Ingersoll, Morton, and Farris’s (2013) approach to transform our text and capture the patterns in textual data. Pre-processing is critically important for preparing a dataset for text mining. For this, we reduce the input text document size (Vijayarani and Janani, 2016), and then carry out the sub-processes, stop-word elimination, tokenization, stemming, and lemmatization. First, we obtain tokens by breaking the text into words. This is called tokenization. Second, we conduct stemming by removing the derivational suffixes. In addition, we group the inflected forms of a word to analyze them as a single item. This is called lemmatization, and is done to enable a morphological analysis of the words therein. Third, we create the excluded list for stop-word removal and conduct downcasing and synonym expansion.

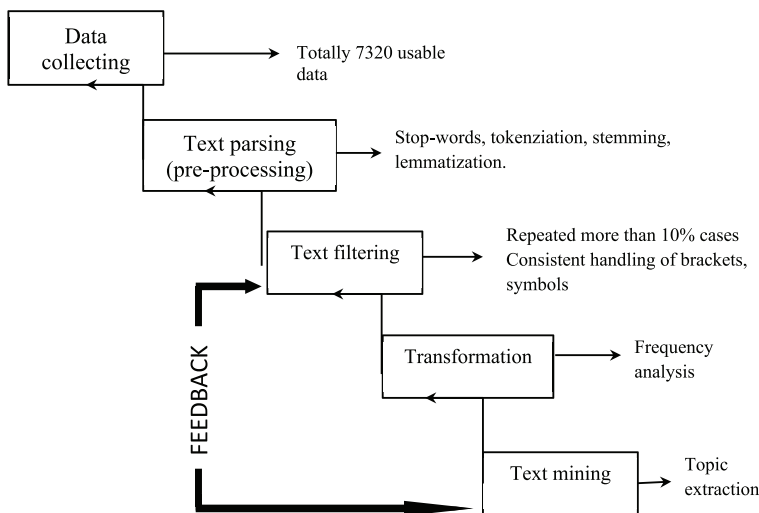


Figure 2. Text mining process (adapted from Chakraborty et al., 2013).

Text filtering: The brackets and symbols were adhered to consistently. Numeric characters were allowed since we filtered the job ads by year of publication. For better grasp and interpretation of the results, we filtered the frequencies in more than 10% of the cases.

Transformation: We calculated the frequency of job ads by year of publication and subtitles. We also investigated the frequency of words related to pre-accounting job skills.

Text mining: We used topic extraction based on job skills.

Results

In this section, we first provided brief information on our corpus, and then presented our descriptive results, frequency, and topic extraction analysis.

Corpus

Table 2

Collection statistics

Total number of cases	7320
Total number of paragraphs	44035
Total number of sentences	47842
(Total number of words (token	442442
(Total number of word forms (type	25916
Total words excluded	113812
Words per sentence	9,2
Words per paragraph	10

Descriptive Statistics

Following the pre-processing stage, we examined the filtered ads by year of publication and sub-position. Table 3 presents the frequency table.

Table 3

Total Job Advertisements by Year and sub-position

	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total	Total Percent
Pre Accounting Clerk	81	101	210	272	445	678	731	525	363	3406	46,5%
Pre Accounting Employee	2	-	-		2	24	24	26	13	91	1,2%
Pre Accounting Personel	5	7	18	18	42	127	113	120	98	548	7,5%
Junior Accountant	15	19	27	61	70	94	104	75	59	524	7,2%
Pre Accounting Specialist	4	5	8	9	10	23	14	17	22	112	1,5%
Pre Accounting and Sale		5	21	28	34	41	34	29	28	220	3,0%
Pre Accounting and Secretarial	2	72	219	277	448	340	400	208	134	2100	28,7%
Bookkeeper	3	9	5	11	13	27	42	82	127	319	4,4%
TOTAL	112	218	508	676	1064	1354	1462	1082	844	7320	100%

The most significant information in the frequency table is the variety of job titles. We expected more standardized job titles as per the VQAAPS (pre-accounting clerk). However, several hybrid versions existed. The VQAAPS prefers to use the “pre-accounting clerk” job title for level 4. Thus, our results are consistent with the standard; that is, high percentage of

ads represented by “pre-accounting clerk.” Table 3 shows a decreasing number of job ads after 2015. One possible reason is technological development in the accounting sector, such as the use of e-invoices (Elçin et al., 2018). However, Table 3 may be misleading. A more detailed interpretation is required. As previously mentioned, the VQAAPS was released in late 2015. A careful examination of the trends of sub-positions surprisingly shows that after 2015, job ads for the pre-accounting clerical job decreased, whereas those for bookkeeper jobs increased. This result is disappointing for two reasons.

First, vocational standards need to lead the sector and bridge the gap between employees and employers. From our results, the VQAAPS seems to have failed in this since the number of pre-accounting clerical job titles mentioned actually decreased. This is not as expected after the release of standards. Second, calling a level-4 accountant bookkeeper is not acceptable for linguistic reasons. The Turkish translation of the word “bookkeeper” is “muhasebeci.” When the suffix “ci” is added to the root word of a profession name in Turkish to indicate the reputation of the profession, the reputation of the profession “falls from grace.” For example, the profession of dentistry can be expressed in two different ways in Turkish. You can call it *disci*, derived from the root word of the profession *dis* (tooth) and the suffix “ci.” You can also directly name the profession *dis doktoru* (tooth doctor) in Turkish. Professional dentists prefer to be called “tooth doctor” because the other term is likely to underestimate the professional’s job. When we associate this situation with the accounting profession “bookkeeper,” the Turkish term *muhassebeci* has the suffix “ci” at the end of the profession. This discredits the job’s reputation. After 2015, the bookkeeper job title has undergone rapid change, contrary to the VQAAPS standard. Although we considered only the 2016 data for this interpretation, these trends provide some evidence that the accounting sector does not follow, or even ignores, the national standards.

After representation of the general structure, we analyzed the job ads by the job description and job skills separately since these two aspects have different meanings and purposes. Job descriptions capture the general tasks, job-related duties, and responsibilities of the position with regard to the employees’ technical skills, whereas job skills are mostly related to the desired individual employee characteristics, such as their analytical and time management skills, both of which can be called soft skills.

Job Skills Analysis

Table 4 gives a summary of the frequency of words related to job skills. The number of times a word has been repeated in the job skills section is shown in the “frequency” column, while the number of cases with related features is shown in the “number of cases” column.

Table 4
Word Frequencies in reference to Job Preferences

Word	Number of cases	Cases %	Frequency	Shown %
Female	2714	37.08%	2772	2.30%
Graduation	2421	33.07%	2616	2.17%

MSOffice	2047	27.96%	2057	1.71%
Word	Number of cases	Cases %	Frequency	Shown %
Experienced	1896	25.90%	2059	1.71%
Decent	1334	18.22%	1359	1.13%
High school	1328	18.14%	1343	1.12%
Diction	1273	17.39%	1278	1.06%
LOGO	994	13.58%	1027	0.85%
Communication	966	13.20%	1014	0.84%
Responsibility	796	10.87%	813	0.68%
Male	767	10.48%	792	0.66%
Team	749	10.23%	796	0.66%
Age	744	10.16%	752	0.62%

*We chose the words which were repeated in more than 10% of the cases.

Following the word frequency analysis, we analyzed the job skills by their respective topics. The results are presented in Table 5.

The job skills that employers expect for candidates can be grouped under two main headings following the CPA Australia's categorization (CPA Australia): technical skills and soft skills. As discussed in the literature review section, in addition to technical skills, certain skills are required to effectively apply the technical skills—soft skills. The table above clearly shows that employers expect their candidates to be more competent with regard to professional/technical knowledge, indicating their focus on the so-called technical skills rather than soft skills. Although the detected soft skills are slightly more than the technical skills in number (seven versus six), considering the frequency of times and number of cases that these concepts appeared, the dominance of technical skills is clearly evident.

From the candidates' educational level (e.g., university, high school, or vocational school), people with higher education seem to be preferred. In Turkey, you do not need a bachelor's degree to apply for pre-accounting positions. Two-year vocational college students can be considered for pre-accounting positions (Allahverdi and Karaer, 2019). This finding shows the dichotomy of pre-accounting employees in Turkey. Specifically, the question of whether a pre-accounting employee can be considered a professional or as holding an occupation arises. Although numerous studies have made a distinction between an occupation and profession (Chitty, 1997), the consensus is that long-term education is indispensable for the required level of professionalism. In line with this thinking, a pre-accounting staff finishing vocational school cannot be considered as holding the required standards of professionalism. Thus, in Turkey, it is more appropriate to consider a pre-accountant job as holding an occupation. However, a pre-accounting position can later come to be regarded as a professional job, such as when the secretarial job titles decreased and specialist job titles increased slightly from 2013 to 2016 (Table 3).

Table 5

Topic Frequencies in relation to Job Preferences

	Topic	Keywords	Number of cases	Cases %	Frequency
TECH- NICAL SKILLS	Basic accounting knowledge	Invoice; current account; bank; bond; inventory; payment; daily cash; tax; agreement	4884	66.72%	7731
	MSoftware	Word; excel; very well	4008	54.75%	7102
	Graduation degree	High school; trade vocational; university; bachelor; vocational school of higher education; ;business; public finance economics	3514	48.01%	8154
	Real life experience	Year; minimum; experience; similar position	2881	39.35%	3627
	Vocational software knowledge	;LOGO; Tiger; program	2509	34.28%	1754
	Secretarial tasks	;Telephone; fax traffic photocopy; e-mail; cargo	1869	25.53%	1342
SOFT SKILLS	Verbal/ written communication	;Diction; decent representational skills	2796	38.20%	2897
	Problem solving	Planning; analytic; organizing; coordination; concentrate; attentive; solution-oriented; pursuer	2726	37.24%	4211
	Time management	;Flexible working hours ;dynamic environment compatible	2363	32.28%	5784
	Presentable	Debonair; personal care; outer view; elegant	1910	26.9%	2173
	Professional demeanor	Principled; responsible; organized; attentive; elaborative	1611	22.01%	1341
	Interpersonal skills	Human relations; successful; debonair	1455	19.88%	1703
Self-confidence	Responsibility; open-minded	1446	19.75%	940	

Comparison and Summary of Results

From our results, of the 25 criteria, only 12 have been commonly identified in the literature, standards, and the sector. These criteria are as follows: graduation with a degree; a professional demeanor; core accounting knowledge; and technological, written and verbal communication, decision-making, teamwork, problem-solving, documentation, computing, resource and time management, and planning skills. We believe that anyone wanting to work in the pre-accounting field in Turkey should have these capabilities. As regards the requirements of the sector in Turkey, in addition to these criteria, the candidate needs to be presentable. Initiative, professionalism, and lifelong learning also appear in both the literature and standards, although the sector does not consider these attributes important. This implies that

the sector does not look for individuals who are willing to learn continuously, improve themselves, and perform innovatively. However, good looks seem to be indispensable for working in the accounting field. One reason for this could be that those holding pre-accounting and secretarial jobs are responsible for welcoming guests. This appears to be one of the most common factors with a 28.7% frequency, as shown in Table 3. Ethical issues have unfortunately been neglected. Since the most famous scandals in the accounting area in Turkey are due to unethical behavior (Dellaportas, 2006; Esmond-Kiger, 2004; Koumbiadis and Okpara, 2008), the sector's attitude to this issue calls for an in-depth investigation.

Table 6

Comparison of VQAPP, the literature and the industry criteria according to pre-accountant job preferences

THE CRITERIA	LITERATURE	STANDARD	SECTOR
Professional demeanor	✓	✓	✓
Core Accounting Knowledge	✓	✓	✓
Technological Skills	✓	✓	✓
Written & verbal communication	✓	✓	✓
Analytical and critical thinking	✓	X	X
Foreign language	✓	X	X
Lifelong learning	✓	✓	X
Real life experience	✓	X	✓
Decision-making	✓	✓	✓
Pressure management	✓	X	✓
Leadership	✓	X	X
Teamwork skills	✓	✓	✓
Self-confidence	✓	X	✓
Intellectual abilities	✓	X	X
Problem-solving	✓	✓	✓
Emergency management	X	✓	X
Occupational health and safety Knowledge	X	✓	X
Documentation	✓	✓	✓
Computing Techniques	✓	✓	✓
Initiative and enterprise	✓	✓	X
Graduation degree	✓	✓	✓
Resource and time management	✓	✓	✓
Planning	✓	✓	✓
Ethic/Credibility	✓	✓	X
Presentable	X	X	✓

Analytical and critical thinking, leadership and intellectual abilities, and foreign language knowledge do not seem to be consistently required skills in Turkey (standard and sector requirements) and the literature. For the first two, accounting processes generally consist of national rules and routine work orders, and these attributes do not count much and are not considered worth gaining by Turkish pre-accountants. Furthermore, one recent study provides evidence that employers consider knowledge of a foreign language the least important skill for accounting graduates (Coşkun et al.2017).

The literature and the Turkish sector concur in terms of the three attributes of real-life experience, pressure management, and self-confidence. In Turkey, a pre-accountant position is simply a starting point to an accounting career; this explains why the standard does not demand real-life experience for this position. Although a recent study has indicated self-confidence and pressure management as important skills from the perspective of an auditor, lecturer, or student (Lim et al., 2016), the VQAAPS fails to mention these competencies.

Emergency management and occupational health and safety knowledge appear only within the scope of local standards. This is a legal obligation for any occupational standard by definition. As a general assessment, local standards and the sector share much in common with the international literature. This finding is surprising because the VQAAPS was established by a professional accounting association called the Union of Chambers of Certified Public Accountants and the Sworn-In Certified Public Accountants of Turkey (TURMOB). Thus, the standards and sector should be more similar. This discrepancy may be due to the insufficient and/or non-elaborate workforce analysis conducted before establishing the standards.

Conclusions

Before discussing our research questions in detail, we first evaluated the results in general. Overall, a graduation degree, general accounting, and MS Office knowledge are the most sought-after technical skills. Furthermore, time management, problem solving, and communication skills are the most desired soft skills. Although the detected number of soft skills is slightly higher than that of technical skills (seven versus six), given the frequency and higher number of cases in which these attributes appeared, the prevalence of technical skills can be clearly accepted. The dominance of technical skills contradicts Tan and Laswad's (2018) findings that interpersonal and personal skills are the most sought-after skills by employers in Australasia. The main reason for this difference is that an accounting position is perceived as an occupation rather than profession in Turkey, whereas accountants are considered business professionals rather than "backroom number crunchers" in the Australasian countries. Nevertheless, it is a mistake to underestimate routine skills, such as IT and core accounting knowledge, especially for entry-level accountants (Liyan, 2013; Tan and Laswad, 2018), even though some scholars believe that technical skills can be gained through "on the job training" (Low et al., 2016).

One remarkable finding is that the most required specification for a potential pre-accounting staff was that the applicant should be female. This interesting finding contradicts previous research since the majority of accounting-related studies have claimed that accounting is a liberal profession dominated by men in most countries (Del Baldo, Tiron-Tudor, and Faragalla, 2018). However, this situation may vary owing to cultural differences (Wells and Fieger, 2006; Kyriakidou et al., 2016) and the fact that an increasing percentage of women

have started to have a voice in the accounting sector after the 1970s (Walker, 2008). Two plausible reasons can be given for this unexpected finding. First, as Bryant (2010) has suggested, a woman's career advancement in accounting is more difficult than that of a man. Women are more likely to be positioned at a lower level. The reason for requiring female candidates could be that this study focused on the entry-level accounting job title, pre-accountancy. This argument is supported by other studies that claim that women have a low rate of participation in higher-level accounting positions (Keiran, 2017; Del Baldo et al., 2018), and that more women have a lower job status than men (Whiting and Wright, 2001). Similarly, a recent study has shown the predominance of male accountants in large businesses and female accountants in small and medium enterprises (Silva, Dal Magro, Gorla, and Silva, 2018). The second reason is that the majority of job ads consisted of pre-accounting clerical and secretarial sub-positions. Women seem to be considered more suitable for these positions. This claim is similar to the findings of Riach and Rich (2006) that 97% of the people in secretarial positions are women. The third reason relates to Turkish cultural norms, where women exemplify femininity rather than independence. Thus, in Turkey, women's tasks are generally associated with their homes (Akin, 2017). Women tend to be hired more in secretarial positions because these tasks can be considered "housework" in the context of companies. In response to Booth and Leigh's (2010) findings of gender-stereotyping of job demands, we argue that in Turkey, when looking for pre-accountants, the sector prefers females. Nevertheless, considering gender equality, we have to state that "being female" cannot be considered a job skill criterion.

Another interesting finding is the lack of consensus on the qualification required to apply for a pre-accounting job in Turkey. Scholars indicate that a profession is different from an occupation in that it requires long-term education and orientation processes (Chitty, 1997). We can thus assert that a confusion exists on whether the sector perceives an accounting field job as a profession or as an occupation.

This study proposes that core pre-accounting competencies come from three different perspectives, the sector, standards, and the literature; our results show both similarities and differences between them. For the first research question, 16 criteria appear to be what the Turkish sector required for pre-accounting employees. As regards the second research question, we plausibly assert that the pre-accountants' job skills required by the Turkish sector are similar to those required in the literature; more than half of the 25 job skills pertain to the soft skills identified in both the sector and the literature. The difference of only seven out of the twenty-five criteria between the sector and the literature signifies consistency in their requirements.

In contrast with Tsui's (2013) findings, the gap between the sector and academia in Turkey seems to be reasonable. However, with regard to our third research question, the gap between the sector and standards across the nine criteria reveals that the VQAAPS' standards are less compatible with the sector's expectations than in the literature. In the same line, eight diffe-

rent pre-accountant sub-job titles in the ILO can be considered a universal initiator. This is similar to our results (Table 3). However, the VQAAPS suffers from its job title positioning. These results prove that the Turkish sector is more adapted to international criteria than the local standards.

Finally, the results show that although the local standards follow the ILO and TURMOB guidance, gaps actually do exist, especially between the sector and local standards. This is very important because all countries' local standards generally follow the ILO framework. Although the TURMOB has been consulted, such consultation is insufficient to reflect the sector's real expectations. As a general recommendation, we suggest that policymakers pay attention to the employers' opinions before establishing national standards.

Limitations and further studies

Despite its valuable contributions and the relative paucity of this type of research in the accounting area, this study has some limitations. The first limitation is that our data relate to only Turkey. More comparative studies involving data from different countries need to follow. Second, the data cover nine years only. If more comprehensive data could be gathered, longitudinal studies could be conducted to highlight the changing trends in the accounting field and achieve more generalizable results. Third, we considered only job skills. However, there are job descriptions in the job ads that could be further analyzed. Fourth, we used only 12% of our data since we focused only on "pre" accountant (entry-level) job ads, although there are other job titles such as accounting manager and accounting director, which are considered to be more senior positions with more responsibilities. Therefore, their corresponding job skills may differ from our results.

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RESEARCH ARTICLE

Behavioural Aspects of Customers' Preference for Participation Banks: Evidence with Turkish Data*

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Abstract

Participation banks (PBs) are distinct from other banks in that they operate on an interest-free principle. This study aims to investigate the behavioural aspects of individual customers who prefer PBs when choosing a bank. The study covers 12 regional levels throughout Turkey determined by the Turkish Statistical Institute (TURKSTAT). A multidimensional measurement model has been created that can measure the behavioural aspects of PB customers. In line with the maximum likelihood calculation technique due to normal distribution of collected data, the question of whether or not the measurement model is compatible with the data set has been tested using methods of Exploratory Factor Analysis and Confirmatory Factor Analysis. As a data collection tool, the survey form is used and survey form data for a total of 440 customers are analysed. According to the results of the study, it is determined that attitude, social influence, religious sensitivity, experience, accuracy, awareness, trust, benevolence and cost factors are determinant in the transformation of behavioural intentions into actual behaviour when customers choose PBs. Among these factors, the factors that best explain intention are benevolence, attitude, social influence and accuracy, whereas with the cost incurred in banking transactions, traditional and social media ads directed at PBs have a relatively lower ability to explain behaviour.

Keywords

Participation Banks, Bank Customer, Customer Behaviour, Exploratory Factor Analysis, Confirmatory Factor Analysis

Introduction

Interest-free banking is one of the activity types of the banking sector, which constitutes the basis of the financial system. It has become a remarkable type of banking in the 21st century both due to its place in the total banking sector and due to its rapid spread at the global level.

In a world where the negative effects of the first World War and then the global economic depression of 1929 were felt, the Second World War began while seeking a solution to and an exit from economic depression. Such developments, which have led to the deterioration of the economy of many countries and an increase in poverty, have prompted a search for an

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alternative financing system in the financial sector. In particular, the emergence of the need for interest-free finance in the 1940s and 1950s in Muslim communities and research carried out in this area brought the idea of participation banking to the agenda. Initiatives launched in Malaysia and Pakistan have almost taken on the role of intermediation in transforming the idea of participation banking from theory to practice.

Egypt is where the idea of participation banking has turned into practice. The establishment of a savings bank in the city of Mit-Ghamr, Egypt in 1963 is known as the first of its kind of banking. Following this development, the transnational Islamic Development Bank and the Dubai Islamic Bank entered into operation in 1975 in order to promote social and economic development within the framework of Islamic law, and the idea of participation banking in the modern sense was implemented. Especially in the 20th century, the acceleration of the industrialization process and the unexpected rise in oil prices in the 1970s accelerated the idea of transitioning participation banking from thinking into practice. All these developments have set an example in terms of European countries and other countries, such as Russia and the United States, and the practice of participation banking has become more common in the world (Alrifai, 2017).

Global financial crises throughout history have made the banking system questionable, raising issues such as insufficient banking regulations, the risk factor in banking transactions and capital adequacy. Particularly in the period since 2007, the global financial system has gone through several major fluctuations that have resulted in the persistence of some systemic deficiencies and increased concerns about sustainability. Due to high interest rates in the United States, the failure of many banks following the explosion of the mortgage market and the bankruptcy of Lehman Brothers has necessitated effective and comprehensive intervention in the global financial system. As part of all these developments in the global financial system, PBs in both Turkey and in other countries where the interest-free financial system is applied have continued to erode the market share of other banks (Jobst, 2011).

The practice of participation banking in Turkey began with Decree No. 83/7506 on 16 December 1983, which allowed private financial institutions to operate on an interest-free basis. The term for these private financial institutions was changed to “Participation Banks” in accordance with Banking Law No. 5411 on 1 November 2005. Since its inception in 1985, participation banking has shown rapid growth, particularly in the 2000s. A total of 6 PBs are operating in Turkey as of 2020. In line with the latest data published by the Banking Regulation and Supervision Agency-BRSA (September 2020), the share of PBs in the total banking sector has increased to 7% (BRSA, 2020). In an environment where PBs aim to reach a share of 15% in 2025 (PBAT, 2015) and become a provider of financial products and services according to international standards, the importance of this study’s investigation of the behavioural factors that lead customers to choose these banks is clear.

When the studies in the literature (Taib, Ramayah & Razak, 2008; Rashid & Hassan, 2009; Asif, Shah, Afeef & Ahmed, 2016) are examined, it is seen that they are generally limited to a specific city or region. In particular, the fact that no comprehensive research on the subject has been conducted in the national literature reveals the original value of this study. In light of the information expressed, the main purpose of this study is to contribute scientifically to the domestic and foreign literature by identifying possible behavioural factors in the preference of individual customers for PBs based on the sample from TURKSTAT's 12 regions.

This work has five chapters. In the second chapter, which is the literature analysis, studies on this subject are examined. In the third chapter, the research methodology used in the application phase of the study is discussed, and in the fourth chapter the findings obtained from the analysis are presented. In the last part of the study, the findings obtained are interpreted and discussed, and recommendations are made regarding the purpose of the study.

Literature Analysis

When examining pioneering studies investigating the behavioural aspects of customers who prefer PBs, it is seen that the first related study was conducted in Jordan by Erol & El-Bdour (1989). The authors aim to identify the behavioural aspects of bank customers in preferring PBs and other banks. They have analysed the data obtained by survey data collection with a t-test for 197 people who are customers of PBs and 237 people who are customers of other banks. The authors argue that individuals, especially in the 20-29 age range, act more consciously by investigating the profit-loss situations of their own savings when choosing PBs and are better aware of participation banking services, so the level of awareness is higher in younger individuals. Furthermore, the authors note that customers are not behaviourally influenced by the religious factor while choosing PBs (Gerrard & Cunningham, 1997; Zaher & Hassan, 2001). In parallel with this result, they also state that the religious factor does not have a strong effect on the behaviour of customers, as seen in a sample of 136 PB customers in Malaysia in a study conducted by Amin, Rahman, Sondoh Jr & Hwa (2011). According to findings of this study, customers are behaviourally influenced by human behaviour, such as that of family, friends, and spouses etc. who are around them while choosing PBs.

Subhani, Hasan, Nayaz & Osman (2012) highlighted the influence of the religious factor on behaviour in their study of 300 samples of Pakistani PB customers. In addition, bank service quality, bank accessibility and social-environmental impact are other significant factors that guide behaviour. In the study conducted by Imtiaz & Ullah (2016), the authors have found that religious sensitivity is the most important factor affecting behaviour. Another study claiming that this factor has an effect on customer behaviour is the research conducted by Asif et al. (2016). According to the authors, apart from religious sensitivity, factors such as social environment, government support, ease of service and cost are effective on the behaviour of PB customers. The results of the research conducted by Warsame and Ileri (2016) for Nigeria are also in line with the findings obtained from this study.

There are other studies suggesting that the social influence factor is effective in the behaviour of customers who prefer PBs. For instance, Zainuddin, Jahyd & Ramayah (2004) have examined whether there are behavioural differences between PB customers and other bank customers by conducting a survey of a sample of 123 Malaysian bank customers. As a result of the research, the authors have noted that customers consider the opinions and suggestions of the people around them a social influence, and that the social influence factor plays a significant role in behaviour when choosing PBs. As a justification for this, customers rely more on opinions of people around them. Another study similar to this has been conducted in Pakistan by Ali & Raza (2015). In this study, the authors aim to examine the behavioural aspects of individuals in their preference for credit cards offered by PBs. The authors, who have examined the data obtained from 466 PB customers through a factor analysis method, have observed that social influence plays a more dominant role on the bank-related behaviours of customers, but the cost incurred in banking transactions (commission expenses, etc.) do not have any effect on customer behaviour.

There are also scientific studies indicating that the social influence factor as well as the personal attitude of the customer play an active role in the behaviour of PB customers when they prefer these banks. For example, in a study of 300 individuals in Malaysia by Taib et al. (2008), the authors have found that individuals' personal attitudes, apart from the social influence factor, are also effective in investment decisions, and this is reflected in individuals' actual behaviour. In the study conducted by Ali, Raza & Puah (2015) on a sample of 471 bank customers, it is argued that Pakistani individuals have more behavioural personal attitudes when they prefer PBs, and they pay particular attention to factors related to cost in banking transactions. Warsame & Ireri (2016), who claim that social influence has no effect on individuals' bank preferences, find that the personal attitude factor plays a significant role in the behaviour of Qatari individuals. The authors point out that an attitude based on personal knowledge and experience is the most prominent factor in the investment decisions of individuals. Similarly, Mehtab, Zaheer & Ali (2015) state that knowledge and experience related to banking transactions are effective on the behaviour of PB customers in their survey study conducted on a sample of 200 individuals in Peshawar. Apart from these studies, other studies aimed at identifying the behavioural aspects of customers who prefer PBs when choosing a bank are summarized in Table 1.

Methodology of Research

In this section, the scope of the research, the research model, the universe and sample of the research, data collection and data analysis, respectively, are discussed.

Table 1

Summary of Other Studies Examining Behavioural Aspects of PB Customers

Research	Purpose	Findings	Data Collection Technique	Sample Number/ Scope
The role of religious norms, trust, importance of attributes and information sources in the relationship between religiosity and selection of the Islamic bank Usman, Tjiptoherijanto, Balqiah & Agung (2017) Journal of Islamic Marketing	To determine the relationship between factors affecting the bank choice of PB customers and religious factor	Religious sensitivity and trust factors play an important role when customers choose PBs.	Survey	363 people/ Indonesia
Exploring the demand side issues in participation banking in Turkey: Questionnaire survey on current issues and proposed solutions Savaşan, Saraç & Gürdal (2013) Afro Eurasian Studies	To identify current issues in the field of participation banking in Turkey	Four main issues: implementation of Islamic principles, traditional banking competition, laws and regulations, human capital and corporate governance.	Survey	1045 businessmen/ Turkey
Examining a theory of reasoned action (TRA) in internet banking using SEM among Saudi consumers Albarq & Alsughayir (2013) International Journal of Marketing Practices	To investigate behavioural aspects of customers in the context of internet banking usage	Attitude and the social influence factor are effective in the use of internet banking by Saudi bank customers.	Survey	350 people/ Riyadh
Factors influencing selection of Islamic banking in Thailand: The mediating effect of confidence Yamirudeng (2013) Doctoral Thesis	To identify factors affecting decisions of PB customers	Awareness, trust, personal attitude and service factors are effective on behaviour.	Survey	300 people/ Thailand
Consumer attitudes and purchase intentions toward Islamic banks: The influence of religiosity Souiden & Rani (2013) International Journal of Bank Marketing	To study the role of the religious factor on the behaviour of customers who prefer PBs	The religious factor has no influence on customer behaviour.	Survey	188 people/ Tunisia
Customer's criteria for selecting an Islamic bank: Evidence from Pakistan Awan & Bukhari (2011) Journal of Islamic Marketing	To determine the behavioural aspects of customers' bank preference	While awareness and religious factors have a low effect on customers' behaviour, service quality has a high impact.	Survey	250 people/ Pakistan
The influence of religion on Islamic mobile phone banking services adoption Sun, Goh, Fam & Xue (2011) Journal of Islamic Marketing	To examine the influence of the religious factor on the behaviour of mobile users of participation banking	The influence of the religious factor on the behaviour of mobile users has been identified.	Survey	135 people/ South East Asia

Research	Purpose	Findings	Data Collection Technique	Sample Number/ Scope
Islamic banking: selection criteria and implications Marimuthu, Jing, Gie, Mun & Ping (2010) Global Journal of Human Social Science	To investigate decisive factors in the preference of PB customers for these banks	It is determined that cost, quality of service and social influence factors are effective in customers' bank preferences.	Survey	450 people/ Klang Valley
Customers' demographics affecting bank selection criteria, preference, and market segmentation: Study on domestic Islamic banks in Bangladesh Rashid & Hassan (2009) International Journal of Business and Management	To examine effective factors in bank preferences of domestic customers in Bangladesh	Awareness of banking transactions, service efficiency and development of electronic banking system have an impact on behaviour.	Survey	371 people/ Dhaka City
Perception of Islamic banking: Does it differ among users and non-users? Zainuddin et al. (2004) Jurnal Manajemen dan Bisnis	To investigate the difference between PB customers and other bank customers	PB customers rely more on their social circle in choosing a bank than other bank customers. Also, their personal attitudes play a prominent role.	Survey	123 people/ Penang
Perceptions of Malaysian corporate customers towards Islamic banking products & services Ahmad & Haron (2002) International Journal of Islamic Financial Services	To identify behavioural aspects of Malaysian PB commercial customers	Cost, religious factor, company interest and fast and effective service are effective on the behaviour of corporate customers.	Survey	100 people/ Malaysia
Islamic banking: A study of customer satisfaction and preferences in Jordan Naser, Jamal & Al-Khatib (1999) International Journal of Bank Marketing	To investigate factors affecting the bank preference of PB customers	Financial products and services offered by the bank are effective on customer behaviour.	Survey	206 people/ Jordan
Banking behavior of Islamic bank customers: perspectives and implications Metawa & Almoosawi (1998) International Journal of Bank Marketing	To examine factors in bank selection on customers of Bahrain Islamic Bank and Faisal Islamic Bank	Friends, family and bank proximity factors are effective on customers' behaviour.	Survey	300 people/ Bahrain

Scope of Research

This study references 12 regions, as determined by TURKSTAT. The 12 regions where field research has been conducted are as follows: TR1-Istanbul, TR2-West Marmara, TR3-Aegean, TR4-East Marmara, TR5-Western Anatolia, TR6-Mediterranean, TR7-Central Anatolia, TR8-Western Black Sea, TR9-Eastern Black Sea, TRA-Northeast Anatolia, TRB-TRC East Anatolia and Southeast Anatolia in Turkey. The regions are illustrated in Figure 1.



Figure 1. 12 Regions
Source: TURKSTAT

Research Model and Hypotheses

A research model has been developed throughout Turkey using studies in the literature to determine the behavioural aspects of individual customers who prefer PBs when choosing a bank. This model is illustrated in Figure 2.

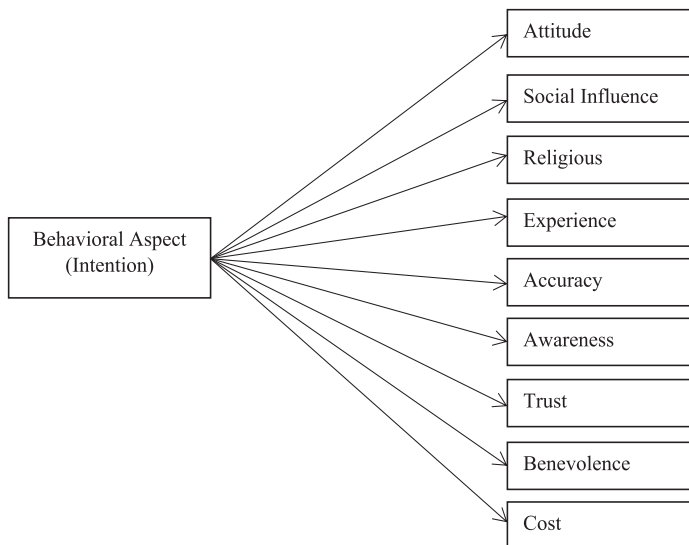


Figure 2. Research Model
Source: Created by the author.

The above research model has been created in order to determine the behavioural aspects of individual customers who prefer PBs. It was created by the author by combining a total of

nine basic factors together with attitude and social influence factors (Fishbein & Ajzen, 1975) taken from TRA (Theory of Reasoned Action). In the study, TRA factors consist of attitude and social influence factors. A brief description of the factors in the research model can be described as follows:

TRA was developed by Fishbein and Ajzen in 1975 and was taken as a reference in scientific studies in many fields, such as social psychology, food and medicine (Park, 2000; Chau & Hu, 2001; Mathieson, Peacock & Chin, 2001; Teo & Pok, 2003; Celuch, Taylor & Godwin, 2004; Hsu & Chiu, 2004; Kleijnen, Wetzels & Ruyter, 2004; Zainuddin et al., 2004; Ma'ruf, Mohamad & Ramayah, 2005; Ramayah & Suki, 2006; Shih & Fang, 2006; Gopi & Ramayah, 2007; Souiden & Rani, 2013; Koe & Rahman, 2014; Ali et al., 2015; Ali & Raza, 2015; Mamman, Ogunbado & Abu-bakr, 2016; Warsame & Ireri, 2016). The main goal in this theory is to uncover the relationship between individuals' behaviour, beliefs and intentions. In this model, an individuals' behaviour occurs through his or her intention. The factors defining this theory are highlighted in Figure 3 (Taib et al., 2008).

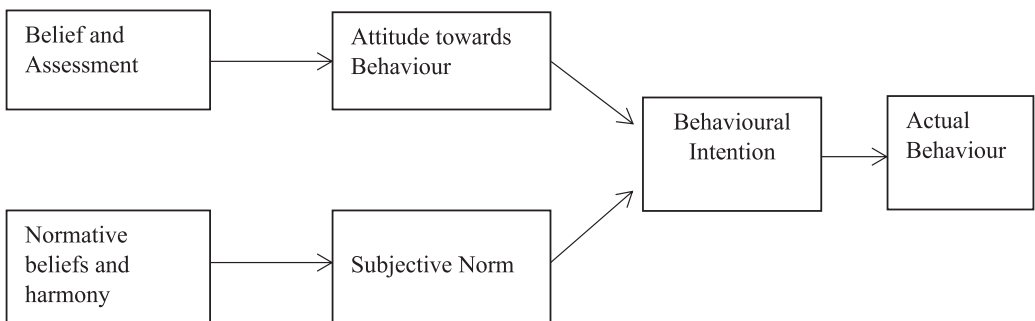


Figure 3. TRA Factors
Source: Taib et al., 2008

According to TRA, individuals' behaviour is influenced by personal attitude and social influence factors. One must regard individuals' beliefs or thoughts they have about themselves and their environment in order to understand their behaviour. In the social influence factor, a person motivates himself by adapting to certain preferences of people such as a spouse, family, friends etc. who feel important to him (Lada, Harvey Tanakinjal & Amin, 2009; Trafimow, 2009).

Attitude

An attitude is generally a positive or negative assessment of an individual regarding a particular case. In other words, attitude refers to an individual's approach to a situation or an event. Therefore, attitudes of individual PB customers towards participation banking are examined under this factor (e.g., I will always be a customer of the PB in my banking tran-

sactions, the number of PBs should increase, etc.) (Taib et al. 2008; Amin et al., 2011; Albarq & Alsughayir, 2013).

Hypothesis 1 (H₁): The attitude factor has a positive effect on the behaviour of individual customers who prefer PBs.

Social Influence

Social influence refers to an individual's perception of what other people think of a situation or an event, and to what extent this affects an individual's behaviour or action. Under this factor, this study examines whether individual customers are affected by their relatives' opinions (e.g., friends, family, etc.) about PBs when they choose them (Koe & Rahman, 2014; Ali, Raza & Puah, 2015; Warsame & Ireri, 2016).

Hypothesis 2 (H₂): The social influence factor has a positive effect on the behaviour of individual customers who prefer PBs.

Religious Factor: The sensitivity of individual customers who prefer PBs to interest has been determined under the religious factor in this study (Haron, Ahmad & Planisek 1994; Metawa and Almosawi, 1998; Naser et al., 1999; Sulaiman, 2003; Gait & Worthington, 2008; Amin et al., 2011; Sun et al., 2011; Rehman & Masood, 2012; Ramdhony, 2013; Magd & McCoy, 2014; Koe & Rahman, 2014).

Hypothesis 3 (H₃): The religious factor has a positive effect on the behaviour of individual customers who prefer PBs.

Experience: Under the experience factor, we examine considerations including the proximity of customers' residences to PB branches (so that they can be informed of all relevant developments) and the degree to which internet and mobile banking are simple and understandable (Zainuddin et al., 2004; Hassan, Ahmed, Imran, Naeem, Waheed & Ahmed, 2012; Mehtab et al., 2015; Asif et al., 2016).

Hypothesis 4 (H₄): The experience factor has a positive effect on the behaviour of individual customers who prefer PBs.

Accuracy: The fact that PB employees act as experts in their banking transactions is considered within the scope of the accuracy factor (Morgan & Hunt, 1994; Doney & Cannon, 1997; McKnight & Chervany, 2002; Wakefield, 2004; Zainuddin et al., 2004; Usman et al., 2017).

Hypothesis 5 (H₅): The accuracy factor has a positive effect on the behaviour of individual customers who prefer PBs.

Awareness: With the awareness factor, we have tried to determine whether or not the

reputation of PBs in society and advertisements for PBs in various media and social media outlets (such as television, newspapers, Facebook, Instagram and Twitter) create awareness among customers (Mehtab et al., 2015; Al-Sharif, Qwader & Al-Slehat, 2017).

Hypothesis 6 (H₆): The awareness factor has a positive effect on the behaviour of individual customers who prefer PBs.

Trust: Within the scope of the trust factor, we have investigated compliance with the principle of transparency in banking transactions and banks' being public or private capital (Jarvenpaa, Tractinsky & Vitale, 2000; Sun et al., 2011; Voon, Ngui & Agrawal, 2011; Koe & Rahman 2014; Usman et al., 2017).

Hypothesis 7 (H₇): The trust factor has a positive effect on the behaviour of individual customers who prefer PBs.

Benevolence: The confidence of employees in bank transactions, solving possible problems related to bank transactions in a short time, and supporting social responsibility projects are discussed under the title benevolence (Morgan & Hunt, 1994; Doney & Cannon, 1997; Voon et al. 2011; Usman et al., 2017).

Hypothesis 8 (H₈): The benevolence factor has a positive effect on the behaviour of individual customers who prefer PBs.

Cost: Under the cost factor we examine the impact of PBs on customer behaviour with regard to the fees and commissions for banking services they provide and late fees applied in instalment transactions (Haron et al., 1994; Abdullah & Dusuki, 2006; Olson & Zoubi, 2008; Amin et al., 2011; Koe & Rahman, 2014; Ali & Raza, 2015; Asif et al., 2016).

Hypothesis 9 (H₉): The cost factor has a positive effect on the behaviour of individual customers who prefer PBs.

Population and Sampling of Research

It is required to know the research population (universe) in order to determine the sample in a study. Research conducted on a target audience whose precise lines are unknown may not yield effective results. Generalizing about a research population based on data from a sample mass is based on probability. Therefore, the larger the sample mass, the less likely it is to be mistaken in the generalization made about the research population. Hence, for a suitable sample, it is required to achieve a balance that provides the ability to represent (Altunışık, Çoşkun, Bayraktaroğlu & Yıldırım, 2010). In line with this information, the minimum sample size to be reached in a research population of 1 million people and above is 384 people, within the framework of acceptable sample size for a particular population developed by Sekaran

and Bougie (2016) and generally accepted in the literature (Sekaran & Bougie, 2016). According to 2018 4th quarter data published by the Participation Banks Association of Turkey (PBAT), the total number of active individual customers of PBs in Turkey is 1,038,787 people. Accordingly, the number of customers in the 12 TURSTAT regions and the minimum sample numbers to be reached by region are presented in Table 2.

Table 2

The Number of Active Individual Customers by Region and the Number of Samples to be Reached.

12 TURKSTAT regions		Active	Minimum Sample	Individual Customer
Code	Region Name	Total Number of Individual Customers	Number according to Sekaran and Bougie (2016)	Sample Percentage (%)
TR1	Istanbul	413474	153	39.84
TR2	West Marmara	18460	7	1.82
TR3	Aegean	66517	25	6.5
TR4	Eastern Marmara	114211	41	10.67
TR5	Western Anatolia	122278	44	11.6
TR6	Mediterranean	76243	27	7.03
TR7	Central Anatolia	48095	18	4.68
TR8	Western Black Sea	32723	13	3.38
TR9	Eastern Black Sea	25684	10	2.6
TRA	Northeastern Anatolia	19792	8	2.08
TRB	Middle East Anatolia	29378	11	2.8
TRC	Southeastern Anatolia	71932	27	7
Grand Total of Regions		1038787	384	100

Source: Created by the author using data published by PBAT.

Collection of Data

A survey form was used to collect data from customers who use PBs. Bank branch managers were interviewed and reported that they would like to participate in this research, and that survey forms could be filled out by bank staff as they interviewed customers. Survey forms were then sent by mail/cargo to branches of participating banks throughout Turkey, and 440 forms were completed by bank staff through face-to-face interviews with individual customers, ensuring that they could answer completely and correctly.

The Delphi method was used to prepare the data set of this study. This method is based on the knowledge, opinion and experience of a group of experts on a particular subject (Okoli & Pawlowski, 2004). The expert group is composed of academicians and finance experts (bank employees). Initially, taking into account the experience of the expert group and studies in the literature (Fishbein & Ajzen, 1975; Haron et al., 1994; Morgan & Hunt, 1994; Metawa & Almosawi, 1998; Jarpenvaa et al., 2000; Mehtab et al., 2015), a scale with 33 items was developed. Also, an open-ended questionnaire was organized. Content adequacy of the items in the questionnaire was examined by pilot study. The articles are designed according to the

Likert scale of 5 (1=strongly disagree, 5=strongly agree). Creating 5 or 7 scales gives the variance and sufficient Alpha coefficient (internal consistency) required to examine the relationships between matter and scale (Lissitz & Green, 1975).

The pilot study was conducted on 69 individual PB customers in Trabzon province. Accordingly, survey questions were finalized and implemented at the regional level. The results of the pilot study were shared with the expert group. After a panel discussion, a final decision was made for 33 statistically significant articles ($p < 0.05$) and an open-ended question. This number, as Hinkin & Schriesheim (1989) suggest (more than 7), is sufficient in terms of internal consistency and trust. The survey form was designed as a total of two sections following introductory information concerning the study. In the first part, demographic questions were asked. The second part presented a total of nine factors that may affect customer behaviour when choosing a PB and asked 33 questions about these factors.

Analysis Method of Research

In this study, two basic analysis techniques, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), were used via SPSS 24 and AMOS 24 software programs, respectively.

Exploratory Factor Analysis

Regarding EFA (Getty & Thompson, 1994; Kline, 1998), the main axis method (Rumel, 1970; Ford, MacCallum & Tait, 1986) was used in this study. The Kaiser-Meyer-Olkin (KMO) test was performed for sample adequacy. The KMO value was recognized as > 0.8 (Kaiser, 1958). The appropriateness of factor structure was examined by Bartlett's globality test. The percentage of variance described by factors greater than 1 and the Guttman-Kaiser Eigenvalue greater than 70% was used. Assuming that there is no relationship between the factors, the orthogonal rotation (varimax) technique was applied. Varimax rotation increases the interpretability of factors. It also aims to minimize a large number of factors with high load (Hair, Anderson, Tatham & Black, 1995; Hopkinson & Pujari, 1999). It is sufficient that the factor loads of substances are higher than 0.40 (Stevens, 1992; Field, 2000; Tabachnick & Fidell, 2007).

Confirmatory Factor Analysis

In calculating general goodness of fit belonging to the scale with CFA, Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), Goodness of Fit (GFI) and Standardized Root Mean Square Error of Approximation (SRMR) are used (Meehl, 1990; Longo & Mura, 2007). For a good fit model, chi-square value (χ^2/df) normalized by degrees of freedom is suggested to be between 2-5 (Bagozzi & Yi, 1998; Chiu & Wang, 2008). CFI and

GFI values are supposed to be above 0.90 (Hu & Bentler, 1999). Browne & Cudeck (1993) state that SRMR and RMSEA values should be below 0.08.

Cronbach's alpha was calculated to examine the scales' internal consistency trust. The internal consistency trust coefficient indicates whether there are individual differences about specific groups of substances. As an acceptable internal consistency indicator of the scale created in this study, Cronbach's alpha value equal to or greater than 0.80 is accepted for the Cronbach's alpha coefficient (Cronbach, 1946).

Findings

This section discusses statistical information about sampling, trust of survey questions, correlation analysis, Cronbach alpha, described mean variance, combined trust, EFA and CFA.

Statistical Information About Sampling

A total of 440 individual customers were studied in the research. Accordingly, the distribution of demographic characteristics of customers is illustrated in Table 3. As can be seen in the table, 73.4% (323 people) of the individual customers participating in the study were male and 26.6% (117 people) were female. At the same time, 25.5% of respondents (112 people) were between the ages of 18-29, 19.5% (86 people) were between the ages of 40-49, and 10% (44 people) were between the ages of 50-59. It is observed that 41.4% (182 people), who make up the majority of respondents, were between the ages of 30-39 years.

Of the sample, 64.1% (282 people) are married, 33.2% (146 people) are single, and 2.7% are married or unmarried. At the same time, 8.2% (36 people) of the respondents have primary education degrees, 29.8% (131 people) have high school and equivalent school degrees, 12.3% (54 people) have associate degrees, 41.4% (182 people) have bachelor's degrees and 8.4% (37 people) have master's degrees. In addition, it is noted that 11.4% of respondents (50 people) earn a monthly income of less than £2,000, 22.3% (98 people) earn between £2,000-3,000, 37.3% (164 people) earn between £3,001-5,000, and 29.1% (128 people) earn a monthly income of more than £5,000. When respondents are evaluated in terms of occupational distribution, 15.7% (69 people) are craftsmen and those who work in related jobs, 27.6% (122 people) work in jobs that do not require qualifications, 42.6% (187 people) are professionals, and 14.1% (62 people) are from groups other than these.

When the sample is evaluated in terms of customers' PB history, it is seen that 17.7% (78 people) have been customers for less than 1 year, 35.1% (154 people) for between 1-5 years, 31.1% of (137 people) for 6-10 years and 16.1 percent (71 people) for more than 10 years. Furthermore, it is obvious that the majority, or 59.3% (261 people), are also DP customers,

while 40.7% (179 people) are only PB customers when evaluated in terms of the rate of customers' use of DPs. In terms of DP history, it is observed that 30.9% (82 people) have been DP customers for less than 5 years, 23% (60 people) for 5-9 years, 31.7% (83 people) for 10-15 years, 6% (15 people) for 16-20 years, and 8.3% (21 people) for more than 20 years.

Table 3
Demographic and Professional Characteristics of Respondents

Gender	Frequency	%	Income Level	Frequency	%
Female	117	26.6	Less than ₺ 2,000	50	11.4
Male	323	73.4	₺2,000-3,000	98	22.3
Age	Frequency	%	₺3,001-5,000	164	37.3
18-29	112	25.5	More than ₺ 5,000	128	29.1
30-39	182	41.4	Occupation	Frequency	%
40-49	86	19.5	Artisans and employees in related jobs	69	15.7
50-59	44	10.0	Employees in jobs that do not require qualifications	122	27.6
Over 60 Years	16	3.6	Professional Groups (Doctor, Engineer, Lawyer, Teacher, Banker, Civil Servant, etc.)	187	42.6
Marital Status	Frequency	%	Other (Unemployed, Retired, Housewife etc.)	62	14.1
Married	282	64.1	PB History	Frequency	%
Single	146	33.2	Less than 1 year	78	17.7
Divorced	12	2.7	1-5	154	35.1
Education Status	Frequency	%	6-10	137	31.1
Primary	36	8.2	More than 10 years	71	16.1
High School	131	29.8	DP History	Frequency	%
Associate's degree	54	12.3	Under 5 Years	82	30.9
Bachelor's degree	182	41.4	5-9	60	23.0
Master's degree	37	8.4	10-15	83	31.7
Rate of Deposit Banks (DPs) Usage	Frequency	%	16-20	15	6.0
Yes	261	59.3	Over 20 Years	21	8.3
No	179	40.7	Total	440	100
Total	440	100	Total	440	100

Validity and Reliability of Measurement Tool in Research

Cronbach's Alpha, KMO and Barlett test, which are used as a measurement tool in the research and which belong to the scale related to factors that may affect the behaviour of individual customers included in the survey form, have been calculated through the SPSS program. The results of validity and reliability analysis of the scale are included in Table 4.

The fact that the internal consistency coefficient Cronbach's Alpha (α) is in the range of $0.80 < \alpha < 1.00$ indicates that the scale is highly reliable. As shown in Table 4, the internal consistency coefficient of the 33-question scale is calculated as 0.928. At the same time, KMO value is 0.92 and Barlett test ($\chi^2=6816.142$, $df=528$, $P=0.000$) is statistically significant. The fact that KMO value is greater than 0.50 and Barlett value is significant shows that the rese-

arch dataset is suitable for factor analysis (Sharma & Roy, 2016). Moreover, it is determined that all matter factor loads in the diagonal of the anti-image correlation table are higher than 0.50. Therefore, it is concluded that the substances contained in the scale have accurately measured the property as required (Durmuş, Yurtkoru & Çinko, 2018).

Table 4

Reliability Results and Average Values of the Scale

Number of Questions	Sample Number	Average	Cronbach's Alpha	KMO	Barlett		
					X2	df	P
33	440	3.72	0.928	0.922	6816.142	528	0.000

Normality Test of Scale

Z scores are calculated in determining normality distribution of scale data. A Z score between +1.96 and -1.96 indicates normal distribution of data (Tabachnick & Fidell, 2007). Furthermore, normal distributions of data are calculated through histogram and Q-Q graphs (Ben & Yohai, 2004). The results of the Z score of the research scale are stated in Table 5. According to the Z score results, it is seen that the research scale has a normal distribution. Moreover, the fact that skew values of the scale are in the range of ± 2 (Akalin, 2015; George & Mallery, 2016) reveals that normality assumption is met. Results from the tests above verify that the scale is suitable for EFA.

Table 5

Normality Test Results for Behavioural Intention Scale

Questions	N	Average	Skewness	Std. Error	Z Score
1-The reason I prefer PBs is that their activities are interest-free.	440	3.909	0.90	.116	1.55
2-People around me benefit from the services offered by PBs.	440	3.864	-0.80	.116	-1.13
3-Ads about PBs in traditional media tools such as television, radio, and newspapers do not affect my preference for these banks.	440	3.507	-0.50	.116	-0.61
4-I pay attention to whether my work at PBs is permissible.	440	3.884	0.82	.116	1.72
5-The late fees imposed by PBs in instalment transactions should be lower than other banks.	440	3.782	-0.75	.116	-0.95
6-PBs take care of their customers in banking services.	440	4.023	-1.19	.116	-1.68
7-My environment has no influence on my preference for PBs.	440	3.314	-0.32	.116	-0.86
8-I will always be a customer of PBs in my banking transactions	440	3.911	0.78	.116	1.36
9-The fact that services like internet banking and mobile banking etc. are simple and understandable affects my preference for PBs.	440	3.545	0.56	.116	0.73
10-I am sufficiently informed about the services offered by PBs (SMS, e-mail, mobile notification, etc.)	440	3.793	-0.76	.116	-0.99
11-I trust PBs in my banking transactions.	440	4.018	-1.16	.116	-1.33

Questions	N	Average	Skewness	Std. Error	Z Score
12-The fact that PB employees attach importance to their appearance (clothes, headscarves, etc.) does not affect my choice of these banks.	440	3.584	-0.62	.116	-1.29
13-People around me think that their investments through PBs are more fruitful.	440	3.680	0.54	.116	0.63
14-I do not pay attention to the name of these banks (Kuveyt Türk, Vakıf Participation, Turkey Finance, Al-baraka Türk, Ziraat Participation) when I choose to use PBs.	440	3.152	-0.14	.116	-1.04
15-The fact that they offer attractive payment opportunities in fund utilization service positively affects my preference for PBs.	440	3.805	-0.77	.116	-1.41
16-PBs act according to Islamic standards in their activities.	440	3.502	0.86	.116	1.04
17-I don't feel the need to question my transactions with PBs.	440	3.766	-0.46	.116	-0.67
18-PBs should receive lower fees and commissions for the services they provide compared to other banks.	440	3.148	-0.85	.116	-1.28
19-The culture in the city where I live has an effect on my preference for PBs.	440	3.959	-0.19	.116	-1.54
20-PBs must act expertly in meeting the bank-related needs of customers.	440	3.466	0.93	.116	1.07
21-The fact that PBs are private, public (state) capital or foreign capital does not affect my preference for these banks.	440	3.934	-0.44	.116	-1.45
22-I think PBs are transparent in their banking transactions.	440	3.925	-1.06	.116	-1.77
23-The services provided by PBs meet my expectations.	440	3.486	0.97	.116	1.23
24-The reputation of PBs in society does not affect my decision to work with these banks.	440	3.793	0.49	.116	1.12
25-I follow innovations in PBs.	440	3.423	-0.69	.116	-0.72
26-Being close to the branches of PBs has an effect on my preference for these banks.	440	3.875	-0.36	.116	-1.03
27-I don't think interest is used in the services of PBs.	440	4.034	-0.90	.116	-1.15
28-PBs provide satisfactory assistance in solving customer problems.	440	4.098	0.99	.116	1.05
29-I recommend that my acquaintances who are customers of other banks use PBs.	440	3.991	1.08	.116	1.76
30-Participation banks perform banking services in accordance with Islamic procedures.	440	4.132	1.03	.116	1.49
31-The number of PBs should increase.	440	3.527	-0.38	.116	-0.49
32-The support of PBs in social responsibility projects affects my preference for these banks.	440	3.202	-0.15	.116	-1.18
33-Ads related to PBs on social media such as Facebook, Twitter and Instagram affect my preference for these banks.	440	3.531	-0.24	.116	-1.40

EFA and CFA Findings

EFA was conducted on the data set consisting of 440 answers from individual customers participating in the survey. In structural equation models, the sample size is suggested as at

least 150 in some sources. According to some sources, the number of parameters to be estimated in the model should be at least 10 times larger (Civelek, 2017). If a size in the model has two observed variables, the number of samples must be at least 400 (Çelik & Yılmaz, 2013; Aksu, Eser & Güzeller, 2017). Hence, sample size of the study meets analysis assumption. In order to reach the highest quality of factor structure, several EFA rounds have been regulated in the study. A varimax technique has been selected in line with the presumption that the units are not related to each other. EFA results are stated in Table 6.

In the first-round results of the 33-item EFA, 9 factors with eigenvalues greater than 1 were produced with an initial 25 iterations. In the analysis, KMO value was calculated as .92 by Bartlett's globality test ($p < 0.000$). Also, 7 items with less than .40 factor loads under a single factor in rotation rounds were deleted (Stevens, 1992; Field, 2000; Tabachnick & Fidell, 2007). According to the findings, the first factor can explain 23.505% of the total variance, the first and second factors together, 33.284% of the total variance and all nine factors can explain 70.358% of the total variance (Kalaycı, 2010; Gürbüz & Şahin, 2016; Karagöz, 2017). In line with this result, the effect on the behavioural intention of individual customers who prefer PBs is expressed through social influence, religious sensitivity, experience, awareness, accuracy, trust, benevolence and cost dimensions.

Table 6

Explanatory Factor Analysis References

Main Factor	Item	Factor Loads								
		1	2	3	4	5	6	7	8	9
Attitude	Item 30	.788								
	Item 29	.768								
	Item 8	.705								
	Item 31	.628								
Social Influence	Item 13		.818							
	Item 2		.648							
	Item 4			.793						
Religious	Item 27			.705						
	Item 16			.669						
	Item 1			.656						
Experience	Item 23				.843					
	Item 25				.714					
	Item 10				.654					
	Item 9				.646					
Accuracy	Item 20					.797				
	Item 17					.741				
	Item 15					.664				
Awareness	Item 3						.812			
	Item 24						.620			
Trust	Item 22							.759		
	Item 11							.698		
	Item 21							.669		

Main Factor	Item	Factor Loads								
		1	2	3	4	5	6	7	8	9
Benevolence	Item 28								.810	
	Item 6								.646	
Cost	Item 18									.768
	Item 5									.654
Initial eigenvalues		7.057	4.237	2.743	2.541	1.984	1.850	1.551	1.409	1.322
% of variance		23.505	9.779	8.283	7.670	6.890	4.729	3.954	2.885	2.663
Cumulative %		23.505	33.284	41.567	49.237	56.127	60.856	64.810	67.695	70.358

The scale of factors affecting behavioural intention is tested with CFA of 440 samples after testing with EFA. In the first stage, CFA was performed by loading all items that make up the scale on a single factor, and the results are indicated in Figure 4. Single-factor CFA fit index were determined to be $\chi^2/df=4.518$ GFI=.788 CFI=.805 AGFI=.751 SRMR=.074 and RMSEA=.090. According to these results, it is determined that the single-factor model does not adapt for analysis and that there is no common method bias (Aksu et al., 2017; Civelek, 2018). An analysis scale determined by EFA has been tested with first level multifactor CFA after single factor CFA. The analysis results are stated in Figure 5. The values of fit index among the variables that are exogenous in latent variable status and analysed as behavioural intention indicators, such as attitude, social influence, religious sensitivity, experience, accuracy, awareness, trust, benevolence and cost implicit variables have been calculated.

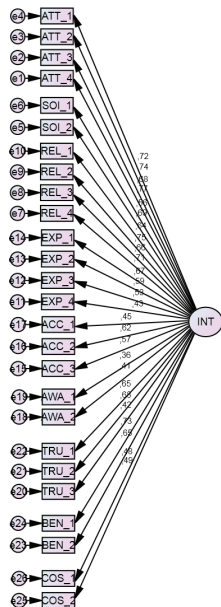


Figure 4. Single-Factor CFA

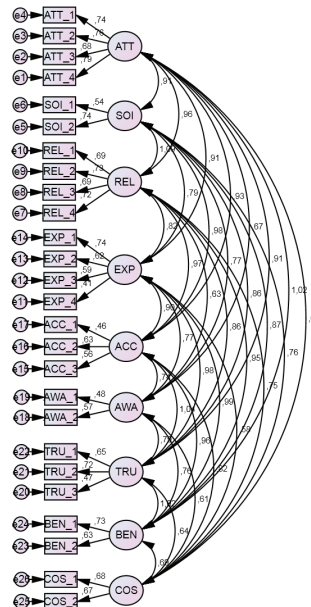


Figure 5. First-Level Multifactor CFA

First-level multi-factor CFA fit index are calculated as $\chi^2/df=4.003$ GFI=.901 CFI=.896 AGFI=.856 RMSEA=.081 SRMR=.063. For the same model, AIC=1990.910, CAIC=2244.163 and ECVI = 4.525.

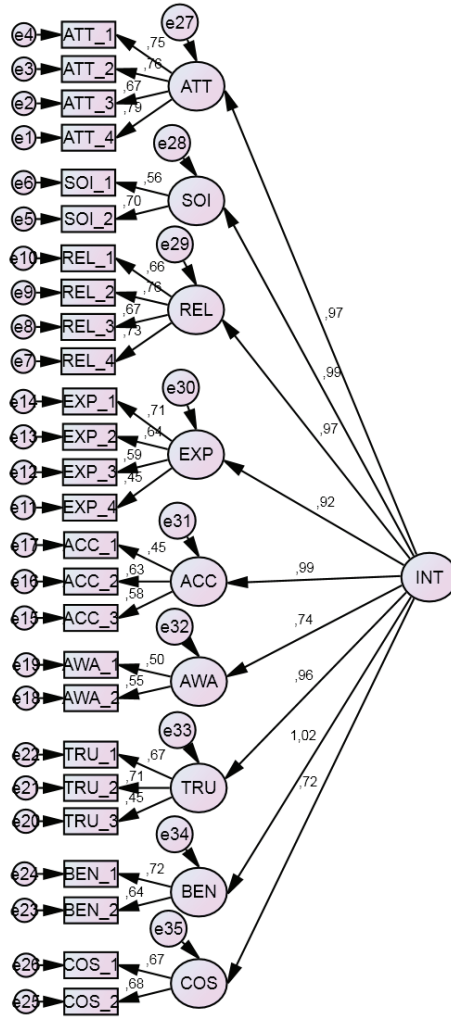


Figure 6. Second-Level Multifactor CFA

The values obtained indicate that the model is compatible with the first-level multifactor CFA (Aksu et al., 2017; Civelek, 2018). The second level CFA results of the model are shown in Figure 6. Compliance indicators for this model are calculated as $\chi^2/df=4.144$ GFI=.897 CFI=.913 AGFI=.884 RMSEA=.075 SRMR=.068. In this context, single-factor CFA, first-level multi-factor CFA and second-level multi-factor CFA compliance indicators are presented in Table 7. When looking at the first and second level outcomes of the CFA stated

in Table 7, it is seen that fit index related to the analysis scale is above the threshold values generally accepted in the literature and it is verified by the data that the nine sub-dimension structures of the scale are obtained while the IFI and NFI values, especially the CFI and GFI fit index, are greater than 0.90 and the AGFI value is greater than 0.85 (Bayram, 2013). Since the SRMR and RMSEA values are less than 0.08 (Aksu et al, 2017; Civelek, 2018; Gürbüz, 2019). Compared to the first and second-level models, $\Delta\chi^2= 1089.854-984.738=105.116$ and $\Delta df=17$. At the same time, it has been determined that the AIC value of the second model (1213.854) is smaller than the AIC value of the first model (1990.910), the CAIC value of the second model (1529.234) is smaller than the CAIC value of the first model (2244.163), and the ECVI value of the second model (2.765) is smaller than the ECVI value of the first model (4.525). Based on the findings obtained, it is concluded that the fit index of the second model is a more appropriate model in terms of the data set. In addition, it is determined that the fit index of the first model is also within the accepted limits and therefore this model could also be utilised in the study. In addition, it is found that the fit index of the first model is also within the accepted limits, and therefore this model can also be used in the study.

Table 7

CFA Compliance Indicators for Behavioural Intention Scale

Level N=440	Chi-square	df	P	Chi-square/df	CFI	GFI	IFI	AGFI	SRMR	RMSEA
Single factor	1351.003	299	.000	4.518	.805	.788	.806	.751	.074	.090
First	984.738	246	.000	4.003	.896	.901	.920	.856	.063	.081
Second	1089.854	263	.000	4.144	.913	.897	.904	.884	.068	.075

Descriptive statistical information about behavioural intention scale and its sub-dimensions used in the study, correlation coefficients, trust and discriminant validity results are highlighted in Table 8 together. It is observed that Cronbach's Alpha and Combined Reliability (CR) coefficients of sub-dimensions of the scale are greater than 0.70, and the correlation values between dimensions are less than 0.90. As a merger validity, average variance extracted (AVE) is greater than 0.50, while CR values are greater than AVE values. The square root values of AVE for each dimension in parentheses are above the threshold value of 0.50. At the same time, these values are higher than the values of the correlation coefficients found in the relevant column.

Discriminant validity is a measure of the degree to which a structure contained in measurement models differs from other structures. The value of AVE must be calculated to determine the validity of scale discriminant for each dimension. The acceptable threshold value of AVE is greater than 0.50. For discriminant validity, it is also expected that these values will be greater than correlation coefficients with other dimensions by regarding the square root of AVE values for each dimension in the dataset. It has decomposition validity for each dimension of the scales used in this case. Another value used to calculate scale reliability for each dimension is CR coefficient. The fact that this value is above 0.70 indicates that combined

reliability is ensured (Fornell & Larcker, 1981; Civelek, 2017).

Standardized regression weights for behavioural intention scale are specified in Table 9. Considering coefficients and probability values of 9 sub-dimensions related to the implicit variable of intention, attitude ($\beta=0.971$, $p<0.000$), social influence ($\beta=0.980$, $p<0.000$), religious sensitivity ($\beta=0.991$, $p<0.000$), experience ($\beta=0.924$, $p<0.000$), accuracy ($\beta=0.997$, $p<0.000$), awareness ($\beta=0.732$, $p<0.000$), trust ($\beta=0.964$, $p<0.000$), benevolence ($\beta=1.016$, $p<0.000$) and cost ($\beta=0.709$, $p<0.000$) factors all affect customer intention in a positive way.

Table 8

Descriptive Statistics, Correlation Coefficients, Reliability and Decomposition Validity Results

	Av.	Std. Dev.	1 ATT	2 SOI	3 REL	4 EXP	5 ACC	6 AWA	7 TRU	8 BEN	9 COS
Dim. 1	3.78	0.49	(0.724)								
Dim. 2	3.62	0.80	.393**	(0.737)							
Dim. 3	3.68	0.78	.482**	.457**	(0.707)						
Dim. 4	3.74	0.67	.491*	.417**	.397*	(0.718)					
Dim. 5	3.63	0.87	.424**	.494*	.457**	.501*	(0.736)				
Dim. 6	3.33	0.62	.412**	.485**	.412*	.444**	.454**	(0.721)			
Dim. 7	3.70	0.81	.358**	.501**	.478**	.460**	.479**	.357**	(0.709)		
Dim. 8	3.72	0.79	.463*	.346**	.348**	.405*	.501**	.459**	.390**	(0.732)	
Dim. 9	3.67	0.93	.458**	.499*	.428**	.464**	.426**	.455**	.413**	.528**	(0.712)
Cronbach's Alpha			0.843	0.781	0.813	0.854	0.822	0.706	0.799	0.792	0.831
CR			0.826	0.702	0.799	0.808	0.779	0.681	0.752	0.695	0.673
AVE			0.525	0.544	0.500	0.516	0.542	0.521	0.503	0.536	0.508

* : $p<0.01$ ** : $p<0.05$ Note: Cross values stated in parentheses refer to square root values of AVE.

The following authors have discovered significant results on behavioural intention in studies on the subject: Taib et al. (2008) and Amin et al. (2011) in aspects of attitude and social influence; Sun et al. (2011), Voon et al. (2011), Rehman & Masood (2012), Ramdhony (2013) and Magd & McCoy (2014) in the dimension of religious sensitivity; Zainuddin et al. (2004) and Hassan et al. (2012) in the dimension of experience; Morgan & Hunt (1994) and McKnight & Chervany (2002) in the dimension of accuracy; Doney & Cannon (1997), Jarvenpaa et al. (2000), Sun et al. (2011) and Voon et al. (2011) in the dimension of trust; Morgan & Hunt (1994) in the dimension of benevolence; Abdullah & Dusuki (2006) and Olson & Zoubi (2008) in the dimension of cost. The findings obtained in this study coincide with the results of the studies expressed in the literature.

Table 9

Standardized Regression Weights of Structural Regression Model for Behavioural Intention Scale

Factor Dimensions	Code	Intention	β	P	
Attitude	ATT	<---	INT	0.971*	0.000
Social Influence	SOI	<---	INT	0.980*	0.000
Religious	REL	<---	INT	0.991*	0.000
Experience	EXP	<---	INT	0.924*	0.000

Accuracy	ACC	<---	INT	0.997*	0.000
Awareness	AWA	<---	INT	0.732*	0.000
Factor Dimensions	Code		Intention	β	P
Trust	TRU	<---	INT	0.964*	0.000
Benevolence	BEN	<---	INT	1.016*	0.000
Cost	COS	<---	INT	0.709*	0.000

*: $p < 0,01$ significant.

As a result of the analysis conducted in the study, all of the hypotheses (H₁, H₂, H₃, H₄, H₅, H₆, H₇, H₈ and H₉) have been accepted statistically. In this context, it has been found that the benevolence dimension can explain the scale of behavioural intention at 1.016%; attitude, social influence, religious sensitivity, accuracy and confidence can explain it at 95% and the experience dimension can explain it at over 90%. The cost and awareness dimensions explain more than 70% of behavioural intention.

Discussion and Conclusion

As of the end of 2020, the practice of participation banking in Turkey, which has completed its thirty-seventh year, continues to become more widespread and institutionalized day by day. Increasing the share of PBs in the total banking sector depends taking market share from other banks. Therefore, PBs are expected to further increase their competitiveness with other banks. It is necessary to determine the behavioural aspects and tendencies of customers who prefer these banks, apart from new financing products such as digital banking, sukuk, investment agency accounts, and commodity sales offered by PBs using new technology. This is the main purpose of this study.

In the behavioural intention scale analysed in line with the purpose stated above, it is determined that 9 factors included in the model as a sub-dimension have a positive effect on intention, and among them, the benevolence factor affects behavioural intention the most. Another key finding is that religious sensitivity plays a decisive role in behavioural intention when individual customers prefer PBs. In addition, the findings show that customers are affected by their personal attitudes and the views of those in their immediate environment. Besides these definitions, it is determined that advertisements in traditional media (television, radio and newspaper) and social media (Facebook, Twitter and Instagram) have a statistically positive effect on the behaviour of individual customers. On the other hand, while individual customers prefer PBs, the image and reputation of banks in society has been determined to have an impact on the decision to be made. Another important finding is that TRA factors developed by Fishbein & Ajzen (1975), which emphasize the significance of individuals' attitudes in transforming thought to actual behaviour, have been verified in this study for Turkey. In the study of Erol & Al-Bdour (1989), which is identified as the first research on the subject, the authors have found that respondents in Jordan are not affected by the religious sensitivity factor, while they prefer interest-free banks. However, in this study, it is revealed

that the religious factor is an effective factor when transforming respondents' thoughts into actual behaviour. In other words, this factor explains 99% of behavioural intention.

On the survey form, individual customers are asked, "what is the key factor in your preference for PBs?" Customers are generally interested in interest sensitivity, environment (family, friends, etc.), the proposal, salary account, fast banking transactions, low cost (no commission in various banking transactions such as money transfer, EFT and account operating fee), and that bank staff behave respectfully, friendly and sincerely. Responses to the open-ended question support the results obtained from the analysis.

Consequently, it is noted that the interest-free finance system appeals not only to Muslim societies but also to all people within the framework of commercial ethics, fairness, justice and productivity in the globalized and digitalized world order in the 21st century. Authorized policy makers should take into account the expectations, opinions and suggestions of customers who prefer PBs (in other words, the attitudes and behaviours of this type of banking customer) in order to diversify the services offered by PBs, improve their qualifications and increase their share in the total banking sector to 15% or higher within the scope of the vision for 2025. In this context, PBs, especially in banking transactions that require costs (commission, money transfer fee, etc.) should take appropriate steps by paying more attention to the elements. In other respects, increasing the number of PB branches and locating them close to companies, especially in industrial-intensive areas, may provide more customer potential for PBs. Additionally, it would be beneficial to explain the banking services offered, particularly the functioning of the participation banking system and its differences from other banks, through seminars/workshops to be held frequently in order to gain a higher share of the sector.

The findings obtained from the analyses conducted in this study are limited to the opinions of the respondents. The limitation of the study is its collection of data from individual PB customers at the level of the 12 TURKSTAT regions. In this regard, the study is among the few studies in the field. In future studies, different dimensions that might have an impact on behavioural intent could be investigated in different cultures. The behavioural intention scale, on the other hand, could be tested on customers who prefer other types of bank activity.

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RESEARCH ARTICLE

Integrating the Theory of Constraints and Six Sigma: Process Improvement Implementation

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Abstract

Businesses apply many management philosophies aiming to manage processes effectively, eliminate bottlenecks and improve their process performance. The most important of these philosophies are the Theory of Constraints and the Six Sigma. These are used separately in process improvement and performance enhancement in many businesses. Recently, an integration model approach of two philosophies has been examined in the literature in an effort to reduce their weaknesses and increase their strong effects. In the literature, three different approaches are identified for the integration model of Theory of Constraints and Six Sigma. In this study, the integration model of Jin, Abdul-Razzak, Elkassabgi, Zhou, & Herrera, (2009) was applied in an industrial enterprise in order to identify and eliminate the root causes of the decline in sales figures. It has been revealed that the integration model can help to identify and eliminate these root causes and how it benefits the business. As a result of the application, an improvement in production cost by 1.56% and 3.55% and an increase in σ value from 1.4 to 2.3 were determined. With this model, constraints in the production process were determined, managed and eliminated.

Keywords

Theory of Constraints, Six Sigma, Integration Model, Power Cable Production

Introduction

On the basis of protecting their assets and to ensure continuity, companies should manage their processes effectively, eliminate bottlenecks and improve their process performance. In order to perform those actions, they apply many management philosophies. One of them is the Theory of Constraints (TOC), which Goldratt mentioned in his book “Goal” written in 1984, and another is the Six Sigma (6σ) philosophy developed by Motorola in the 1980s. The popularity of these concepts continues in today’s business world and literature.

The purpose of the TOC is to increase the capacity of the whole system with the purpose of reaching businesses’ goals and targets now and in the future. It has been seen that studies

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in the literature about the TOC are conceptual, the application of TOC principles to different theoretical problems, the comparison of TOC philosophy with different systems and TOC applications (Rahman, 1998). The TOC has been applied to many fields; the manufacturing sector (Ünal, Tanış & Küçükşavaş, 2005; Demircioğlu & Akkaya, 2016; Wolniak, Skotnicka-Zasadzien, & Zasadzien, 2018; Urban & Rogowska, 2018; Rojas, Jurado, & Londono, 2018; Sorkun, 2018; Urban, 2019; Garza, et al., 2019; Akçimen & Antmen, 2019; Aiastui, Perez de Eulate, & Guisasola, 2020; Al-Fasfus, Hamza, & Elkotayni, 2020; Karakoç & Şık, 2021; Mahdi, Abboud & Hussain, 2021), the service sector (Taştan & Demircioğlu, 2015; Akbulut & Ertan, 2015; Ayanoğlu & Şakar, 2015; Yükcü & Yüksel, 2015; Escobar, Vega, & Zamora, 2016; Grida & Zeid, 2019), supply chains (Harish, 2019; Kelly & Germain, 2020; Huang, Lu & Dang, 2021), project management (Mishra, 2020; Sarkar, Jha & Patel, 2021), product mix decisions (Ünal et al., 2005; Kaygusuz, 2005; Mehdizadeh & Jalili, 2018) and human resources management (Tekin & Şahin, 2014; Alghaithi & Sartawi, 2020).

6 σ is a systematic approach that aims to increase business profitability, performance, production and customer satisfaction, as well as to reduce the operational costs of the business. The studies about 6 σ are classified within the framework of descriptive, experimental, conceptual and literature review (Nonthaleerak & Hendry, 2006; Ninerola, Rebull & Lara, 2021). The method is described in the literature on the manufacturing sector (Koch, Yang, & Gu, 2004; Erdiller & Orbak, 2005; Hsu, Pearn, & Wu, 2008; Boangmanalu, Abigail, Sembiring, & Tampubolon, 2020; Sithole & Nyembwe, 2020; Rebull, et al., 2020) and service sector (Dakhil, 2019; Stanivuk, et al., 2020; Abid, et al., 2020; Ali, 2020) applications; in the context of its relationship with Total Quality Management (TQM) (Yang, 2004; Çalışkan, 2006; Bircan & Köse, 2012; Elmacı, Uslu, & Tutkavul, 2013) and lean (Edgeman & Bigio, 2004; Turan & Turan, 2019; Ikumapayi, et al., 2020; Gholami, et al., 2021; Costa, et al., 2021); it is also seen that it is the subject in conceptual and descriptive frameworks (Pyzdek, 2000; Rasis, Gitlow, & Popovic, 2002; Rowlands, 2003; Coronado & Antony, 2004; Antony, 2004; Ülgen, 2014; Uluskan, 2017). According to Kwalk & Anbari (2006) 6 σ includes the combination of five methods; TQM or continuous quality improvement, customer focus, multiple analysis methods, financial performance and project management (Lee & Chang, 2012, p.453).

Both methods have similar and also different aspects (Table 1). The TOC deals with the methods, procedures and paradigms that are interfering with the processes, rather than concentrating on the technical constraints which 6 σ is better at detecting in the processes (Lee & Chang, 2012, p.454). While 6 σ deals with technical issues with quantitative tools, the TOC tries to find solutions with more qualitative analysis. While 6 σ is located in the chain between supplier and customer in the system, the TOC is mostly located between the whole system and the weakest link which has the most limited capacity in the system. While the value approach of 6 σ is meeting the demands and expectations of the customer, the TOC's value approach is mostly based on the use of the constraints in the system with the aim of being be-

neficial at the highest level. By taking into account both theories’ fundamental assumptions, implementation steps, effects on the organization and shortcomings, Nave (2002) emphasizes that if the organization focuses on minimizing fluctuation and standardizing process outputs, it should concentrate on 6σ; if it focuses on constraints and increasing the level of output, it should concentrate on TOC.

Table 1
Comparisons of TOC and 6σ

	6σ	TOC
Aim	Minimizing fluctuations	Managing constraints
Implementation Plan	1. Define 2. Measure 3. Analyze 4. Improve 5. Control	1. Identify the constraint 2. Exploit the constraint 3. Subordinate to the constraint 4. Elevate the constraint 5. Back to step 1
Focus point	Problem oriented	Constraint oriented
Assumptions	There is a problem. Numerical valuations are available. If fluctuations are minimized, the output level would increase.	Emphasis on production speed and throughput. Existing systems are applied. All processes are independent from each other.
First Impact	Output quantity standardize	Quick output
Secondary Impact	Lower improvidence. Quick output. Lower level of stock. Performance measurement for managers. Improved quality.	Lower improvidence. Lower level of stock. Output cost accounting. Performance measurement system. Improved quality.
Reviews	The relationship of systems with each other is ignored. Processes develop independently.	Minimum employee input and contribution. Data analysis has not been evaluated.

Ref: (Nave, 2002, p.77)

Conceptual Framework

The Theory of Constraints and Six Sigma Integration Model

Although the TOC and 6σ are different philosophies, many businesses can use both of them as their method of finding solutions. Some managers are aiming to speed up the workflow and minimize fluctuations that can be seen in output by combining those two philosophies. In the literature three different integration models have been identified.

The Jin et al. (2009) Integration Model: The Fundament of this model is; while 6σ creates in-depth solutions for complex problems the TOC identifies bottlenecks in the system and tries to eliminate them. This method is recommended for businesses which do not have enough budget to apply the 6σ method in cases where removing the constraint determined in the next processes will not provide a meaningful improvement. The best solution is the application of the 6σ at the point where the capacity shrinks and bottleneck occurs in a facility. In this model, the implementation plans of both philosophies are applied separately and then combined using these steps (Figure 1).

Identify the constraint; here is the first step where we reach the basic problem by using Thinking Process (TP) tools and analyzing its impact on the organization. Workflow charts and value flow maps are used to determine system constraints.

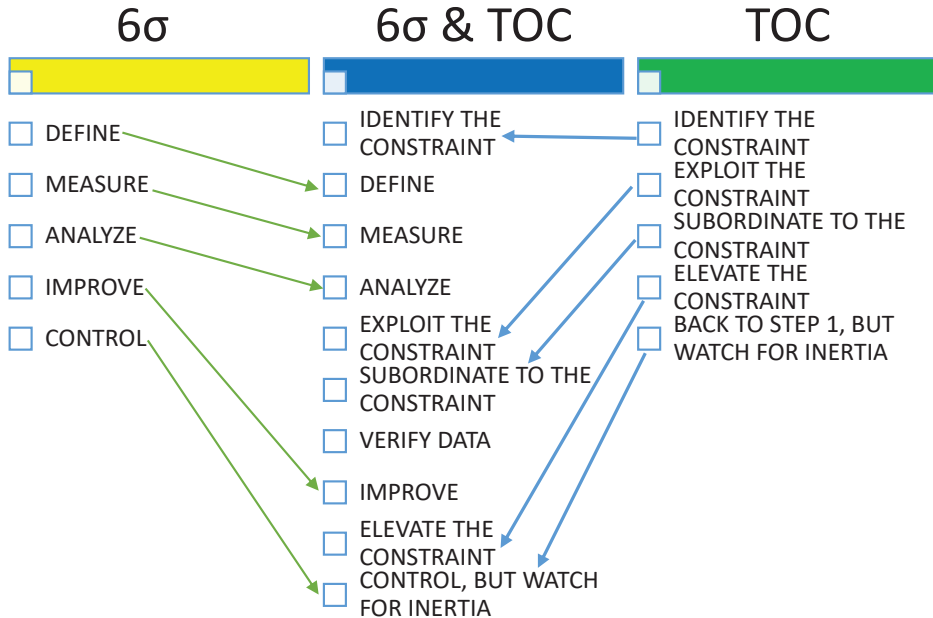


Figure 1. Jin et al. Integration Model
 Ref: (Jin, et al., 2009, s.87)

Define; this is the starting point of 6σ. Due to the limited budget, only the most obvious Critical Quality Characteristics (CTQ) are taken into account. CTQ's are parameters that define internal and external customers' demands and preferences.

Measure; this is the step where to define the chosen CTQ's after constraints. Defined criteria should be understandable by all business personnel. Histogram, Pareto Analysis, Quality Control Charts are the most common statistical tools in this step.

Analyze; this step covers all activities to find the root cause of CTQ's. The importance of this step is to find a solution to the problem to be developed in the next steps. Workflow charts, fish-bone diagram, failure mode and effect analysis (FMEA) and regression analysis can be used.

Exploit the constraint; at this stage we go back to the constraint and try to maximize the usage of it. Due to having different type of constraints, different tools can be used in this stage.

Subordinate to the constraint; in here, all processes are designed according to the constraint. It is attempted to reduce the workload in front of the bottlenecks. Value flowcharts or drum-buffer-rope methods can be used.

Verify data; with the object of achieving improvement, we should verify data. We should verify whether there have been any changes in the CTQs in the previous stages when the constraint was managed and the system was designed according to the constraint.

Improvement; at this stage, it is attempted to make the most appropriate improvement by using a Design of Experiment (DOE) application. DOE tries to reveal relationships between inputs and outputs in production processes by using statistical tools and mathematical models.

Elevate the constraint; aiming to increase workforce or to make processes more effective, necessary investments are done.

Control, Back to Stage 1; this step is necessary for continuous improvement. To observe the progress, team members should constantly monitor results. When a new constraint is detected, the model is restarted.

Ehie and Sheu (2005) Integration Model: According to Ehie and Sheu (2005), there are three advantages of integrating the TOC and the 6σ ;

- Constraints are analyzed, measured and controlled by using statistical methods. With this approach, problems and decisions are understood by the whole organization.

- The fact that the bottleneck is the first point to be analyzed will result in a greater financial gain.

- 6σ gets support from the TOC in order to be adopted to the whole system.

From the point of view of this integration model; the TOC serves as a framework for continuous improvement while the 6σ helps to implement changes by providing specific statistical tools and engineering techniques.

Lee and Chang (2012) Integration Model: By examining the TOC, the 6σ and root cause analysis (RCA) comparatively, Lee and Chang (2012) investigated the specified strengths and weaknesses of these methods can complement each other.

In this model, the TOC defines constraints and outputs by acting as a framework and with 6σ , specific processes are defined by using statistical tools and techniques for development. With RCA, in an attempt to find root causes of the problems that occur in the processes, necessary methods were provided for the project team by brainstorming.

Application of the TOC and 6σ Integration Model

Purpose of the Application

In the literature review, it has been determined that the TOC and 6σ are applied separately in many production facilities. On the other hand, there are not enough studies on the integration

model application. One of the purposes of this study is to be among the few sources in the literature on a similar subject and to contribute to it. The main purpose of this application is; to determine the solutions following the application steps of the TOC and 6σ integration model and the implementation of the solution into the low performance that occurs during the production steps. This application was performed in one of the biggest power cable manufacturers called XYZ A.Ş. which was established in the 1970s and operates 3 shifts a day with 200 employees. It exports approximately 80% of all its production to Europe and the Middle-East.

Definition of the Problem

The Medium voltage (MV) product group is used mainly in construction and infrastructure projects. It is the product group that gives the fastest response to the growth of the construction sector. According to the construction turnover index of the Turkish Statistical Institute (TÜİK), taken from the database of between 2017 and 2019 when the export figures were examined¹, it was found that there was a significant increase in this period. It is expected that an increase in sales of this MV product group in both the domestic and export markets between 2017 and 2019. However, MV cable sales of the company were 45% of total sales in 2017, and it decreased to 35% and 20% in 2018 and 2019 respectively. Although the production capacity for MV products was sufficient to reach the targeted sales figures, it could not be achieved due to the competition. XYZ A.Ş. aims to increase its sales figures in this group for 2020 and beyond. In line with this goal, it is aimed to determine whether there is any constraint in the MV production process, to analyze it, to design the process according to the constraint and to make the necessary improvement studies.

Integration Model Application

Among the integration models identified in the literature review, The Jin et al. (2009) TOC and 6σ integration model and its implementation steps will be used for the improvement. The reason for choosing this model is that the application steps are more detailed compared to the other two models and the MV production process, which is planned to be improved, consists of different process. The company would like to use this model because it does not have enough budget to apply 6σ in the situation where removing the constraint cannot provide a meaningful improvement.

Identify the Constraint

In order to define basic problem and examine its effect on the process, TOC's TP tolls were used. A project team consisting of a Sales Manager, an MV Line production Supervisor, a Quality Control (QC) Manager and a Factory Plant Manager was formed to determine the reasons for this decrease. The main reasons have been defined by the team as follows;

1 Export Amount (kg) / Amount (USD) ; (2017) 7,734,647 kg / 38,581,829 USD, (2018) 6,314,111 kg / 34,801,573 USD, (2019) 11,149,647 kg / 50,332,063 USD (Reference; TUIK, <https://iz.tuik.gov.tr/#/showcase/>)

- Not being able to meet the expectations of customers in the sales price of the product and not being able to compete with the prices offered by other manufacturers,
- Failing to meet the quality expectations of the customers,
- Inability to deliver products on time.

Between 2017 and 2019, it was determined that, a total of 62 customer complaints were received from external customers and none of them were related to the MV product group. In the same period, during the general inspection carried out by international quality organizations, none of the non-conformity was received for the same product group. Capacity occupancy rates of the MV production line were; 2017 - 31.60%, 2018 - 38.90%, 2019 - 29.40%. In the light of these data and information, we can generalize that the main reason for the decrease in sales should be the failing to meet customer expectations in the sales price and the inability to compete with prices offered by other manufacturers.

According to the data obtained from the sales manager; the costs of MV products consist of a raw material cost (94-95%), a labor cost and electricity expenses (4-5%) and general expenses (1%). Therefore, it has been decided to define high total production expenses including raw materials and production process as a constraint. Aiming to compete with product sales prices, necessary improvements should be made to reduce these costs.

To examine this constraint and to reach to the root causes of these effects, one of the TP tools Current Reality Tree (CRT) was used. After meeting with the MV production line supervisor, employees and the QC Manager, low production speed, high raw material costs, the long length of the pre-production preparation period and a high scrap amount per unit, have been identified as effects that increase the production cost. A CRT was formed by analyzing the effect-cause-effect relationship of those effects (Figure 2). The root causes were identified as follows;

- The MV production line is not suitable for alternative production technologies.
- There is no Gravimetric Dosing (GD) technology.
- The end product variety is high.

Since MV products are used in different environmental conditions, different projects and applications, many different types of cable have to be produced. Hence, we can say that the high end product variety of MV product groups are natural to it. When CRT is examined, it is seen that since the amount of raw material used cannot be determined it takes time to adjust the insulation thickness which increases the production preparation time and decreases the production speed. Considering the constraint concept, the adjustment of insulation thickness process has been defined as a bottleneck. Since the raw material amount can be adjusted

easily with GD technology, this bottleneck will be improved. Again, with the same GD technology, different types of products can be used. Thanks to this technology, raw materials can be controlled at every stage of production, and production costs can be reduced by using alternative raw materials. As a conclusion, not having GD technology is considered a constraint.

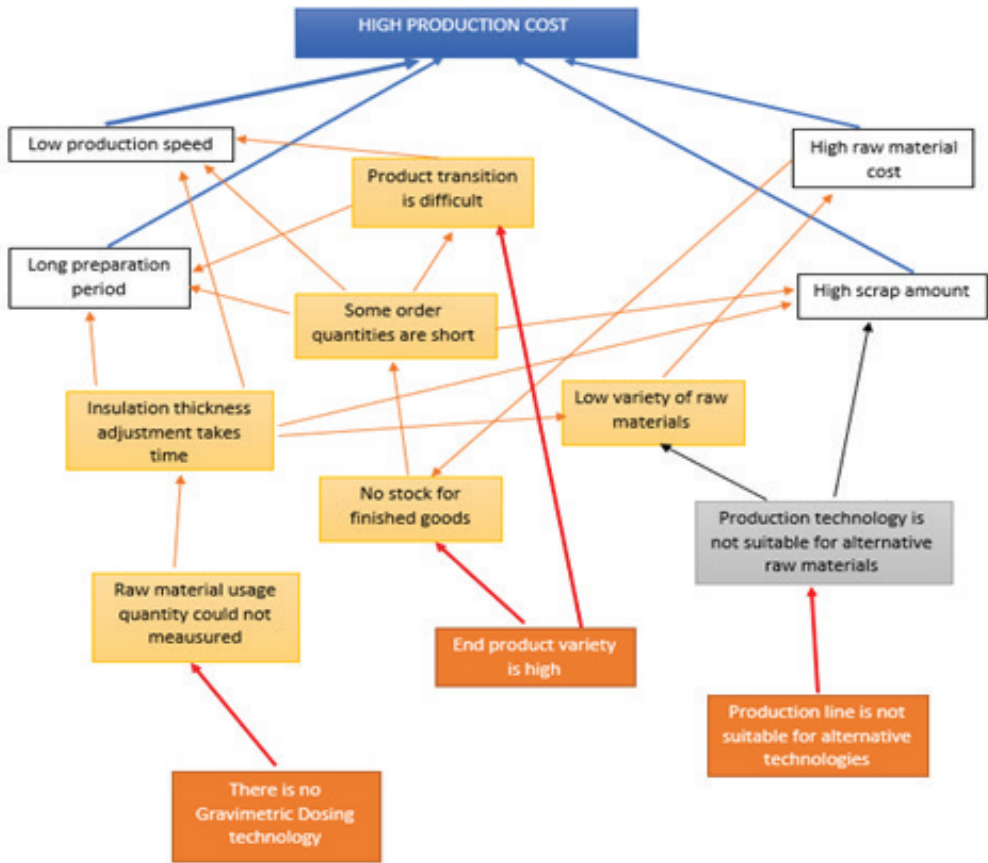


Figure 2. Current Reality Tree

Define

In this stage, where the starting point of 6σ, CTQ's will be determined and the most critical ones will be selected. A SIPOC (Supplier-Input-Process-Output-Customer) map was used to make a more detailed description of CTQs (Table 2). With the help of the SIPOC map, customers who are involved in every step of the processes will be listed and critical CTQs can be determined. For this, “voice of the customer” (VOC) analysis will be used (Table 3).

Table 2
SIPOC Map

SUPPLIER	INPUT	PROCESS	OUTPUT	CUSTOMER
Quality Control (QC)	QC approved conductor	<i>Starting point of Insulation</i>	Conductor	MV operator
Semi Conductive Granule Input	Semi Conductive Granule	<i>Insulation Process</i>	Insulated core	QC, Screening Operator
Insulation Material Supplier	XLPE material			
MV operator	Insulated Core	<i>QC</i>	QC approved insulated core	Screening Operator
QC	QC approved insulated core	<i>Starting point of Screening</i>	Insulated core ready for screening	Screening Operator
Copper tape supplier	Insulated core ready for screening	<i>Screening</i>	Screened core	Jacketing line operator
Copper wire plant	Copper tape Copper wire			
Screening operator	Screened core	<i>Starting point of Jacketing</i>	Screened core ready for jacketing	Jacketing line operator
PE, HDPE supplier PVC plant	PE, HDPE Granule PVC Granule	<i>Jacketing Process</i>	Cable	QC, Packing/Delivery operator
Jacketing line operator	Cable	<i>QC</i>	QC Approved Cable	Packing/Delivery Operator
Packing/Delivery Operator	QC Approved Cable	<i>Delivery</i>	Packed Cable	External Customer

With the intention of doing a VOC analysis, one-on-one interviews were made with customers defined on the SIPOC map. Their expectations and demands regarding the product or product features were listed. Hence, we are focusing on the insulation process of MV production, we listed down related customers and their CTQs related to this process only.

Measurement and Analysis

So as to determine the reasons for the decrease in sales, MV proposals that did not turn into sales orders between 2017 and 2019 were analyzed. It was determined that 606 requests did not turn into orders in that time. The dominant cause is to be determined by Pareto Analysis. All correspondence between the sales representatives and customers were checked. The reasons were; the price offered was too high (57%), the order quantity was not sufficient for the production (25%), the production line was not sufficient for the order (9%), other items in the project (order) could not be produced (6%), could not meet the delivery time requirements (3%) (Figure 3). As seen in the analysis, the reasons why offers do not turn into orders are high prices and insufficient quantity.

Table 3
 VOCs and related CTQs

Customer	VOC	CTQ
QC	-Conductor specifications should be consistent with international standards	-Conductor resistance and weight values should be consistent with QC charts and production parameters
	-Insulation thickness and mechanical properties should be consistent with international standards	-Insulation thickness and mechanical properties should comply with standards
MV Line operator	-Conductor should be suitable for insulation	-Surface of conductor should be smooth and round
	-Insulation and semi conductive granules should be suitable with line	-All those granules should be suitable to run the line at maximum capacity and speed. And they should be cleaned from the extrusion lines after the production easily
	-Single type and brand material should not be used	-To apply alternative production techniques, different type of raw materials which can be easily cleaned should be available
	- Quantity of raw material that used at the beginning stage of the production should be easily measured	-Since the MV line is totally a closed line, insulation thickness could not be measured. With GD system, thickness could be easily measured and adjusted.
Screening Operator	-Insulated core should be suitable for screening	- Surface of the insulated core should be smooth and round
Customers that give MV orders (External Customer)	-Best price (lowest one) should be offered -Quality of product should be consistent with standards and parameters -Diameter of cable should be suitable for designed connectors and plugs. -Orders should be delivered on time	-Offered price must be the same or lower than other prices. It must be delivered on time. Cable should meet all quality norms.

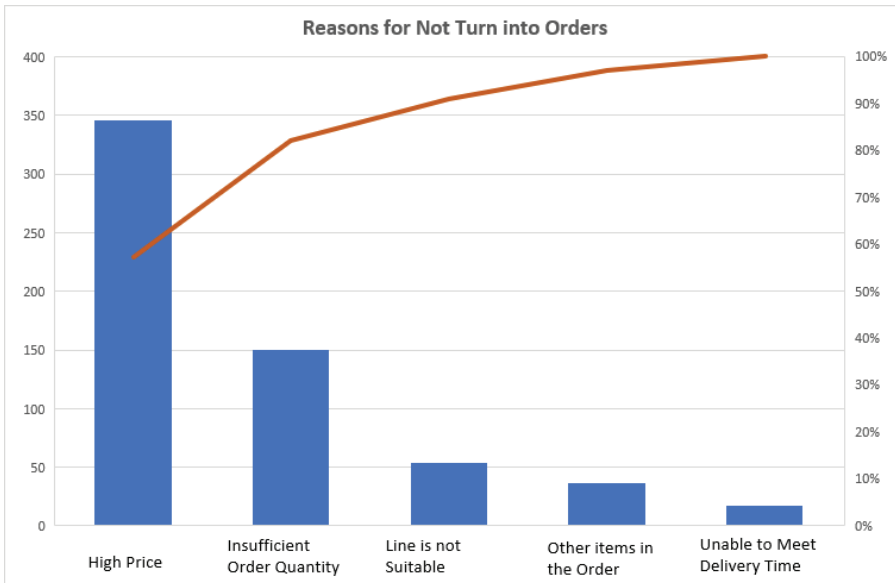


Figure 3. Pareto Analysis

At this stage, it was attempted to determine the root cause of the high prices by the project team by using a cause – effect diagram (Figure 4). Raw material, labour and energy costs were determined as sub-elements of the product cost. The usage of a single type of material constitutes an obstacle in achieving the targets of an increasing production speed or decreasing the scrap amount and production cost of the enterprise. The reason that was defined in the labour cost was the fact that the inability to control the raw material amount during the production, has a direct effect on production cost.

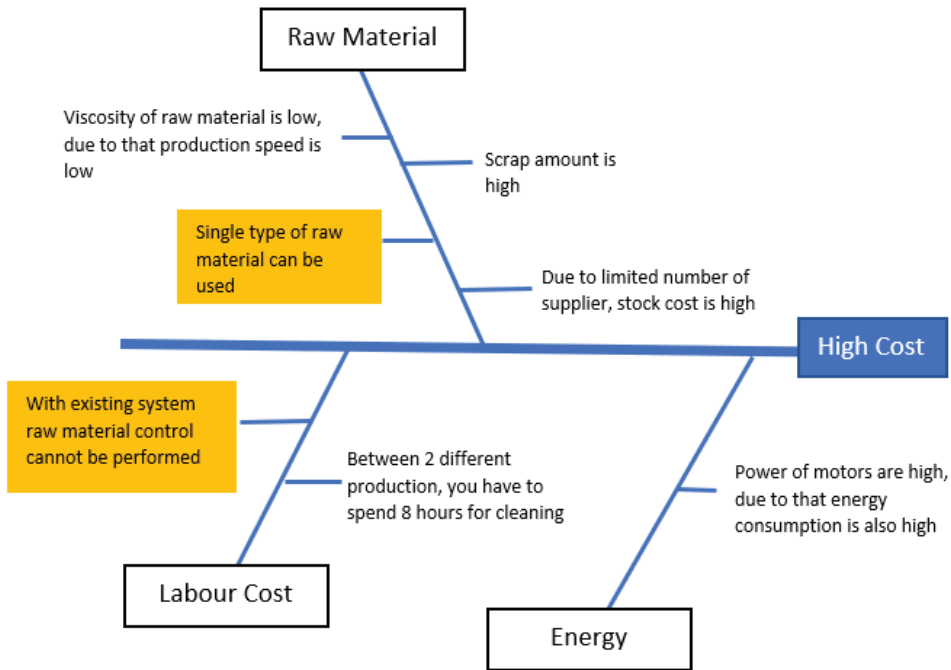


Figure 4. Cause – effect diagram

Exploit and Subordinate to the Constraint

Defined constraint is a physical constraint. By using a GD system, the thickness of cross-linked polyethylene which forms the insulating layer of cable, will be accurately and consistently controlled during the production. In this way, we prevent excessive usage of material and unnecessary cost increase.

At this stage we examined the cost increase caused by the inability to control the material. We selected copper conductor, 30 kV cable (Cu30kV) which constitutes 33% of the entire MV business of the company in 2019. The cost of raw materials were defined with the reference value of international standards related to this cable and the cost of raw materials as per recorded in the accounting data base (Table 4).

Table 4

Raw Material Quantities and Costs determined in cable design /Cu30kV

Raw Material	Thickness (mm)	Quantity (kg/km)	Unit Cost (USD/kg)	Total Cost (USD/km)	Ratio in Total Cost (%)
Copper		2,650	6.25	16,562.5	82.5
Semi Cond.	1.05	120	2.10	252	1.3
XLPE	8.00	699	1.95	1,363.1	6.8
Semi Cond. Tape		14	5.97	83.6	0.4
Copper Screen		225	6.35	1,428.8	7.1
Non-Cond. Tape		11	5.57	61.3	0.3
Jacketing		335	0.95	318.3	1.6
TOTAL		4,054		20,070	

A flowchart of 8 km Cu30kV cable production was collected from an ERP programme that the company use (Table 5). In this chart, the line speed and quantity of the production were detailed. After this production, a sample was taken from the production and insulation layers and they were measured. According to this measurement, the usage of raw materials was calculated (Table 6).

Table 5

Flowchart of the Production (Cu30kV 8x1, 000 m)

Process	Date	Hour	Line Speed (m/min)	Quantity (meters)
<i>Starting point of MV production (Adjustment of thickness)</i>	11.11.2019	8:35	3	198
<i>Adjustment completed</i>		9:41		
<i>Full Speed Production</i>	11.11.2019	09:42 - 5:59	3.9	1,470
<i>Full Speed Production</i>	11.11.2019	16:00 - 3:59	3.9	1,868
<i>Full Speed Production</i>	12.11.2019	00:00 - 7:59	4.35	2,084
<i>Full Speed Production</i>	12.11.2019	08:00 - 5:59	4.35	2,084
<i>Full Speed Production</i>	12.11.2019	16:00 - 7:40	3.77	376

During routine controls on each MV production process, it was determined that all production parameters were consistent with design parameters. However, due to the reason of the semiconductive and insulation layer being thicker than the design parameter, the cable diameter was increased. In this case the usage of other raw materials was increased.

Table 6

Consumption of Raw Materials /8 km (Cu30kV)

Raw Material	Thickness (mm)	Consumption (kg/km)
Copper		21,413
Semi Cond.	1.14	1,021
XLPE	9.08	6,656
Semi Cond. Tape		117
Copper Screen		1,821
Non-Cond. Tape		95
Jacketing		2,843
TOTAL		33,966

The quantity of raw materials between actual value and quantity that should be used according to design parameters were compared (Table 7). According to this comparison there is a 3.6% weight difference between the actual value and the design value. With the same unit costs for each raw material, the total cost of Cu30kV product were calculated and compared with the design cost. The Production cost was determined to be 20,351.48 USD/km which is 1.4% more expensive than the design cost calculated previously (20,070 USD/km).

Considering the 4% profit margin for the MV product group foreseen by the company, a 1.4% improvement in raw material costs will provide a good advantage. In light of the information obtained from production workflow chart for 8 km (Table 5), the average line speed for the total production, including the adjustment stage for the thickness, was calculated as 4.10 m/min.

Table 7

Weight Differences of Raw Materials between Design and Production (Cu30kV)

Raw Material	Design (Quantity kg/km)	Production (Quantity kg/km)	D / P %
Copper	2,650	2,650	0
Semi Cond.	120	126.36	5.3
XLPE	699	823.76	17.8
Semi Cond. Tape	14	14.48	3.4
Copper Screen	225	225.37	0.1
Non-Cond. Tape	11	11.75	6.8
Jacketing	335	351.85	5
TOTAL	4,054	4,203.57	3.6

According to the information obtained from the production managers, in cases where there is additional time spend for adjustment, Cu30kV product can be produced at 4.35 m/min. With this information, by keeping the production account constant the actual and targeted man-hour information was calculated. In addition, the labour productivity rate was also calculated (Kahya & Karaböcek, 2020, p.3) (Table 8).

Table 8

Actual – Targeted man-hour information (Cu30kV)

	Q. of Production (m)- A	Avr. Speed (m/min)- B	Time(man.hour) A/B	Labour Productivity Rate (LPR)
Cu30kV (Production)	8,080	4.10	32.85	8,080/32.85= 245.96
Cu30kV (Target)	8,080	4.35	30.95	8,080/30.95= 261.07
				261.07/245.96 x 100= 6.14%

A 6.14% increase in productivity will reduce the labour and energy costs of the product. As the cost distribution information determined for the MV cables, and those improvements on raw material, labour and energy costs 1.4% and 6.14% respectively, gains from the expenses would reach 1.6% (Table 9).

Table 9

Gain from expenses (Cu30kV)

	<i>Raw Material Cost</i>	<i>Labour-Energy Cost</i>	<i>General Expenses</i>	<i>Total Cost</i>
Percentage in Total Cost (%)	94	5	1	
Unit Cost (USD/km)	20,351.48	1,082.53	216.50	21,650.51
Improvement Ratio (%)	1.4	6.14		
New Unit Cost (USD/km)	20,066.56	1,016.06	216.50	21,299.12
Average Improvement (%)				1.6

With the use of a GD system, alternative raw materials also can be used instead of XLPE. You can use base material (L1) and two additives (XA1 and XA2) for insulating material. The GD system supplier recommended new recipe for the new application. With this new formula, the cost of Cu30kV product was calculated again (Table 10).

In order to calculate new total cost with improved labour and energy cost which were calculated before, we use the new raw material cost (19,654 USD/km) as a base value (Table 11).

Table 10

Updated recipe and Raw Material Cost (Cu30kV)

<i>Raw Material</i>	<i>Thickness (mm)</i>	<i>Quantity (kg/km)</i>	<i>Unit Cost (USD/kg)</i>	<i>Total Cost (USD/km)</i>	<i>Ratio in Total Cost (%)</i>
Copper		2,650	6.25	16,562.5	84.27
Semi Cond.	1.05	120	2.10	252	1.2
L1		685	1.15	787.75	4.0
XA1	8.00	2	30.8	61.6	0.3
XA2		12	8.20	98.4	0.5
Semi Cond. Tape		14	5.97	83.6	0.4
Copper Screen		225	6.35	1,428.8	7.3
Non-Cond. Tape		11	5.57	61.3	0.3
Jacketing		335	0.95	318.3	1.7
TOTAL		4,054		19,654	

As a result, either with the use of existing raw materials and recipes to completely control the usage of raw material and production speed (thus achieving 1.6%), or with the use of new recipes and raw materials (thus achieving 3.55%) we can reduce our production cost. Hence, the usage of the new recipe provides a better result, it was preferred to commission this new system with the use of new raw materials.

Table 11

Updated cost (Cu30kV)

	<i>Raw Material</i>	<i>Labour-Energy</i>	<i>General Expenses</i>	<i>Total</i>
Percentage in Total Cost (%)	94	5	1	
Unit Cost (USD/km)	20,351.48	1,082.53	216.50	21,650.51
Improvement Ratio (%)	19,654	1,045.43	209.08	20,908.51
New Unit Cost (USD/km)				3.55

Verify Data

With the purpose of examining the effectiveness of the new system, affected CTQs and VOC's should be listed again (Table 12).

Table 12
CTQs after improvement

<i>CUSTOMER</i>	<i>VOC</i>	<i>CTQ</i>	<i>Improvement</i>
QC	-Insulation thickness and mechanical properties should be consistent with international standards	-Insulation thickness and mechanical properties should comply with standards	- Insulation thickness can be controlled in every layer with a GD system
MV Line Operator	- Insulation and semi conductive granules should be suitable with line	- All those granules should be suitable to run the line at maximum capacity and speed, and they should be cleaned from the extrusion lines after the production easily	- New raw materials which were adopted with a GD system were cost affective and could be easily cleaned and removed from the extrusions
	- Single type and brand material should not be used	- To apply alternative production techniques, different type of raw materials which can be easily cleaned should be available	
	-- Quantity of raw material that was used at the beginning stage of the production should be easily measured	- Since the MV line is totally a closed line, the insulation thickness could not be measured. With a GD system, thickness could be easily measured and adjusted.	
Customers that give MV orders (External Customer)	-Best price (the lowest one) should be offered -Quality of product should be consistent with standards and parameters -Diameter of cable should be suitable for designed connectors and plugs. -Orders should be delivered on time	-The Offered price must be the same or lower than other prices. It must be delivered on time. Cable should meet all quality norms.	-We can reach a 3.55% improvement on production cost. Thus we can reach prices that meet customers' expectations. -As the new production speed is faster, orders will be completed on time.

Improve and Elevate the Constraint

The GD supplier has made trials on the existing line to demonstrate the reliability and measurement accuracy of the system. The purpose of these trials are to determine the accuracy of material consumption and how the system interferes with the production line when there is a problem in material flow. At this stage Design of Experiment (DOE) was applied to examine the effects on output (Demir, 2004, p.7).

Raw materials L1, XA1 and XA2, are measured with GD and affect the process. In order to define numbers of a sufficient trial, factorial design (FD) will be used. Since raw materials whose effects we will examine are lower or higher than the basic recipe value, we can say that each factor (raw material) has two levels. In that case we can use 2^k FD. Here, “k” indicates

the number of factor, “2” indicates the number of levels. If factors are lower level than the prescription value, it will be shown as “-“, if it is high, it will be shown as “+”. Since the number of experiments is 2 and for factors 3, the number of trial is calculated as $2^3 = 8$.

In trials, the performance of the GD system was evaluated with; how long it takes to give a response for material flow increase or decrease by the system (the expectation is lower than 3 seconds), the line speed in the increase or decrease of the materials, the quality of the product and finally the cost of the product. For each experiment, 5 different, in total 40 trials were made separately, and the levels of raw materials used were determined by taking the arithmetic average of each trial result. The most suitable combination is, MV line speed (+), quality (+), cost (-) and in this combination, GD system responds to material changes less than 3 seconds. Above those 8 experiments, the 7th experiment was found to be the most appropriate one (Table 13).

Table 13
Effects of Factors in DOE

		<i>Trial 1</i>	<i>Trial 2</i>	<i>Trial 3</i>	<i>Trial 4</i>	<i>Trial 5</i>	<i>Trial 6</i>	<i>Trial 7</i>	<i>Trial 8</i>
<i>Raw Materials</i>	<i>L1</i>	+	+	+	+	-	-	-	-
	<i>XA1</i>	+	-	+	-	+	-	+	-
	<i>XA2</i>	+	+	-	-	+	+	-	-
	<i>GD respond (sn)</i>	2	2	2	1	2	2	1	1
<i>Assesment</i>	<i>Line Speed</i>	+	-	+	-	+	-	+	-
	<i>Quality</i>	+	-	+	-	+	-	+	-
	<i>Cost</i>	+	+	+	-	+	+	-	-

The total investment cost of the GD system is 111,920 USD. The profitability, continuity and reliability of investments should be evaluated by using economic analysis methods. The main analysis methods are the profitability index method, payback period method, net present value method and internal rate of return method (Saray, 2019, p. 36-39). Due to fragile economic conditions in Turkey, the company should choose the payback period method (PPM) which is a numerical period that shows how long it takes to recover the value spent for investment (Fizibilite info, 2020).

The estimated sales volume of the MV product group for 2020 has been determined as 13 million USD. If there is not any investment, considering the 4% profit margin, the cost of sales (=total sales / (1+profit margin)) was determined as 12.5 million USD. According to the cost distribution that specified above, the raw material cost would be (94%) 11.75 million USD, labor and the energy cost would be (5%) 0.625 million USD, general expenses would be (1%) 0.125 million USD. With the implementation of an integration model, it has been determined that with a GD system, we could save either 1.6% with the same recipe or 3.55% with a new recipe. Based on that information the average saving return is calculated as 318,656 USD.

According to the PPM formulation (Saray, 2019, p.37) the amount of investment would be covered in less than a year with the earnings to be made in 2020. For this reason, the company has decided to invest.

$$\text{Average Saving } (\bar{x}) = \frac{\sum \text{Unit Saving}}{n}$$

$$\text{Average Saving } (\bar{x}) = \frac{\sum (\text{Raw Material Cost} \times \% \text{ Improvement}) + (\text{Labour \& Energy Cost} \times \% \text{ Improvement})}{n}$$

$$PPM = \frac{\text{Amount of Investment}}{\text{Net yearly Earnings}} = \frac{111,920 \text{ USD}}{318,656 \text{ USD}} = 0.35 \text{ year}$$

Control and Identification of New Constraints

With the intention of checking the effectiveness of the GD system, several samples were selected from the actual production and raw material usage and the line speeds were checked. Cu45kV type of cable was selected. The production parameters and the cost of cables were analyzed (Table 14). According to examination, a 1.55% improvement has been achieved in the raw material cost and productivity increased by 2.56%.

Additionally, the “σ” levels are also calculated and compared considering the Cu45kV’s product cost differences with design cost before and after GD system. The company aims to have the product cost lower or at least equal to the design cost. Before the GD system, between 2018 and 2019, there were in total 18 lots of production, and in 2020 between February and August there were 9. The obtained product costs were listed and compared with the design cost (Table 15).

To calculate “σ” levels before and after the system, we can check defects per million opportunities (DPMO) number (DPMO= DPOx1, 000,000) (Table 16).

Table 14
Design and Production parameter of Cu45kV

	Raw Material	Thickness (mm)	Quantity (kg/km)	Unit Cost (USD/kg)	Total Cost (USD/km)	Speed (mt/min)
Design	Copper		3,380	6.15	20,787	3.12
	Semi Cond.	1.1	150	2.12	318	
	XLPE	12	1,291	1.85	2,388.4	
	Semi Cond. Tape		17	6.54	111.2	
	Copper Screen		776	6.27	4,865.5	
	Non-Cond. Tape		14	6.04	84.6	
	Jacketing		540	1.27	685.8	
	TOTAL		6,168		29,240.5	

	<i>Raw Material</i>	<i>Thickness (mm)</i>	<i>Quantity (kg/km)</i>	<i>Unit Cost (USD/kg)</i>	<i>Total Cost (USD/km)</i>	<i>Speed (mt/min)</i>
Production	Copper		3,380	6.15	20,787	3.20
	Semi Cond.	1.11	165	2.12	318	
	L1		1,274	1.19	1,516	
	XA1	12.05	4	8.6	34.4	
	XA2		22	17	374	
	Semi Cond. Tape		17	6.54	111.2	
	Copper Screen		777	6.27	4,872.8	
	Non-Cond. Tape		15	6.04	90.6	
	Jacketing		542	1.27	688.3	
	TOTAL		6,196		28,792.3	
Improvement Ratio					1.55%	2.56%

Table 15

Production costs before and after GD system (Cu45kV)

	Lot	Cost (USD)	Lot	Cost (USD)		Lot	Cost (USD)
Before GD	1	29,650.28	10	29,720.56	After GD	1	28,792.30*
	2	29,230.33*	11	29,230.22*		2	29,242.00
	3	29,927.55	12	29,980.33		3	28,695.65*
	4	29,190.68*	13	29,350.68		4	28,800.25*
	5	29,777.56	14	29,229.25*		5	29,257.33
	6	29,200.65*	15	29,331.21		6	28,720.16*
	7	30,000.58	16	29,220.65*		7	28,698.25*
	8	29,150.20*	17	29,550.28		8	28,820.90*
	9	29,210.80*	18	30,005.72		9	28,920.90*

Tablo 16

"σ" Level

σ	DPMO	σ	DPMO	σ	DPMO
6	3.4	2.5	158,665	1.4	539,828
5	233	2.3	211,855	1.3	579,260
4.5	1,350	2.2	241,964	1	691,462
4	6,210	2	308,538	0.5	841,345
3.5	22,750	1.8	382,089	0.3	884,930
3	66,807	1.5	500,000	0.1	919,243

Ref: (Sağlık Yönetimi 2019, 2020)

In order to calculate DPMO, defects per product (DPU= defective product quantity / total production) and the number of defects per opportunity (DPO=defective product quantity / [total production x number of defect opportunities per unit]) must be determined respectively (Eren B. , 2020). The amount of defective products has been determined as products that have a higher cost than the design cost. A number of defect opportunities is the sum of the features that are characterized as a production failure (Eren B. , 2020). In this process it is "1" where the cost of production is higher than design cost (Table 17).

Table 17

“σ” Level before and after GD System

	<i>DPU</i>	<i>DPO</i>	<i>DPMO</i>	<i>σ level</i>
Before GD	10 / 18= 0.555	10 / (18x1) = 0.555	0.555 x 1,000,000= 555,000	1.3 - 1.4
After GD	2 / 9= 0.222	2 / (9x1) = 0.222	0.222 x 1,000,000= 222,000	2.2 - 2.3

While “σ” value was between 1.3 and 1.4 before GD system applied, it then reached 2.2-2.3. As a result of this increase, we can say that after the commissioning of the system, there was an improvement on the process and the “σ” value was increased. In addition, during the discussions of management reviews held twice a year, the amount of scrap per MV production has started to decrease since the beginning of 2020. It was 20.74 meters on average per production in 2018, 19.64 meters in 2019 and finally decreased to 16.48 in 2020.

In parallel with the continuous improvement, the screening process which is the next step of the MV production process was reviewed. Screening is the process of applying semi conductive tapes, copper wires and copper tapes over the insulated conductor. According to production parameters and screening process records of Cu45kV, in every single kilometer of the production 58,000 meter 1.36 mm diameter copper wire and 1,000 meter of copper tape has to be used. At the screening machine, you have to use 160 mm small plastic reels. 1.36 mm copper wires are transferred from 630 mm diameter steel drums to those plastic reels. It takes 290 minutes to transfer 1.36 mm wires to 58 plastic spools which is necessary to start production.

According to the production records of 11 x 800 meter order Cu45kV, it was determined that it takes 140 minutes to screen an 800 meter drum (Table 18). Since 58 plastic spools are emptied at the end of 140 minutes, all new 58 spools will not be ready. It takes around 150 minutes to complete all 58 drums. In this case we can define the wire transfer process as a bottleneck of the screening process. KT and 6σ integration model should be reapplied to manage and eliminate this bottleneck.

Table 18

Screening process records (Cu45kV 11x800 m)

<i>Process</i>	<i>Date</i>	<i>Time</i>	<i>Line Speed</i>	<i>Production</i>
Screening process (Wire Transfer)	10.05.2020	10:40-15:30	100 m/min	58,000 m.*
Screening	10.05.2020	16:00-18:20	5.70 m/min	803 m.
Screening	10.05.2020	20:40-23:06	5.70 m/min	808 m.
Screening	11.05.2020	01:20-03:40	5.70 m/min	805 m.

*58.000 m. (Transfer of 1.36 mm copper wire to 58 plastic spool)

Conclusion

When the literature was reviewed, TOC and 6σ were used separately in process improvement. On the other hand, integration models of each philosophy were limited in the literature. In this study, the integration model of Jin et al. (2009) was reviewed and was applied in an industrial company. The company has a considerable role in low and medium voltage power

cable manufacturing business. The selected integration model was used to identify and eliminate the reason for the decrease in sales figures in the MV power cable group in the last three years. By applying the integration model, attempts were made to answer the following questions.

- What are the root causes of the decrease in sales figures of the MV product group?
- Whether the integration model of Jin et al. (2009) can help to identify and eliminate these root causes.
- How this elimination will benefit to the company.

In an effort to find an answer to the first question, MV production processes were detailed. Then, a project team consisting of managers from the factory determined that when aiming to offer a competitive sales price, high production costs needed to be reduced. First of all, CRT was used to determine root causes. Then, CTQ's were defined with the help of SIPOC map and VOC analysis. At the definition and analysis step of the integration model, a Pareto analysis and cause-effect diagrams were used. Parameters that cause an increase in the production cost were determined with the help of ERP program records. One of the root causes determined in CRT was "There is no GD system". As a result of analysis, it has been revealed that commissioning a GD system will provide an improvement of 1.56% to 3.55% in the production cost. The repayment period of the GD system investment also takes less than a year. It was also proved that the GD system was providing an improvement in production costs and an increase productivity from different production records. In addition, this system also had a positive effect in increasing the σ value of the Cu45kV production cost. It was raised from 1.3-1.4 σ to 2.2-2.3 σ after the installation of the GD system. At the end, new constraints were defined in the screening process which is the next step of the MV production process and implementation of Jin et al. (2009) integration model was completed.

Although a desired increase was not experienced in the sales figure of the MV product group due to the negative consequences of the Covid-19 pandemic experienced all over the world, profitability was increased compared to the previous years.

With this study, the TOC and 6σ integration model of which Jin et al. (2009) developed, was applied to the highly competitive and conservative energy cable manufacturing sector. This model requires the usage of detailed data and information. In this sector all enterprises have their own secrets and details. Due to that, the company requested that the name and some technical information be hidden during this study. Although the application of this model has provided a significant improvement for the company, it is thought that the gains are more than the specified numerical values. This model can also be applied to different process, such as the low voltage production or packing and delivery that have more general process parameters and might be the same for the same industries.

As a conclusion, the TOC and 6σ integration model can be applied to all businesses that want to review their processes and control their production costs and operate in the production or service sector. Thanks to this model, enterprises can make radical changes to their processes and increase their profitability levels above the sector averages that they are in.

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RESEARCH ARTICLE

Does Organizational Culture Impact on Firm Performance: Evidence From Turkey*

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Abstract

This paper aims to examine the impact of corporate culture over the financial performance of certain enterprises therewith by covering the data of chemical, petroleum, rubber and plastic products firms (XCHEMST) traded in Borsa Istanbul. In that regard, corporate culture data have been obtained from the surveys of the Denison's Organizational Culture Model (DOCM) employees and managers of these businesses while the financial data were gleaned from financial statements of the mentioned enterprises between 2012-2016. We posited the ROE as a dependent variable while ROA and DEBT EQUITY have been employed as explanatory financial variables. Accordingly, we have determined SIZE and AGE as firm-specific variables. Utilizing cross-sectional data and multiple linear regression models, we estimated the coefficients of the variables with the aid of an OLS estimator. In so doing, this paper provides sufficient empirical evidence that three out of four cultural traits in the Denison's Theory have had no impact on the financial performance of Turkey's chemical firms traded on BIST, whereas the mission trait has had a significant impact. Consequently, our results are largely in line with the findings of other C/P research, suggesting that the mission trait of the DOCM is the core cultural term in ensuring thriving firm corporate performance.

Keywords

Firm Performance, Effectiveness, Organizational Culture, Organizational Behaviour, Emerging Market Countries

Introduction

In past decades, researchers have broadly focused on characterizing, conceptualizing and measuring (to build a model) culture phenomenon and other aspects of organizational culture. For example, Hartnell, Ou & Kinicki (2011) have remarked that over 4600 manuscripts have revealed the isomorphic structure of organizational culture and the impetus behind the social characteristics that influence employee behavior, subsuming the idea that it is the people who make up the culture. Although Lewin (1951) had earlier noticed that a number of forces pushing or attracting each other constitute a special movement within enterprises, it had not

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aroused research interest in the impact of this organizational phenomenon on firms' outcomes until the 1980's. In other respects, in recognizing the uniqueness of culture and the distinctive characteristics of the organizations, some academics and business practitioners have turned their eyes to this difference-maker and inimitable strategic resource (Hofstede & Peterson, 2000). For instance, in a landmark C/P study, Kotter & Heskett (1992) claimed that organizational culture is a way of managing, and firms may boost their effectiveness and outcomes by embracing the culture as a management philosophy. Additionally, their contemporary colleague, Schein (1992), pointed out that maximizing the value of human resources is vital because intellectual assets constitute the primary resources for creating value in firms; and it is essential for corporations to have a culture imbued with intellectual attendance (Olughor, 2014). In the sequel, Yilmaz & Ergun (2008) highlighted another dimension on the value of determining the cultural predictors of organizational effectiveness, discriminating highly productive firms from less productive ones and the drivers of organizational change.

A long-standing research stream on C/P studies has brought about immense enrichment to the field and the results/methods in these studies have led to a remarkable compilation guide for further inquiries. Our work, as a nominee, has taken some important points into account by taking advantage of the accumulated richness of the past. Before proceeding to the next section, we will underline some of the prominent considerations emerging from previous studies that reveal the blind-alley nature of the C/P link due elements exclusively determinant to the methodology of our study. Note that the aforementioned considerations have forced the present research to adopt certain assumptions in order to extricate the impact of the corporate culture on financial performance. We specifically present empirical evidence with the following conditions.

The first concerns how organizational culture changes in the course of time and the temporal impact of culture related to outcomes over time. Some analysts, for instance Kotter & Heskett (1992), stated that crises and new challenges force inherent cultural values to change the way things are done in an organization and the set of practices that are widely shared within a business culture. In fact, they can prevail over the organization in the long run. It can reliably be presumed that culture is relatively stable over time (Bezrukova et al., 2012) and it is difficult to change (Davidson et al., 2007). In regard to the culture and time linkage, many researchers suggest that the magnitude of C/P connections remains stable or increases slightly within a one-to-six year period following cultural assessment (Gordon & Di Tomaso, 1992; Denison & Mishra, 1995; Boyce et al., 2015). Within the scope of available information, our study acknowledges that measuring organizational culture at one time is sufficient to represent it and other cultural traits as variables within the analysis because of the fact that culture can be dominant and stable for many years due to the beliefs and deep assumptions engrained.

A second acknowledgement is related to the contingent effect of the external environment and industry type on the C/P interplay. As several authors have pointed out in prior works, it is

possible that the industry type may have a disparate relationship with culture traits (Denison & Mishra, 1995) and business outcomes (Glaser, 2014); accordingly, the nature of the business environment may further affect the financial results of the firms through various competitive conditions (Zheng et al., 2009). Our study takes industry effects into consideration, and we have chosen one industry type: chemicals, petroleum, rubber and plastic products in order to limit the impact of different sectors on both culture and outcomes.

The third revolves around the most unbridgeable point in C/P studies as per our opinion and it needs to be clearly explained. The question of where organizational movement fits among the factors that have an impact on financial statements has not yet been answered even though remarkable effort has been oriented toward corporate culture as an important feature of organizations (Petty et al., 1995). However, some researchers, such as Denison & Mishra (1995), have claimed that culture influences a wide variety of performance indicators, while some assert that each cultural trait relates to specific performance measures in its own unique way (Hartnell et al. 2011). It is obvious that results remain ambiguous and the impact of culture on financial statements has not been fully illuminated. A default effect may not be evident on financial performance indicators because culture is not included in financial statements. For instance, culture may have a clear impact on the balance sheet when providing external financing or increasing the firm's assets through an investment. But how can the contribution of the culture to performance be distinctly monitored by financial indicators derived from financial tables? To find out, we underline the fact that financial statements may be further influenced by the various financing and investment decisions of firms. So, we tried to devise a model where the indicators obtained from the financial statements generate consistent results. Afterwards, we tested our corporate culture variables together with the proposed model to obtain our main findings and expose the clear impact of corporate culture on financial indicators.

A fourth concern is the *causality* and *timing* issue in C/P connection. It partially relates to previous assumptions. It is quite possible to emphasize that different approaches have recently been introduced to the research field to reveal the blind-alley nature of the C/P linkage. As a noteworthy example of giving a point to *causal priority*'s crucial importance, Boyce et al. (2015) claimed that previous works have been generally inadequate in establishing any causality. They did not indicate any direction for C/P linkage although they have been supporting an association between culture and business outcomes. The causality issue involves the change of culture over time, but it is unclear at what time the effect of culture contributes to financial outcomes due to the temporal delay in the intricate nature of C/P research. Herewith, the contribution of the culture does not become apparent in addition to other organizational strategies and managerial instruments that contribute to the return on investment for various performance outcomes over time (Boyce et al. 2015). While the causality effect has been decisive for our research design, our basic approach encompasses unilateral causality from culture to performance outcomes, as concluded by Boyce et al. (2015).

The purpose of the present study is to investigate and discuss the impact of an organizational culture on its financial performances (abbreviated as C/P from now on) from the perspective of Turkey, as an ambassador of an emerging economy context, instead of the western/overseas countries that host most of the studies in the literature. To this end, our study is based on Denison’s Theory of organizational culture and firm performance. Hence, it presents empirical evidence from an industry of which companies operate in a volatile economy. Such fast-changing conditions may probably impel firms to a versatile business environment and force them to shoulder much more financial risk. Accordingly, the present study attempts to add a set of financial variables in order to build a concrete regression model and narrow the gap in elucidating the full impact of culture on performance.

Beginning with the introduction, the structure of the paper is as follows: the next section offers a justification of Denison’s Organizational Culture Theory in relation to organizational outputs. We, then, proceed to the study’s hypotheses. The subsequent one encloses the methodology with three sub-sections: data collection and sample characteristics, the presentation of the variables and the validation of the scale and preliminary analyses. Finally, the findings of the study are presented in the follow-up section while the results of our analysis are discussed in a final section.

Denison’s Theory and Firm Performance

As for the framework of the organizational culture in relation to firm effectiveness, based on empirical research, case studies and new cutting-edge theoretical models on organizational behavior, Denison (1990) has developed a framework that offers a new approach with four ideas about producing a productive work environment. In the following years, Denison and his colleagues (Denison & Mishra, 1995; Denison & Neale, 1996, 1999; Fey & Denison, 2003, Denison et al., 2003a; 2003b) advanced the theory with cross-cultural relevance by measuring and comparing the cultural characteristics of organizations in different national settings, resulting in empirical results on the performance of enterprises performing in various national contexts.

Denison’s Organizational Culture Model with Main Axes and Organizational Direction

Compliance with	Change and Flexibility	Consistency and Direction
External Conditions	Adaptability	Mission
Integration within the Organization	Involvement	Consistency

Source: Denison and Mishra, 1995.

Illustration-1

Denison’s survey has been tested in many national contexts around the world such as Canada, Australia, Brazil, the U.S., Japan, Jamaica, South Africa (Denison et al. 2003a; 2003b), Russia and the U.S. (Fey & Denison, 2003). The aforesaid studies have been finalized as comparative field studies and the first revelation of a level of similarity across the region. In a dual country crosscheck, they produced results in the opposite direction. Accordingly, cultural traits and effectiveness indicators might vary from one country to another. For instance, the adaptability trait has been the most effective driver of performance in Russian firms, the mission focus emerged as the strongest trait in the U.S. (Fey & Denison, 2003). Earlier studies by Denison produced different results on which cultural traits have been influential on effectiveness indicators (Denison & Mishra, 1989; 1995); but in support of his theory, mostly positive correlations between these traits and a range of effectiveness criteria have been reported in a variety of organizational, sectoral and national contexts.

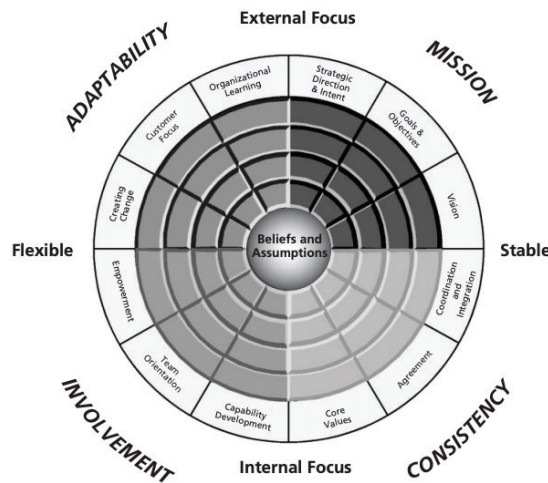


Figure 1. The Denison Organizational Culture Model with Cultural Dimensions and Traits

Source: Denison and Neale,1996.

As shown in Figure-1, the model theoretically manifests a set of traits and auxiliary sub-components in order to accurately discern which cultural dimension (or trait) enables or restricts organizational effectiveness and change (Yılmaz & Ergun, 2008). In this way, it serves as a holistic evaluation of organizational culture with; (1) organizational performance, (2) organizational development and (3) other internal and external organizational capabilities that reveal the relationship mainly between organizational culture, efficiency and change.

Denison’s Model contains underlying beliefs and assumptions at the core, similar to Schein’s (1984) organizational culture model. Structurally, the model principally consists of two main axes: *internal focus* and *external focus*. In addition, the model subsumes four major cultural traits: involvement, consistency, adaptability and mission. It also suggests that

effective firms possess all four cultural traits. Accordingly, organizational effectiveness is characterized by the balancing and simultaneous pursuit of the competing demands for which these values stand. In this direction, Denison et al., (2014) further concluded that the most effective organizations have high levels of each trait or a full profile of them.

Research Hypothesis

The theoretical and informational background of this study suggests two empirically testable statements: (1) the organizational culture, estimated as the sum of the scores of four broad cultural traits, has a significant impact on the indicator of firm profitability and (2) each of four traits (a) involvement, (b) consistency, (c) adaptability, (d) mission separately has a significant effect on the indicator of firm profitability (as the effects of other cultural traits are controlled for). Pursuant to the first statement, it subsumes four broad traits and tests their combined power whereas the latter statement refers to the cultural trait's singular power on the performance indicator. Hence, we first tested a logical and reasonable main hypothesis derived from Denison's Theory and the empirical findings of previous studies in following fashion:

Hypothesis 1: As a cumulative score of four cultural traits, there is a relationship between organizational culture and the return on equity.

Referring to the function of building employee capability, contribution and responsibility, the involvement trait helps organizations create multiple decision mechanisms by incorporating different and new ideas into the decision-making processes, allowing employees to care about the organization with a sense of ownership and commitment and enabling the actuation of team dynamics to solve complicated problems. In accordance with these facilities, as Denison & Neale (1996) states, it procures the internal integration of firms besides flexibility and creativity. Based on the information provided, the following hypothesis is suggested;

Hypothesis 2: Involvement dimension of organizational culture has a positive effect on the return on equity indicator.

The consistency trait briefly covers whether the organization is well-structured and owns a strong and coordinated internal culture intensely felt by the members. Reducing the requirements for certain control systems (probably external sources and related costs) by facilitating connection and communication (Fisher, 1997) it also refers to improving organizational efficiency and effectiveness, two components of firm performance. Based on these arguments, the following hypothesis is developed;

Hypothesis 3: Consistency dimension of organizational culture has a positive effect on the return on equity indicator.

Adaptability symbolizes the degree to which a firm is able to fit rapidly into the changes and demands of the business environment; for instance, signals from customers, suppliers and the marketplace (Olughor, 2014). It further facilitates the transformation of external signals into internal changes to enhance a firm's skills to overcome the increasing dynamism and volatility of its business environment, while it assumes a certain predictor of a firm's capability to gain new territories (Yılmaz & Ergun, 2008). Based on the information given, the following hypothesis is suggested:

Hypothesis 4: Adaptability dimension of organizational culture has a positive effect on the return on equity indicator.

Based on presumed organizational meaning and purpose, the mission trait refers to the existence of a shared definition of the function and purpose of the organization and its members. The trait is accordingly beneficial in troubleshooting if the firm is in danger of short-sightedness or is equipped with a systematically-defined strategic and action plan (Olughor, 2014). It also places emphasis on the stability of the organizational structure and assumes it is the strongest driver of market share, financial performance indicators and overall firm performance (Yılmaz & Ergun, 2008). Based on the information provided above, the final hypothesis of the paper is suggested:

Hypothesis 5: Mission dimension of organizational culture has a positive effect on the return on equity indicator.

Methodology

As organizational culture data was compiled at a single point in time, it has been decisively determinant on the preference for cross-sectional data in the analysis. In this context, we measured employee perceptions in varied departments of selected firms in order to form organizational culture variables.

We formed the corporate culture variables using cross-sectional data and made co-efficient estimations of these variables with the Ordinary Least Square (OLS) estimator for the Multiple Linear Regression Model. Subsequently, we run the Ramsey Regression Specification Error Test (Ramsey's Reset) to detect functional model building errors that may have occurred due to the lack of a proper relationship between the dependent and observed variables. In addition the Omitted Variable Bias Test (OVB) performed to determine any measurement errors that might have occurred if some variables were wrongly excluded from the regression model. To tackle the frequently-encountered heteroscedasticity problems in the regression models, we used Eicker (1967), Huber (1967) and White's (1980) *t-statistic values* that are resistant to standard errors and not affected by the heteroscedasticity issue.

The study's econometric model entailed a two-step analysis. The first step was to constitute a model that produced stable statistical results before appending the cultural traits. The second was to reveal the hypothetical impact of culture on performance with the addition of cultural variables. From this perspective, we first attempted to establish a fundamental regression equation with a higher internal stability in order to accurately figure out the supposed impact of corporate culture on financial performance. The logarithmic expression of the basic regression equation (1) in the study is as follows;

$$ROE_{it} = a_{it} + \beta_1 ROA_{it} + \beta_2 DEBTEQTY_{it} + \beta_3 SIZE_{it} + \beta_4 SIZE^2_{it} + \beta_5 AGE_{it} + u_{it} \quad (1)$$

In equation (1), *ROE* refers to return on equity, *ROA* stands for return on asset, *DEBTEQTY* is the debt to equity ratio, *SIZE* denotes firm size, *AGE* stands for firm age, the subscript *t* denotes a single point in time, β stands for the parameters that are coefficients to be estimated, *a* is the drift term and u_t is the error term.

Following the substantial equation (1), we tested the impact of culture on business performance by positing corporate culture variables and interaction terms for the basic model and formed equations (2), (3), (4), (5) and (6).

Addition to equation (1), it can be expressed with organizational culture variables in logarithmic forms in the following fashion;

$$ROE_{it} = a_{it} + \beta_1 ROA_{it} + \beta_2 DEBTEQTY_{it} + \beta_3 SIZE_{it} + \beta_4 SIZE^2_{it} + \beta_5 AGE_{it} + \beta_6 ORGCULT_{it} + u_{it} \quad (2)$$

$$ROE_{it} = a_{it} + \beta_1 ROA_{it} + \beta_2 DEBTEQTY_{it} + \beta_3 SIZE_{it} + \beta_4 SIZE^2_{it} + \beta_5 AGE_{it} + \beta_6 INV_{it} + u_{it} \quad (3)$$

$$ROE_{it} = a_{it} + \beta_1 ROA_{it} + \beta_2 DEBTEQTY_{it} + \beta_3 SIZE_{it} + \beta_4 SIZE^2_{it} + \beta_5 AGE_{it} + \beta_6 CONS_{it} + u_{it} \quad (4)$$

$$ROE_{it} = a_{it} + \beta_1 ROA_{it} + \beta_2 DEBTEQTY_{it} + \beta_3 SIZE_{it} + \beta_4 SIZE^2_{it} + \beta_5 AGE_{it} + \beta_6 ADAPT_{it} + u_{it} \quad (5)$$

$$ROE_{it} = a_{it} + \beta_1 ROA_{it} + \beta_2 DEBTEQTY_{it} + \beta_3 SIZE_{it} + \beta_4 SIZE^2_{it} + \beta_5 AGE_{it} + \beta_6 MIS_{it} + u_{it} \quad (6)$$

In equation (2) *ORGCULT* denotes organizational culture as a composite expression of four cultural dimensions. In equation (3) *INV* stands for the involvement trait of culture, in equation (4) *CONS* stands for consistency trait of culture, in equation (5) *ADAPT* refers to the adaptability trait of culture and finally in equation (6) *MIS* denotes mission trait of culture in Denison's Organizational Culture Theory.

Due to the fact that the age of the enterprise is not distributed homogeneously for all, it is considered that organizational culture scores of relatively small enterprises may be misleading. Similarly, the independent variables, considered as linear relationships, may have a possible effect on the power and direction of the model. It is recommended to use interaction terms in the literature to control this effect (Karaca-Mandic et al., 2012). Using interaction terms, a new variable was created by multiplying the variables that did not show a statistical

significance on the dependent variable alone. In this context, we used five interaction terms derived from the multiplication of organizational culture traits with the firm age and enriched the equivalent model with an algebraic multiplication.

Data Collection and Sample Characteristics

The sample of the study included chemical, petroleum, rubber and plastic products (XCHEMST) enterprises in Borsa Istanbul (BIST) sectoral classifications. The companies in BIST are obliged to publish their quarterly/annual financial reports through the Public Disclosure Platform. The reason for choosing XCHEMST firms in the study is that these enterprises have the highest number of BIST sectoral classifications.

The XCHEMST index is constituted of small and medium-sized enterprises that provide input as to the products needed by the manufacturing industry such as agriculture, automotive, construction, food, health, apparel and cosmetics. It has additional critical petrochemical refineries and large-scale enterprises that produce and distribute natural gas. Thus, the sample of the study consists of enterprises on different scales. When selecting the sample, we paid special attention to the sector exposed to the same environmental competition conditions and considered its impact on organizational culture. Thus, we aimed to limit the changing effects of sectoral differences on culture. The data of the two enterprises were excluded from the analysis due to outlier values.

The financial data of the study were rigorously transcribed from the financial statements of XCHEMST firms. This financial data was based on five consecutive years' (the period 2012-2016) while financial ratios were averaged from the BIST Data Store and PDP's (Public Disclosure Platform of BIST) official website.

Adhering to Denison and Mishra (1995) original instrument with 60 items, Yahyagil (2004) proposed a survey by testing its validity and reliability in Turkey with a total of 36 items using a Likert-type scale with five response options ranging from *strongly disagree* (=1) to *strongly agree* (=5). We followed Yahyagil's advice and arranged two items in reverse form to prevent reflexive responses from informants. Then we converted the data into the normal form and included it in the data set. Afterwards, the questionnaires were directed to the informants to evaluate the corporations' organizational cultures. Finally 322 informants voluntarily participated in the study from different units and having various hierarchical titles, consisting mainly of white-collar high-level managers, unit managers and experts from whom became the team leaders, technical staff and blue-collar workers.

In addition to the financial and culture data, we also employed firm-specific variables--firm age and firm size- in the analysis. The number of employees was obtained through PDP

notifications, company web pages and press releases, while firm age information came from company webpages. The average number of employees in the participating enterprises was 852 (S.D.=1436) and all of the XCHEMST sector enterprises with consistent data are represented in the analyses. The participants included in the research had a balanced distribution although their numbers vary slightly. When the age and size were evaluated, it was highlighted that 17 of the XCHEMST enterprises have between 1-250 employees (51% of the total) and 25 are between 31-86 years of age (75% of the total).

As to the characteristics of the respondents, 60% are male and 40% are female, while a total of 81% have university and higher level graduate degrees. Of the 322 respondents, 65 are aged between 20 and 30 years, 131 are 31-40 years, 100 are 41-50 and 25 are 51 or older. The majority of the participants are between the ages of 31-50 and may be considered to have sufficient work tenure. In addition, 228 of the participants (70.8%) stated that they have been working in the same workplace for more than four years. Considering their age, education, position and working hours, it can be stated that all participants were aware of cultural characteristics such as participative processes, authorization, change creation, customer focus, business vision-mission, management philosophy, and capability development.

Variables

Dependent Variables: The return on equity (*ROE*) ratio is considered to be the most important bottom-line financial indicator of the ultimate profitability and earnings per share capital of the shareholders in business research. It also reflects the effective use of the capital provided by the shareholders and the effect of financial leverage on the firm's profitability (Cakir & Kucukkapan, 2012). Hence, the return on equity ratio was chosen as the dependent variable of the study.

Explanatory Financial Variables: We used two different financial variables to ensure the internal consistency of the regression model and to make the effects of the other variables in the model more visible on the dependent variable. One of these variables is the return on assets (*ROA*) ratio that expresses the extent to which business assets are exploited to generate income (Ongore & Kusa, 2013) while the other is the total debt to equity (*DEBTEQTY*) ratio, a strong indicator of the capital structure.

Firm-Specific Variables: According to Yilmaz & Ergun (2008), business-specific indicators are greatly influenced by factors such as firm size and sector type. We therefore employed firm size (*SIZE*) and firm age (*AGE*) as control variables in our estimations by taking into account the possible effects of the same firm-specific factors on business profitability.

As to the firm-specific factors, past work shows that there is no permanent relationship between firm size and profitability in the same direction (John & Adebayo, 2013). It has also

been observed in these studies that firm size was constituted picking different financial indicators such as total assets (Makori & Jagongo, 2013), total sales (Horvath & Spirollari, 2012), total equity (Koerniadi & Tourani-Rad, 2012) and number of employees (Fey & Denison, 2000). But the data, derived from financial statements such as assets, sales or equity are generally considered as indicators of business performance in the finance literature. Surely, when generated by financial statements, the firm age variable likely will give different results than those generated by the number of employees. In our opinion, the firm size variable is rather fair in comparison to the number of employees. Claiming that the number of employees is more significant than any financial indicant as firm size, Kaen & Baumann (2013) argue that there is a positive relationship between firm size and profitability, but they also suggest that this is not an ever-increasing effect and the size of the firm has a diminishing effect on total profitability as the firm scale grows. While attaching importance to the suggestions of Kaen & Baumann (2013), we took into consideration an *inverted-U type* relationship between firm size & profitability and finally attached the *SIZE²* variable to the equations.

Organizational Culture Variables: Measurement instruments belonging to organizational culture traits were derived from the reputed Denison’s Organizational Culture Survey. Adopting the questionnaire items, our cultural variables were *ORGCULT*, *INV*, *CONS*, *ADAP*, *MIS* as representing traits.

Table 1
Categorical Classification, Ratio Types and Formulae and Expected Coefficient Signs of the Variable

Variable Code	Variable Definition	Calculation	Exp. Sign of Coef.
ROE	Return On Equity	Net Profit/ Total Equity	+
ROA	Return On Asset	Net Profit / Total Assets	+
DEBTEQTY	Debt To Equity Ratio	Total Liabilities / Total Equity	+
SIZE	Firm Size	Number of Employees	+ / -
AGE	Firm Age	Current Year – Firm’s Foundation Year	+ / -
ORGCULT	Organisational Culture	Involvement + Consistency + Adaptability + Mission Traits**	+
INV	Involvement Trait of DOCM*	Score of the Involvement Trait	+
CONS	Consistency Trait of DOCM	Score of the Consistency Trait	+
ADAP	Adaptability Trait of DOCM	Score of the Adaptability Trait	+
MIS	Mission Trait of DOCM	Score of the MissionTrait	+
INTTERM1	Interaction Term 1	Organisational Culture Score x Firm Age	+
INTTERM2	Interaction Term 2	Involvement Trait Score x Firm Age	+
INTTERM3	Interaction Term 3	Consistency Trait Score x Firm Age	+
INTTERM4	Interaction Term 4	Adaptability Trait Score x Firm Age	+
INTTERM5	Interaction Term 5	Mission Trait Score x Firm Age	+

Notes: *DOCM= Denison’s Organizational Culture Model **Variables are formed with arithmetic mean values of four cultural traits.

Table 1 displays the codes of the variables in the regression models, indicating how they were formed, the categorical group they belong to and the expected coefficient signs in the estimation of the parameters.

Instrument Validation and Preliminary Analysis

We performed a Confirmatory Factor Analysis (CFA) to assess the validity and reliability of the psychometric properties for the entire scale, the cultural traits and each component characteristic at the item level. The results of the CFA are depicted in Table 2.

Table 2

Descriptive Statistics for Reliability Coefficients of the DOCM, Cultural Traits and Components

Trait	Sub-Components	α Coefficient	Sub-Components	α Coefficient	Trait
INVOLVEMENT (.628)	Empowerment (Item 1)	,788	Core Values (Item 10)	,788	CONSISTENCY (.506)
	Empowerment (Item 2)	,789	Core Values (Item 11)	,791	
	Empowerment (Item 3)	,788	Core Values (Item 12)	,787	
	Team Orientation (Item 4)	,786	Agreement (Item 13)	,787	
	Team Orientation (Item 5)	,788	Agreement (Item 14)	,787	
	Team Orientation (Item 6)	,788	Agreement (Item 15)	,793	
	Capability Dev. (Item 7)	,787	Coord.and Integr. (Item 16)	,790	
	Capability Dev. (Item 8)	,787	Coord.and Integr. (Item 17)	,789	
	Capability Dev. (Item 9)	,788	Coord.and Integr. (Item 18)	,806	
ADAPTABILITY (.459)	Creating Change (Item 19)	,790	Str.Dir.and Intent (Item 28)	,788	MISSION (.631)
	Creating Change (Item 20)	,788	Str.Dir.and Intent (Item 29)	,790	
	Creating Change (Item 21)	,803	Str.Dir.and Intent (Item 30)	,792	
	Customer Focus (Item 22)	,789	Goals and Object. (Item 31)	,790	
	Customer Focus (Item 23)	,788	Goals and Object. (Item 32)	,786	
	Customer Focus (Item 24)	,786	Goals and Object. (Item 33)	,785	
	Org. Learning (Item 25)	,790	Vision (Item 34)	,784	
	Org. Learning (Item 26)	,789	Vision (Item 35)	,786	
	Org. Learning (Item 27)	,786	Vision (Item 36)	,787	

Notes: Reliability Coefficient of the Model (Cronbach's Alpha) $\alpha = .794$ Total Item = 36

Showing the lower estimate of the reliability of the psychometric test, Cronbach's Alpha value is widely accepted as the main criterion used to determine the reliability of an instrument and it is satisfactory for a value greater than ,70 (Bland & Altman, 1997). Cronbach's Alpha value ($\alpha = .794$) as the organization culture instrument in this study is much higher than the acceptable level at close to ,80 indicating that the questionnaire had a high reliability. Similarly, Cronbach's Alpha values measured for each sub-components were very close to ,80 (varying from ,784 to ,806). The Cronbach's Alpha Value for the four cultural traits are as follows: involvement trait (.628), consistency trait (.506), adaptability trait (.459) and mission trait (.631).

A validity analysis was used to determine whether the data was sufficient to measure the theoretical model and to determine the real-life equivalence of our theoretical approaches. Hence, we performed two tests to figure out the applicability of our data for structural explanation the results of which are seen in Table 3. The first points out the proportion of variance in our variables that might be caused by latent factors. The Kaiser-Meyer-Olkin Measure

(KMO) of Sampling Adequacy Value implies that a variable is perfectly predicted by other variables. The value ranges from 0 to 1, with 1 denoting the height of an error-free prediction, whereas values above ,80 are considered perfect (Buyukozturk, 2002) with the value of ,50 (KMO≤,50) is the lower limit (Field, 2000; 2005). The obtained KMO values for all of the models are (ORGCULT=,756) and, respectively, for cultural traits (INV=,737; CONS=,675; ADAP=,640; MIS=,700), they are satisfactory.

Table 3

Validity Analysis and Goodness of Fit Results for Organizational Culture Traits

Cultural Traits	KMO Value	Bartlett Test of Sphericity Value	Sig.	df	Total Variance Explained
Involvement	,737	224,725	,000	36	49,146
Consistency	,675	241,901	,000	36	49,982
Adaptability	,640	171,519	,000	36	58,550
Mission	,700	262,498	,000	36	50,907
TOTAL	,756	1715,214	,000	630	55, 280

Notes: Explained total variance values are singular values of the traits. The general value of the scale is given at the bottom.

The second test, the Bartlett Sphericity Test, however had results showing that chi-square values ($\chi^2_{(630)}=1715,214 p<.01$) are statistically significant for all variables and the overall scale. As per the validity / the reliability tests, our findings are in line with Yahyagil’s (2004) study that claims that Denison’s organizational culture scale is valid for Turkish firms.

Table 4

Meta-Analytic Correlations Among Indicators

Categories	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9
ROE (1)	8,21	10,60	1.00								
ROA (2)	17,37	71,69	0.33	1.00							
DEBTEQTY (3)	86,10	159,36	0.50	0.07	1.00						
SIZE (4)	852,90	1436,25	0.33	-0.04	0.62	1.00					
AGE (5)	45,22	20,14	0.24	0.19	-0.04	0.25	1.00				
INV (6)	3,66	,15	-0.13	-0.09	-0.12	-0.12	-0.19	1.00			
CONS (7)	3,63	,16	0.06	-0.10	0.27	0.24	-0.19	0.44	1.00		
ADAP (8)	3,63	,11	-0.06	-0.06	-0.08	-0.08	0.11	0.54	0.27	1.00	
MIS (9)	3,83	,14	0.06	0.12	-0.008	-0.03	-0.05	0.38	0.14	0.33	1.00

N= 322 *p<.10 **p.<05 ***p<.01

In addition to the reliability and validity analyses performed with CFA, we conducted a correlation analysis. With reference to Table 4, organizational culture variables, being overwhelmingly small, are not positively or negatively correlated with other financial variables or

firm-specific variables with statistical significance at any level. While the differences were generally perfect as desired, on average, it can be clearly concluded from the table that *the adaptability trait* has the lowest intercorrelation value, having a negative sign with financial indicators, ROE (-,06), ROA (-,06) and DEBTEQTY (-,08) while *the consistency trait* has the highest (,06; -,10; ,27 in the same indicant order).

As previously emphasized in the methodology, our work consisted of a two-step regression model. Table 5 summarizes the steps taken to estimate the primary model with the OLS estimator under the same assumptions as for the cross-sectional data. As a result of numerous iterations, we determined that Model (5) can be tested as a basic model for the operating of corporate culture variables.

According to results displayed in Table 5, the ROA variable in model (1) gives statistically-significant results, implying that the profitability of equity increases when a rise occurs in the profitability of assets. As per the f-statistic value, the model is completely significant and the D-W statistic value shows that there is no auto-correlation between the variables. However, the Ramsey Reset Test *t*-value is statistically significant ($p < .01$) and the coefficient has a positive sign. In this case, the *H₀* hypothesis, which states that the model has been established correctly, is rejected and the model must be strengthened by adding variables to the equation. Prior to the testing, and considering a missing variable in the model, the OVB Test shows that the *t*-value (3,14) is statistically significant at the 1% level. The OVB test result implies another situation in which the hypothesis, which belongs to the DEBTEQTY variable, is the excluded (missing) variable in model (2), cannot be rejected and, therefore, we added the DEBTEQTY variable to model (2).

In model (2), by adding DEBTEQTY variable, the Ramsey Reset Test *t*-value (2.12) is a positive sign at a 5% significance level, and, likewise, the *H₀* hypothesis is still rejected. Hence, we decided to include the SIZE variable as a firm-specific variable, with the result implying that the model is still the missing variable.

Following a like path in models (3) and (4), the variable iterations regarding the Ramsey Reset Test and the OVB Test conveniently resulted in the forming of model (5). In accordance with model (5), Ramsey Reset Test result, which indicated that there is a functional error in the regression, signifies that the *t*-value (1.40) is statistically insignificant. The *H₀* hypothesis cannot be rejected at this time, and the result implies that the regression model is free from functional error.

When all the models were taken into consideration, the ROA variable gave consistent statistically results in terms of explaining it. As to the other explanatory financial indicator, the DEBTEQTY variable produced statistically significant and meaningful results, except for the regression model (3). The SIZE variable accordingly produced a statistically insignificant

result just in model (3) in line with *DEBTEQTY*. Prior to the firm-specific variable, included in the regression model (4) and model (5), the *SIZE*² variable inherently had a negative coefficient sign within the expectations, making it is statistically significant, while the *AGE* variable did not statistically yield any significant result. However, the *AGE* variable was kept in the regression model due to being a component of the interaction terms.

Table 5

Results for Basic Regression Model

Model No Explanatory Variables	Dependent Variable ROE (Return On Equity)				
	(1)	(2)	(3)	(4)	(5)
	Coefficient values of variables / t-statistic values				
<i>Drift Term (a₀)</i>	7,363 (3,85)***	4,693 (2,44)**	4,475 (2,10)**	0,792 (0,35)	-2,703 (-0,73)
<i>ROA</i>	0,049 (6,72)***	0,043 (5,39)**	0,044 (4,92)***	0,041 (5,62)***	0,035 (4,16)***
<i>DEBTEQTY</i>		0,032 (2,34)**	0,029 (1,44)	0,032 (2,24)**	0,036 (2,67)**
<i>SIZE</i>			0,0006 (0,26)	0,009 (3,85)***	0,008 (3,25)***
<i>SIZE</i> ²				-1,29E-06 (-5,11)***	-1,23E-06 (-4,68)***
<i>AGE</i>					0,086 (1,21)
Observation	31	31	31	31	31
<i>R</i> ²	0,109	0,341	0,344	0,548	0,569
Adjusted <i>R</i> ²	0,078	0,294	0,272	0,478	0,483
<i>f</i> -test value	3,56*	7,25***	4,73***	7,88***	6,62***
D-W statistic value	2,35	2,34	2,33	2,29	2,39
OVB Test (<i>t</i> -value)	-	3,14***	0,37	3,42***	1,12
Ramsey's Reset <i>t</i> -value	5,36***	2,12**	4,84***	1,61	1,40

Notes: Values in parentheses indicate non-heteroskedastic t-statistic values. * p < .10 **p < .05 ***p < .01

When the structural strength of the established models was examined, the *f*-statistical test values were significant at the 1% level in models (2), (3), (4) and (5) and all of these models were statistically significant. For the *R*² and *adjusted R*² values that demonstrate the description power of the models, they increased in terms of the four models (ranging from ,109 to ,548), arriving at the last regression model (5) with a value (,569). In addition, the *D-W* test values displayed no auto-correlation between the predictor employed in all five models.

As a result, it may finally be stated that the variables - employed in order to illuminate the effect of C/P in accordance with the main purpose of the study and to purge this effect of potential randomness - generated consistent and stable results in line with our expectations. Therefore model (5) is determined as the basic regression model to test the C/P link.

Main Results For Hypothesized Effects

In the following section, we proceed to the tests that reveal the hypothesized effects of the main research questions and present our estimation results for the effect of C/P. The main and

relative findings of the research are included in this section.

Subsequent to extending model (5) and regressing the return on equity against auxiliary financial predictors and firm-specific variables, we ran a ten-stage regression by positing cultural variables to the basic model to test the main hypotheses of the study. In these regressions, we tested each cultural variable twice both on its own and in interaction terms.

Table 6 summarizes our ten-step regression results. It's visible that all regression models clarify a significant portion of the observed variances in the dependent variables with R^2 's extending from ,569 to ,607 while the f -statistic values range from 4,38 to 6,18, exhibiting that all the models are in the statistically ($p < .01$) significant level. In addition, Durbin-Watson's statistical values, ranging from 2,30 to 2,40, indicate that there is no auto-correlation between regressors. All the diagnostic tests, such as Ramsey's Reset, f -statistical test or the OVB Test on the structural stability of the models show that our model does not carry any functional forms, auto-correlation heteroscedasticity problems.

Next, as to relative effects, the return on asset indicator was shown to be of the most consistent statistical significance ($p < .01$) in explaining the return on equity indicant in all models, while its coefficient sign evidently turned negative in model (15). These results are in line with our expectations and it can clearly be concluded from the results that one-unit growth in return on asset causes an increase in return on equity at various levels except for model (15). Also within expectations, the debt to equity ratio is another stable financial predictor performing a statistical significance in all regression models, explaining the dependent variables. Moreover, the *DEBTEQTY* variable, having a constant positive sign, was generally at the ($p < .01$) significance level, while it was at the ($p < .05$) significant level for model (14) and (15).

The results imply that when an increase occurs in the debt to equity ratio, it results in an increase in return on equity. However these results should be handled with care due to the financial standpoints stemming from theoretically diversified remarks about capital structure's effect on profitability. We recommend that this finding should *not* be dealt with independently from other studies examining the interaction between capital cost and firm profitability and, accordingly, from any financial approaches such as how leverage influences profitability.

Proceeding with the relative effects of firm-specific variables, the coefficient sign of the firm size variable was positive and all values were statistically significant at the ($p < .01$) level. Firm size is apparent in a linear form and a positive interaction with return on equity and this finding crystalizes the relationship between number of employees and profitability in the same direction. However the square of the firm size had negative signs and the values were all significant at the ($p < .01$) level, as expected. But the other firm specific variable, age, was statistically insignificant in all models although having positive or negative signs.

Table 6
Ten-Step Regression Results

Dependent Variable ROE (Return On Equity)													
Variables	Coefficient values of variables / t-statistic values	Variables	Coefficient values of variables / t-statistic values	Variables	Coefficient values of variables / t-statistic values	Variables	Coefficient values of variables / t-statistic values	Variables	Coefficient values of variables / t-statistic values	Variables	Coefficient values of variables / t-statistic values	Variables	Coefficient values of variables / t-statistic values
Model No	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)			
<i>Drift Term</i>	-28,471 (-0,49)	21,216 (0,13)	-2,972 (-0,08)	17,097 (0,21)	-10,285 (-0,24)	17,717 (0,13)	7,648 (0,23)	-16,327 (-0,15)	<i>Drift Term</i> (a,b)	-59,815 (-2,00)*			
<i>ROA</i>	0,036 (4,12)***	0,035 (3,98)***	0,035 (3,99)***	0,036 (4,01)***	0,035 (3,94)***	0,035 (3,56)***	0,034 (3,78)***	0,034 (3,69)***	<i>ROA</i>	0,031 (3,83)***			
<i>DEBT/ETY</i>	0,036 (2,69)**	0,037 (2,63)**	0,036 (2,66)**	0,037 (2,58)**	0,036 (2,57)**	0,036 (2,47)**	0,036 (2,60)**	0,036 (2,53)**	<i>DEBT/ETY</i>	0,037 (2,94)***			
<i>SIZE</i>	0,008 (3,32)***	0,008 (3,12)***	0,008 (3,19)***	0,007 (3,04)***	0,008 (3,27)***	0,008 (2,99)***	0,007 (3,12)***	0,008 (3,03)***	<i>SIZE</i>	0,009 (3,75)***			
<i>SIZE²</i>	-1,26E-06 (-4,70)***	-1,26E-06 (-4,64)***	-1,23E-06 (-4,60)***	-1,22E-06 (-4,41)***	-1,24E-06 (-4,70)***	-1,25E-06 (-4,70)***	-1,23E-06 (-4,57)***	-1,24E-06 (-4,42)***	<i>SIZE²</i>	-1,42E-06 (-5,08)***			
<i>AGE</i>	0,091 (1,20)	-1,156 (-0,37)	0,086 (1,13)	-0,471 (-0,29)	0,091 (1,16)	-0,496 (-0,23)	0,089 (1,23)	0,632 (0,29)	<i>AGE</i>	0,091 (1,34)			
<i>ORGCULT</i>	1,725 (0,45)	-1,641 (-0,15)	0,072 (0,007)	-5,372 (-0,25)	2,055 (0,18)	-5,769 (-0,16)	-2,874 (-0,32)	3,681 (0,12)	<i>MIS</i>	14,693 (2,02)*			
<i>INTERM1</i>	-	0,084 (0,39)	-	0,152 (0,36)	-	0,165 (0,27)	-	-0,148 (-0,25)	<i>INTERM4</i>	-			
<i>INTERM2</i>	-	0,084 (0,39)	-	0,152 (0,36)	-	0,165 (0,27)	-	-0,148 (-0,25)	<i>INTERM5</i>	-			
<i>Observ.</i>	31	31	31	31	31	31	31	31	<i>Observ.</i>	31			
<i>R²</i>	0,574	0,578	0,569	0,572	0,571	0,573	0,570	0,571	<i>R²</i>	0,607			
<i>Adjusted R²</i>	0,468	0,449	0,462	0,441	0,463	0,443	0,463	0,441	<i>Adjusted R²</i>	0,509			
<i>f</i> -test value	5,40***	4,50***	5,29***	4,39***	5,31***	4,41***	5,32***	4,38***	<i>f</i> -test value	6,18***			
<i>D-W</i> value	2,39	2,33	2,40	2,36	2,36	2,30	2,37	2,38	<i>D-W</i> value	2,38			
<i>OVB</i> (t-value)	0,51	0,43	0,01	0,33	0,23	0,38	0,23	0,20	<i>OVB</i> (t-value)	1,51			
<i>Ramsey's Reset</i> t-value	1,28	1,39	1,37	1,36	1,30	1,44	1,41	1,37	<i>Ramsey's Reset</i> t-value	1,41			

Notes: Values in parentheses indicate non-heteroskedastic t-statistic values. * p < 10 **p < 05 ***p < 01

As to the main effects, foremost considering model (6), the composite organizational culture indicator, *ORGCULT* ($\beta_i = 1,72$), is revealed to have a positive impact over return on equity. But this effect does not contain any statistical significance. By the way, the first interaction term (*INTTERM1*) seems to not have made any remarkable contribution to the model while clearly displayed in model (7). With the inclusion of *INTTERM1* ($\beta_i = 0,08$), just the sign of the coefficients which belong to *ORGCULT* ($\beta_i = -1,64$) and *AGE* ($\beta_i = -1,15$) variables have turned into negative. Eventually, while models (6) and (7) are completely significant at ($p < .01$) level, by the sum of cultural traits the organizational culture variable is statistically insignificant to explain the dependent variable, *ROE*. The hypothesized effect indicating that the organizational culture positively affects firm financial performance is not confirmed in our study and therefore *Hypothesis-1* (H_1) is rejected.

To explicate major effects with the four cultural traits, we primarily appended the involvement trait to model (8) and the results show that the *INV* predictor ($\beta_i = 0,07$) had no statistical significance explaining return on equity, although it had a positive sign. As displayed in model (9), the second interaction term, (*INTTERM2*), formed to reveal the joint effect of the involvement score and the firm age, seems not to have had any meaningful impact on the model similar to the *ORGCULT* variable. When *INTTERM2* ($\beta_i = 0,15$) is inserted into the regression in model (9), just the sign of the coefficients that belong to *INV* ($\beta_i = -5,37$) and *AGE* ($\beta_i = -0,47$) variables turned into a negative. Regarding models (8) and (9), the *INV* and *INTTERM2* variables were statistically insignificant to explain the dependent variable (*ROE*), although the two models were completely significant at the ($p < .01$) level. The hypothesized effect indicating that the involvement trait positively affects firm financial performance is not confirmed in our study and, therefore, *Hypothesis-2* (H_2) is rejected.

Similarly, considering the effects of other cultural traits, the regression results show that neither the *CONS* nor the *ADAP* predictor reflected any statistical significance in models (10;11;12 and 13), although *CONS* ($\beta_i = 2,05$) had a positive sign in model (10) and *ADAP* ($\beta_i = -2,87$) had a negative sign in model (12). When the results were assessed with regard to interaction terms posited to model (11;13), *CONS* ($\beta_i = -5,76$) turned to negative while *INTTERM3* ($\beta_i = 0,16$) had a positive sign in model (11). Inversely, *ADAP* ($\beta_i = -2,87$) had a negative sign in model (12) and ($\beta_i = 3,68$) turned into positive while *INTTERM4* ($\beta_i = -0,14$) appeared with a negative sign in model (13). It is quite comprehensible that when the interaction terms get involved in a regression, the coefficient signs of the two components, each cultural trait and firm age, prominently switched to the opposite sign due to their nature. As to the hypothesized effect indicating that the involvement trait and also the adaptability trait positively affected return on equity, they are confirmed in our study and, therefore, *Hypothesis-3* (H_3) and *Hypothesis-4* (H_4) were rejected.

Next, complying with the same analysis design, estimation results that belong to the mission trait distinctly differ from other cultural characteristics. Possessing the maximal value of the beta coefficient among other traits, *MIS* ($\beta_i = 14,69$) also had a positive sign.

Moreover, this sign was significant at the ($p < .10$) level as clearly visible in model (14). But *INTTERM5* ($\beta_1 = 0,02$) formed to indicate the joint-effect of the mission score and firm age had a low beta value and repeatedly displayed insignificant results in model (15), although having a positive sign. Regarding models (14) and (15), the *MIS* variable consequently showed a meaningful effect to explain return on equity, whereas the *INTTERM5* variable was statistically insignificant although both were completely significant at the ($p < .01$) level. The hypothesized effect indicating that the involvement trait positively affects a firm financial performance was confirmed at the ($p < .10$) level in our study and, therefore, *Hypothesis-5* (H_5) is accepted.

Consequently, among the 15 regression models of which five were formed to ensure consistent results for testing cultural traits, only the mission trait was statistically significant at the ($p < .10$) level while the organizational culture itself, including the involvement, consistency and adaptability traits, did not show any statistical significance. Five cases flavored by algebraic multiplication, namely as interaction terms, did not leave any respectable impact on the models, and the explained variance for the dependent variables did not deviate much between the non-attached and attached manner. Finally, *Hypothesis (5)* is accepted while *Hypotheses (1;2;3;4)* are rejected. The discussion and conclusion section below clarifies the implications of our research findings.

Discussion and Implications

Our research differs from other C/P studies that have employed objective and subjective financial criteria together. We have solely employed the most critical indicator of bottom-line performance, ROE, as the dependent variable. With reference to the DOCM, we also analyzed the overall organisational culture itself as represented by the combination of four characteristics with reference to “hard” financial performance criteria.

The findings of this study clearly show that only the mission trait has a positive effect on the financial indicator while the other cultural traits in the DOCM exhibit no meaningful effect. Although the study had hypothesized that cultural characteristics and the organizational culture itself, have a positive effect on firm performance, the effect could not accurately be confirmed in the research just apart from one trait. Hence, our findings signify that H_1 as the main hypothesis of the study and H_2 , H_3 and H_4 that stand for cultural traits are rejected, while only H_5 is accepted.

First, as to the findings related to involvement trait, the findings are supporting the results of the past works by Kotter & Heskett (1992) in the U.S., Garmendia (2004) in Spain, Davidson et al. (2007) in South Africa. Our findings also back the findings of the works by Eren, Alpan & Ergun (2003) and Yılmaz & Ergun (2008) conducted in Turkey.

The findings belonging to the involvement trait have profound theoretical-practical implications and deserve further explanation. According to evidence, there may naturally be a strong belief among employees that organizations own their participatory processes and these processes are in line with business objectives. Although this is widely considered and shared among employees and the perception is reflected in the responses of the participants, the mood of the organization seems to not make any contribution to success. We clearly attribute the participatory work environment to the organization, developed on the basis of both members and departments, knowing that hidden disagreements or conflicts might be caused inside by paying high attention to and firmly adhering to their own ideas. In this manner, the concealed disagreements in the organization create an obstacle for desired business performance. Next, individual and organizational goals directed to employees may be incompatible with the involvement culture and might be pushing the members to be self-centered. Thirdly, we note that cultural forms are close together. In our opinion, the conceptual similarity between the involvement culture and strong culture form, makes it difficult to discern any difference between the two. In this way, our extraction can be interpreted in parallel to Kotter & Heskett (1992)'s study hypothesizing that the firms with strong culture had superior financial outcomes.

As to the consistency trait, The findings related to the consistency trait are similar to the findings of the studies by Kotter & Heskett (1992) in the U.S., Fey & Denison (2003) in Russia, Eren et al. (2003) in Turkey, Garmendia (2004) in Spain, Davidson et al. (2007) in South Africa and Okoro (2010) in Nigeria context while in dissimilar to the findings of the studies by Denison & Mishra (1985; 1995) in the U.S., Gordon & Di Tomaso (1992) in the U.S., Schein (1992), Sorensen (2002) in the U.S., Nazir & Lone (2008) in India, Zakari et al. (2013) in Ghana and Glaser (2014) in the U.S. context.

Findings on the consistency trait imply that the integrative mood felt by combining core values with the agreement and coordination in the organization hardly ever contribute to business performance, even if they seem to increase employee's corporate loyalty and cooperation related to their activities. Among the possible reasons for this implication, it can be argued that attitudes and behaviors based upon core values are not congruent with the firms' economic goals. Accordingly, this view contains an intrinsic contradiction and it can be assumed that activities carried out by agreement and coordination prevent employees from unifying around organizational targets. But as stated by Yılmaz and Ergun (2008) enterprises with a strong culture where internal integration is high, may be deficient in adapting to the external environment and inadequate in meeting the demands of a cultural market lacking flexibility. It is worth considering and may also be valid for chemical enterprises that operate within the intense and rapid-changing competition environment. Thus, the business environment can be a decisive factor in a firm's economic performance.

Our findings related to the adaptability trait are in a different direction than those of the research by Denison & Mishra (1989, 1995) in the U.S., Gordon & Di Tomaso (1992) in the

U.S., Fey & Denison (2000) in Russia, Eren et al. (2003) in Turkey, Nazir & Lone (2008) in India, Hartnell et al. (2011) in the U.S., Fekete & Böcksei (2011) in Hungary while they are in line with the studies of Davidson (2003) in South Africa, Yılmaz & Ergun (2008) in Turkey, Han (2012) in South Korea, Yeşil & Kaya (2013) in Turkey, Ghanavati (2014) in Iran, Glaser (2014) in the U.S. and Pinho et al. (2014) in the Portuguese context.

There are several reasons why the adaptability trait is insufficient to explain ROE. First of all, it can be postulated that chemical enterprises in intense competition fail to predict the market and adapt their culture to environmental change. Besides, it may be stated that an external focus has a different impact than the one on firm performance. Because an external focus gives flexibility and quick movement to a firm, it differs from the internal integration dimension that involves more cumbersome and heavier change. Therefore, a sensitive environmentally-focused culture can be expected to become a faster determinant of market share and profitability. In addition, the internal functions of a business that aim to improve its external focus can interfere with change. In a sense, the system of internal norms and beliefs may be incompetent to perceive, understand and convert the demands from the external environment into targeted financial results. Hence, the unwieldiness and slowness of the existing internal integration (or strong culture) may prevail within an organization, impeding the development of a flexible culture in terms of making changes to the environment.

Finally, one of the most obvious findings in the study is that the mission trait has a statistically significant and positive effect on return on equity ($p < .10$), although other cultural traits give statistically insignificant results on financial indicators. This might be interpreted as perhaps the most intriguing finding in the study. Having the maximum dimensional score (3,81) among others, the findings belonging to the mission trait are in line with expectations.

Our findings provide empirical evidence that a clear vision of long-term goals adopted with an organizational orientation and a business vision would back the achievement of the desired financial performance. Because in a mission-dominated culture, the whole organization focuses on long-term goals and does not divert its direction with short-term fluctuations. Subject to the findings of the study, it is possible to emphasize that the business objectives clearly defined and shared with the employees, the strategic guidance made to the employees in line with these objectives and the sharing business vision with the employees by adopting them can play a critical role in the achievement of their business success. However, our findings suggest that long-term financial success can be achieved by defining long-term goals and organizational unification around the vision while not suggesting that other cultural traits should be overlooked.

The findings related to the mission trait support the results of the past work of Denison & Mishra (1989; 1995) in the US, Fisher (1997) in the US, Nazir & Lone (2008) in India, Okoro (2010) in Nigeria, Zakari et al. (2013) in Ghana, Olughor (2014) in Nigeria and Glaser (2014)

in US, while not supporting the work of Davidson (2003) in South Africa. Our findings also back those of Eren et al. (2003) and Yılmaz & Ergun (2008)'s research conducted in Turkey.

In sum, with the terms of the four cultural characteristics of Denison's Theory, it is quite noticeable that findings of the previous C/P works which were conducted in Turkey and different countries revolved around the mission trait. Our findings are widely in line with the results of other studies, indicating that the mission culture is the central cultural term in assuring business success. As such, the present study implies one important lesson for practitioners who are concerned for the success of their organizations, a mission-dominated culture to be developed around a strategic direction, common goals-objectives and a long-term vision, all critical to the improvement of business financial performance.

Limitations and Directions For Future Research

Some limitations should be taken into consideration when evaluating the findings of our study. First, a relatively small number of firms is included in the analysis, but this should not be presumed as a negative factor thanks to the adequate sample size. However, the authors of the present study strongly recommend that further studies, through increasing the number of enterprises, would augment more reliable results.

Second, we conducted research using the five-year financial data of the selected enterprises. Other factors naturally have been influential on these firms' financials. Especially in developing countries, such as Turkey, there is strong possibility that the reflection of structural and fiscal fragilities in the economy may leave a mark on companies' financials. In this sense, we signal the difficulty to determine the precise contribution of intangible assets, such as the corporate culture that cannot be located in the tables of financial statements.

Third, we had to contend with a lack of information about internal processes and supportive observations inside the plants apart from the survey data limits on the evaluation of our findings. This restricted our observational evaluation as to whether there was an institutional awareness of the concept and importance of corporate culture in the enterprises constituting the sample of the study. To us, the relationship still remains hypothetical while some optimistic research exists in the literature. We underscore that this hypothetical relationship may be revealed more clearly and consistently with the help of better corporate culture and financial performance data, which will be collected over a longer period of time, along with supporting internal observations in subsequent work.

The fourth limitation was our decision to employ a *hard* (objective) performance indicator to estimate the five-year average that did not allow us to operate a multivariate selection for the dependent variables. However, some previous work (e.g. Denison and Mishra, 1989; Denison

and Mishra, 1995; Fey and Denison, 2000; Hartnell et al. 2011) has proved that culture is likely to have a significant impact on *soft* (subjective) criteria based on perceptions of growth, customer satisfaction, product-service quality, etc. In this study, corporate culture has not been evaluated with a measurement of perceptions due to selecting a *hard* financial indicant. This may have created a congeniality problem between the financial indicant and the cultural criteria.

The fifth should be evaluated together with the second as it is related to the impact of the firm's managerial decisions in the areas of financing and investments. Thus, investment and financing decisions such as working capital, dividend policy and capital structure may leave a dense mark on the financial statements and show a possible hypothesis impact of the culture on performance that might have been overshadowed by managerial financial decisions. Thus, the matter of how top executives perceive culture and how it maintains influential domination over managerial financing and investment decisions that affect financial statements is worth investigating. Future research could investigate the factors in detail for approachment of top executives that prevail over the C/P connection.

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RESEARCH ARTICLE

Investigation of Factors Affecting the Number of Automobiles Owned by Households: Count Data Model

Kübranur Çebi Karaaslan¹

Abstract

The automobile industry is a service-oriented industry that is constantly developing. Households are the most important interlocutors in this industry. The study's aim in this direction is to determine what factors influence the number of automobiles owned by households. The factors that affect this number, as well as the extent of these affects, have been investigated in the study. The study's data set was obtained from the Turkish Statistical Institute's Household Budget Surveys. Count data models were used in the study. As a result of the study, the gender, age, educational status, marital status, working status of the household head, household size, annual available income, second house ownership, saving status, eating out habits, going to the movie habits, going to the market habits, difficulty in accessing public transportation services, difficulty in accessing compulsory education services and the variables of the survey year were statistically significant. The information presented in this study is expected to help decision makers and policymakers who benefit from the automobile sector, particularly automobile industry manufacturers.

Keywords

Number of Automobile, Automobile Ownership, Poisson Regression, Count Data Models

Introduction

The automobile industry is a highly competitive industry that is constantly changing and developing. The automotive industry has a sizable and effective market share that benefits all segments of society. The automobile industry is a major economic driver in developing countries such as Turkey. A developed automobile industry is a feature shared by all industrialized countries (Karaatlı et al., 2012: 88). There are many brands in the industry that offer various options for a wide range of budgets, suitable for individuals' needs or luxury expectations. The desire of individuals to live more independently and to avoid public transportation as much as possible, particularly in the recent Covid-19 pandemic, has made automobile ownership important, despite the fact that excessive tax burdens on automobiles in Turkey force individuals hands in terms of automobile ownership, which is no longer a luxury and has become a necessity.

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Since 2015, Turkey's automobile ownership has increased. Although an increase in the number of automobiles is a sign of prosperity, it also has certain negative consequences. It contributes to traffic congestion, particularly in congested cities, as well as the spread of emissions into the atmosphere. Road transport contributes significantly to pollution. As a result of global warming, the amount of emissions in the atmosphere increases as the number of vehicles increases, causing ozone layer damage and negative effects on the lives of many (Otken and Gümüşay, 2009: 1).

The study's purpose is to determine what factors influence the number of automobiles in a population. Nowadays, the number of employed people in a family is more than one, and the regular daily flow of life is gradually accelerating, so an automobile frequently far from meets the needs of the household. Especially in Turkey, due to the currency fluctuations and the ever-increasing tax burdens, automobile ownership has begun to be seen as an investment as well as a necessity and this study was motivated by this situation. The study's findings may be useful to decision makers and policymakers who benefit from the automobile industry, particularly automobile manufacturers, by providing information on the factors influencing the number of automobiles owned by households, which are important interlocutors of the automobile sector.

This work consists mainly of five parts. Following the introduction, the second section contains a literature review. The third section describes the data set, variables, and econometric method used in the study. The results of the analysis are presented in the fourth part, and the results are discussed and evaluated in the final part.

Literature Review

Other economic factors, particularly gender, marital status, educational status, and income, were found to have an effect on automobile ownership in studies conducted as seen in the literature review. Some of the studies on this subject are identified below.

Scott and Axhausen (2006) conducted research on the mobility needs of households. The study's data set was obtained through a survey conducted in Germany. In the study, the bivariate-ordered probit regression model was used. According to the findings of the study, income is important for both season tickets and automobiles, but as income rises, so does the preference for automobiles over seasonal tickets, and the further a household lives from the city centre, the more likely it is to own one or more automobiles.

Potoglou and Kanaroglou (2008) investigated the influence of socioeconomic factors on the number of automobiles owned by a household. A questionnaire was used in the study, as well as a multinomial logistic regression model. The study discovered that the number of working adults and persons with a driver's license affects the number of automobiles, that an

increase in the number of employees increases the likelihood of the household having two or more automobiles, and that households with children and married children are more likely to have two automobiles than single individuals.

Li et al. (2010) investigated the influence of socioeconomic and demographic factors on private vehicle ownership in China's megacities. The study relied on questionnaire data and employed discrete choice models. According to the findings of the study, urban welfare, urban scale, and road infrastructure all have significant positive effects on private vehicle ownership in cities.

In their study, Ritter, and Vance (2013) investigated the effect of reduced family size on the number of automobiles. The study's data set was taken from German household data. In the study, the multinomial logistic regression method was used. The study showed that, despite Germany's declining population, there will be an increase in automobile ownership until 2030, that the projected increase in automobile ownership is related to an increase in household income, and that distance from public transportation is an important determinant of vehicle ownership.

Guo investigated the effect of parking spaces in residences on automobile ownership (2013). The study's data set was obtained via a survey application in New York. According to the findings of the study, garage, driveway, and street parking all have a positive effect on automobile ownership.

Gómez-Gélvez and Obando investigated the determinants of household automobile ownership (2013). The study's data set was obtained through a survey conducted in Colombia. The data in the study was analysed using discrete choice models. According to the findings of the study, income has a major effect on vehicle ownership, and the distance to work influences automobile ownership.

In their study, Akay and Tümsel (2015) studied the factors affecting automobile ownership. In the study, the sequential logistic regression method was used. The study included data from 3733 households from the 2013 Budget Survey. As a result of the study, it was determined that the variable that most negatively affects automobile ownership is a household's monthly expenditures, and the variable that most positively affects the probability of a household owning an automobile is income.

Oakil et al. (2016) examined the factors affecting young people's automobile ownership. The study employed logistic regression analysis. The study results showed a decrease in automobile ownership among young people in the Netherlands. The effect of urbanization level on automobile ownership was found to be much stronger for young couples than for young families or singles.

Another study conducted by Çınar (2018) examined the effect of socioeconomic and demographic factors on consumer automobile ownership. The study's data set was gathered by administering a questionnaire to 2000 people working in Bursa. In the study, a logistic regression model was used. According to the findings of the study, home ownership is the most influential factor on automobile ownership, followed by gender and marital status.

Gürel studied the factors affecting automobile ownership (2019). The study's data set was gathered using a questionnaire administered in Denizli. In the study, binary logistic regression analysis was used. The monthly total income of the household, the number of people with a driver's license in the household, the educational status of the household head, the age of the household head, the number of people with a public transportation card in the household, and the household ownership status were found to be significant factors according to the results of the study.

Memişoğlu and Can (2021) studied the factors affecting purchase decisions in the luxury automotive sector. The study's data set was based on survey data collected in 2019. According to the findings of the study, status, uniqueness, safety, comfort, and environmental sensitivity are important factors in people's luxury automobile preferences.

Methodology

Data Set

The purpose of this study was to investigate the factors affecting the number of automobiles owned by households in Turkey. In the study, the Household Budget Survey of the Turkish Statistical Institute for the years 2015-2019 was used. The stratified two-stage cluster sampling method was used to obtain the data in the Household Budget Survey (Turkish Statistical Institute, [TUIK], 2021). Finally, the study included data on 59102 household heads.

Variables

The study examined the demographic, economic, social, and environmental structures of households in order to conduct an econometric analysis of the number of automobiles owned by households. In practice, the number of automobiles to be used as a dependent variable covers the modes of transportation used by households for special purposes other than commercial purposes.

The factors in the study's data set and the factor affecting household automobile ownership were identified as independent variables. The independent variables were gender, age, educational status, marital status, working status of the household head, household size, annual available income, second housing ownership, saving status, eating out habits, going to the movie habits, going to the market habits, difficulty in accessing public transportation ser-

vices, difficulty in accessing compulsory education services, and year factors. Furthermore, the age variable was classified to examine the effects in different life stages, and the income variable was classified to examine the effects in different income levels.

Research Method

The study employed poisson regression analysis, which was carried out using the Stata 14.1 program. Initially, descriptive statistics for independent variables were used, followed by poisson regression analysis to look at the factors influencing the number of automobiles owned by households.

Results

Descriptive Statistics

Table 1 contains the category definitions and descriptive statistics for the variables in the study. The average number of automobiles per household was 0.453, with a household size of 3.473. It was determined that 83.9% of household heads were male, 23.3% were between the ages of 45 and 54, the majority (81.8%) were married couples living together, 25.7% had a university degree, and 65.4% were working in some capacity. Furthermore, 8.4% owned second homes, the majority (69.8%) did not save money, 36.6% dined out frequently, 7.4% went to the movies frequently, 62.8% went to the market frequently, 65.8% had easy access to public transportation, 63.4% had easy access to health care, and 69.1% had easy access to compulsory education.

Table 1
Descriptive Statistics of Variables

Variables	n (%)	Average	Standard deviation
Number of Automobiles		0.453	0.553
Household Size		3.473	1.821
Demographic indicators			
<i>Gender</i>			
1 Male	83.9		
2 Woman	16.1		
<i>Age</i>			
1 15-24	1.2		
2 25-34	13.2		
3 35-44	23.4		
4 45-54	23.3		
5 55-64	19.5		
6 65 and over	19.5		
<i>Education Status</i>			
1 Had Not Graduated From A School-Primary School	28.3		

Variables	n (%)
2 Secondary school	31.7
3 High school	14.3
4 University	25.7
<i>Marital status</i>	
1 Never Married	3.9
2 Married	81.8
3 Divorced - Spouse Dead	14.3
Economic indicators	
<i>Working Status</i>	
1 Working	65.4
2 Not Working	34.6
<i>Income Level</i>	
1 1st Income Level (lowest)	25.0
2 2nd Income Level	25.0
3 3rd Income Level	25.0
4 4th Income Level (highest)	25.0
<i>Second Home Ownership</i>	
1 Yes	8.4
2 No	91.6
<i>Saving Status</i>	
1 Yes	30.3
2 No	69.8
Social and environmental indicators	
<i>Eating Out Habits</i>	
1 Yes	36.6
2 No	63.4
<i>Going to the Movies Habits</i>	
1 Yes	7.4
2 No	92.6
<i>Going to the Market Habits</i>	
1 Yes	62.8
2 No	37.2
<i>Difficulty Accessing Public Transport Services</i>	
1 Easy	65.8
2 Middle	11.1
3 Hard	23.1
<i>Difficulty Accessing Health Services</i>	
1 Easy	63.4
2 Middle	11.9
3 Hard	24.7
<i>Difficulty Accessing Compulsory Education Services</i>	
1 Easy	69.1
2 Middle	10.8
3 Hard	20.0

Model Estimation

The study used count data models to determine the number of automobiles owned by households. Because the dependent variable included the observation “0,” the zero-inflated poisson regression model and the poisson regression model were statistically compared, and the resulting test statistic indicated that the poisson regression model should be used. (Vuong test of zip vs. standard Poisson: $z = -2.04$ $Pr > z = 0.9793$). The established poisson regression model was found to be statistically significant ($P < 0.000$). The poisson regression model renders the important assumption that there is equal dispersion. Equal dispersion occurs when the variance equals the average, whereas overdispersion occurs when the variance exceeds the average. To determine whether the overdispersion parameter was statistically significant, the likelihood ratio (LR) and Wald tests were used (Dinarcan, 2018: 11; Üçdoğruk and Şengül, 2021: 191). An LR test was used in the study to test for overdispersion. The LR test revealed that the α coefficient was statistically insignificant and that there was no overdispersion. According to this result, it was discovered that poisson regression to the data set was appropriate, and it was studied with robust standard errors.

The presence of multicollinearity between the independent variables that were to be included in the Poisson regression model were tested. The variance inflation factors (Vif) for the independent variables are shown in Table 2.

Table 2

Variance Inflation Factors

Variables	Vif
Demographic indicators	
<i>Gender (reference: male)</i>	
Female	2.09
<i>Age (reference: 65 and over)</i>	
15-24	1.25
25-34	2.27
35-44	2.78
45-54	2.36
55-64	1.79
<i>Education Status (reference: had graduated from a school-primary school)</i>	
Secondary School	1.90
High School	1.60
University	2.42
<i>Marital Status (reference: married)</i>	
Never Married	1.29
Divorced - Spouse Dead	2.16
Household Size	1.42
Economic indicators	
<i>Working Status (reference: not working)</i>	
Working	1.65
<i>Income Level (reference: 1st income level (lowest))</i>	

2nd Income Level	1.65
Variables	Vif
Economic indicators	
3rd Income Level	1.88
4th Income Level (highest)	2.44
<i>Second Home Ownership (reference: no)</i>	
Yes	1.06
<i>Saving Status (reference: no)</i>	
Yes	1.20
Social and environmental indicators	
<i>Eating Out Habits (reference: no)</i>	
Yes	1.31
<i>Going to the Movies Habits (reference: no)</i>	
Yes	1.15
<i>Going to the Market Habits (reference: no)</i>	
Yes	1.08
<i>Difficulty Accessing Public Transport Services (reference: easy)</i>	
Middle	1.93
Hard	3.00
<i>Difficulty Accessing Health Services (reference: easy)</i>	
Middle	2.25
Hard	3.54
<i>Difficulty Accessing Compulsory Education Services (reference: easy)</i>	
Middle	2.02
Hard	2.78
Year	1.34
Mean Vif	1.91

The presence of a high-grade multicollinearity is indicated by a variance inflation factor greater than 10, whereas the absence of a multicollinearity is indicated by a variance inflation factor less than 5 (Alkan et al., 2015: 28). In the study, there was no multicollinearity between the arguments. The Poisson regression model's results are shown in Table 3.

Table 3

Poisson Regression Model Estimation Results

Variables	β	Robust Std. Error	P	95% Conf. Interval	
				LL	UL
Demographic indicators					
<i>Gender (reference: male)</i>					
Female	-0.342	0.026	0.000	-0.392	-0.291
<i>Age (reference: 65 and over)</i>					
15-24	-0.203	0.072	0.005	-0.345	-0.060
25-34	0.004	0.022	0.855	-0.040	0.048
35-44	0.121	0.020	0.000	0.082	0.161
45-54	0.190	0.019	0.000	0.153	0.227
55-64	0.209	0.018	0.000	0.174	0.244
<i>Education Status (reference: had not graduated from a school-primary school)</i>					
Secondary School	0.178	0.015	0.000	0.149	0.208

Variables	β	Robust Std. Error	P	95% Conf. Interval LL	UL
High School	0.187	0.017	0.000	0.153	0.220
Demographic indicators					
<i>Marital Status (reference: married)</i>					
Never Married	-0.477	0.038	0.000	-0.551	-0.403
Divorced - Spouse Died	-0.379	0.028	0.000	-0.435	-0.323
Household Size	0.009	0.003	0.005	0.003	0.015
Economic indicators					
<i>Working Status (reference: not working)</i>					
Working	0.072	0.013	0.000	0.046	0.097
<i>Income Level (reference: 1st income level (lowest))</i>					
2nd Income Level	0.562	0.022	0.000	0.519	0.605
3rd Income Level	0.832	0.022	0.000	0.790	0.874
4th Income Level (highest)	1.104	0.022	0.000	1.060	1.147
<i>Second Home Ownership (reference: no)</i>					
Yes	0.281	0.013	0.000	0.257	0.306
<i>Saving Status (reference: no)</i>					
Yes	0.121	0.010	0.000	0.102	0.140
Social and environmental indicators					
<i>Eating Out Habits (reference: no)</i>					
Yes	0.098	0.010	0.000	0.078	0.118
<i>Going to the Movies Habits (reference: no)</i>					
Yes	0.046	0.014	0.001	0.018	0.074
<i>Going to the Market Habits (reference: no)</i>					
Yes	0.125	0.010	0.000	0.105	0.145
<i>Difficulty Accessing Public Transport Services (reference: easy)</i>					
Middle	0.031	0.020	0.121	-0.008	0.070
Hard	0.049	0.019	0.010	0.012	0.086
<i>Difficulty Accessing Health Services (reference: easy)</i>					
Middle	0.003	0.021	0.896	-0.038	0.043
Hard	-0.021	0.021	0.313	-0.062	0.020
<i>Difficulty Accessing Compulsory Education Services (reference: easy)</i>					
Middle	0.013	0.021	0.542	-0.028	0.054
Hard	0.081	0.020	0.000	0.042	0.120
Year	0.047	0.004	0.000	0.040	0.054
Cons	-2.199	0.029	0.000	-2.257	-2.142
N: 59102	Log Likelihood: -44526.930				
Pseudo R ² : 0.094	Prob: 0.000				

When Table 3 was examined, the gender, age, educational status, marital status, working status of the household head, household size, annual available income, second housing ownership, saving status, eating out habits, going to the movie habits, going to the market habits, difficulty in accessing public transportation services, difficulty in accessing compulsory education services and the variables of the survey year were found to be statistically significant. Coefficient interpretations were to be made through marginal effects. The marginal effect values of the variables used in the model are shown in Table 4.

Table 4

Poisson Regression Model Marginal Effect Estimation Results

Variables	dy/dx	Std. Error	P	95% Conf. Interval	
				LL	UL
Demographic indicators					
<i>Gender (reference: male)</i>					
Female	-0.135	0.009	0.000	-0.152	-0.118
<i>Age (reference: 65 and over)</i>					
15-24	-0.073	0.024	0.002	-0.120	-0.026
25-34	0.002	0.009	0.855	-0.016	0.019
35-44	0.052	0.008	0.000	0.035	0.068
45-54	0.084	0.008	0.000	0.068	0.099
55-64	0.093	0.008	0.000	0.078	0.108
<i>Education Status (reference: had not graduated from a school-primary school)</i>					
Secondary School	0.072	0.006	0.000	0.060	0.084
High School	0.076	0.007	0.000	0.062	0.089
University	0.160	0.007	0.000	0.147	0.173
<i>Marital Status (reference: married)</i>					
Never Married	-0.179	0.011	0.000	-0.201	-0.157
Divorced - Spouse Died	-0.149	0.010	0.000	-0.168	-0.130
Household Size	0.004	0.001	0.005	0.001	0.007
Economic indicators					
<i>Working Status (reference: not working)</i>					
Working	0.032	0.006	0.000	0.021	0.043
<i>Income Level (reference: 1st income level (lowest))</i>					
2nd Income Level	0.160	0.006	0.000	0.149	0.172
3rd Income Level	0.276	0.006	0.000	0.264	0.288
4th Income Level (highest)	0.428	0.007	0.000	0.414	0.442
<i>Second Home Ownership (reference: no)</i>					
Yes	0.142	0.007	0.000	0.128	0.156
<i>Saving Status (reference: no)</i>					
Yes	0.055	0.004	0.000	0.047	0.064
Social and environmental indicators					
<i>Eating Out Habits (reference: no)</i>					
Yes	0.045	0.005	0.000	0.036	0.054
<i>Going to the Movies Habits (reference: no)</i>					
Yes	0.021	0.007	0.002	0.008	0.035
<i>Going to the Market Habits (reference: no)</i>					
Yes	0.055	0.004	0.000	0.047	0.064
<i>Difficulty Accessing Public Transport Services (reference: easy)</i>					
Middle	0.014	0.009	0.125	-0.004	0.032
Hard	0.022	0.009	0.011	0.005	0.040
<i>Difficulty Accessing Health Services (reference: easy)</i>					
Middle	0.001	0.009	0.896	-0.017	0.020
Hard	-0.009	0.009	0.311	-0.028	0.009
<i>Difficulty Accessing Compulsory Education Services (reference: easy)</i>					
Middle	0.006	0.009	0.544	-0.013	0.024
Hard	0.038	0.009	0.000	0.019	0.056
Year	0.021	0.002	0.000	0.018	0.025

According to the marginal effects of the poisson regression model shown in Table 4, in terms of demographic indicators, female household heads had 0.135 fewer automobiles compared to men. Household heads aged 15-24 had 0.073 fewer automobiles compared to those over 65, but those aged 35-44, 45-54, 55-64 had 0.052, 0.084, 0.093 more respectively. Automobile ownership rates for secondary, high school, and college graduates were 0.072, 0.076, and 0.160 lower, respectively, compared to those who had not graduated from school/graduated from primary school. The number of households that had never married and divorced/whose spouse had died were 0.179 and 0.149 less than those who had married, respectively. The increase in household size increased the number of automobiles owned by households by 0.004.

In terms of economic indicators, working household heads had 0.032 more automobiles than non-working ones. Households belonging to the 2nd income level, 3rd income level and highest income level had respectively 0.160, 0.276, 0.428 more automobiles than those belonging to the lowest income level. Those who had a second home had 0.142 more automobiles than those who did not. Savers had 0.055 more automobiles than those who did not.

In terms of social indicators, those who had a habit of dining-out had 0.045 more automobiles than those who did not. Those who had the habit of going to the movies had 0.021 more automobiles than those who did not. Those who had a habit of going to the market had 0.055 more automobiles than those who did not. Those who had difficult access to public transportation services had 0.022 more automobiles compared to those who had easy access. Those with difficult access to compulsory education services had 0.038 more automobiles compared to those with easy access. Over the years, the number of automobiles belonging to households increased by 0.021.

Conclusion and Discussion

The factors affecting the number of automobiles owned by households were discussed in this study. Because the number of automobiles was the dependent variable in the count data, the poisson regression model was used as one of the count data models. As a result of the study, the gender, age, educational status, marital status, working status of the household head, household size, annual available income, second housing ownership, saving status, eating out habits, going to the movies habits, going to the market habits, difficulty in accessing public transportation services, difficulty in access to compulsory education services and survey year were found to be statistically significant. To conclude, the findings are consistent with the literature. The findings shed light on several policy implications.

Women own fewer automobiles than men. This could be due to the fact that the increased number of female drivers in our country is a relatively new situation.

Concerning age factor when categorically taken to see the change in the number of automobiles related to life circuits, it was discovered that young people have less automobile ownership and people over the age of 35 have the highest number of automobiles owned. It is thought that this condition is related to income and getting started in business in an indirect manner.

In terms of marital status, married people have the most automobiles when it comes to marital status. This can be explained by the fact that married people require more automobiles to meet their household needs than single people, and the presence of working spouses or children can sometimes necessitate the need for more than one automobile. In line with this notion, it was discovered that as household size increases, so does the number of automobiles owned by households.

All of the economic indicators have produced results that are consistent with one another. As a natural result of this situation, households with good economic indicators own more automobiles. Those who work have more automobiles than those who do not work, those with a middle-high income have more automobiles than those with a low income, and those a second home have more automobiles.

In terms of social indicators, those who have the habit of eating out have more automobiles than those who don't. Those who have the habit of going to the movies have more automobiles than those who don't. Those who have the habit of going to the market have more automobiles than those who don't. In addition to expressing the sociocultural structure, these variables are also indicators of the welfare level, so parallel outputs with the income level variable are expected.

Those who have difficult access to public transportation have more automobiles than those who have easy access. Those who have difficult access to compulsory education services own more automobiles than those who have easy access. The household's transportation difficulties must have compelled the household to provide more than one vehicle.

The increase in the number of automobiles owned by households over the years can be attributed to the family structure, which has grown and diversified over time, and in this case, more than one vehicle will be required.

Examining automobile ownership, in a country like Turkey, whose per capita income is much less from developed countries, will help us obtain valuable findings. Therewithal, the Covid 19 pandemic has given rise to people's desire to distance themselves from public places, and this has started to force people to obtain automobiles.. In some cases, the inadequacy of public transportation, poor transportation comfort, and even the inability to provide transportation without specialized equipment forces people to own an automobile. In addition to

all of these negative situations, I believe that the study will be valuable in terms of providing the opportunity to evaluate the behaviour of partially high-income groups, in terms of automobile ownership, and will provide beneficial outcomes for the relevant stakeholders.

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RESEARCH ARTICLE

Discrete Event Simulation Model Performed with Data Analytics for a Call Center Optimization

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Abstract

Optimization models enable organizations to find the best solution and respond to the demand from an uncertain environment and stochastic process promptly and with less engineering effort. This study aims to optimize the number of seasonal agents and customer prioritization needed for a call center system using big data analytics and discrete event simulations to improve customer satisfaction. The study was carried out based on data from a leading heating and ventilation company's call center. The K-means clustering technique was used to determine customer segmentation on 6-million-customer data. For prioritization, the making of a Recency-Frequency-Monetary (RFM) analysis was applied. The system was modeled using ARENA simulation software, and performance parameters were measured depending on the segments obtained. The results show that the simulation model performed with data analytics gives better results for a beneficial financial impact with numerical values in customer prioritization, reducing the average waiting time of the most prioritized customers by more than 90%, and for the least prioritized customers, it increased the average waiting time by approximately just 40%. However, with the company segments, the increase in the average waiting time of the least prioritized customers was approximately 300%.

Keywords

Call Center Management, Simulation, Prioritization, Data Analytics, Customer Segmentation

Introduction

Call centers have become the heart of the service sector, which aims to manage customer interactions to sustain operations (Ma, J. et al., 2011). It serves a function in determining customer loyalty and satisfaction with a company. It is strategically vital (Anton, 2000) as call center management is a communication channel where companies directly contact customers (K.J. et al., 2004; Saberi et al., 2017). To effectively and efficiently manage the call centers, companies must carefully analyze the relevant parameters, processes, logic, and relationships to perform effective management. (Mehrotra and Fama, 2003; Feinberg et al., 2000). The process is that customers call the call centers, ask questions about their challenges, compla-

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ints, or the needed solutions for their problems. The company must attach importance to call centers because if customers are not satisfied, there might be a direct loss for a business, i.e., unsatisfied customers may not make repurchases (Feinberg et al., 2000).

Data Analytics is commonly used to analyze and understand customer data. Customer segmentation is an essential technique to gain insight on customer behaviors for decision making and developing strategy. Segmentation divides customers into discrete, homogenous customer groups based on similar characteristics or purchasing preferences. (Hassan, M. M., and Tabasum, M., 2018)

Discrete-Event Simulation (DES), which is one of the strategic management tools, is useful in decision-making by looking at problems as a whole and expressing all the relationships, interactions, and uncertainty sets (Arora, 2007). The simulation is appropriate for analyzing the relationships which are significant for call center management, such as waiting time in queues, source management, utilization, etc. Since DES is very popular in assessing and optimizing stochastic processes, a wide variety of applications exist in the literature. Some of them are as follows: optimization of raw material allocation process (Windisch et al., 2015), increasing operational and manufacturing efficiency (Troncoso-Palacio et al., 2018; Riskadadyanti et al., 2019; Knapčíková et al., 2020), optimization of transportation problems (Afrapoli et al., 2019; Behiri et al., 2018), line balancing (Bongomin et al., 2020; Yemane et al., 2020), and stock management (Gittins et al., 2020; Amorim-Lopes et al. 2021).

This study developed a DES model with data analytics to increase customer satisfaction by determining the number of agents needed and the most appropriate segment for a real-life call center. To the best of our knowledge, this is the first study to assess call center performance management by using simulation and data mining in the literature. The proposed model is believed to be a guide for call center managers and performance management professionals.

The call center of one of the leading companies in the heating, cooling, and air-conditioning sector was selected as a case study. This company receives almost 3.5 million calls during the year from among their 6-million customers. Due to long waiting times, we constructed data-driven customer segmentation applying k-means clustering on the 6-million-customer data and the prioritization making recency-frequency-monetary (RFM) analysis. Then, we compared data-driven segments with the current company segments using a simulation methodology. As a result of the study, the proposed model makes the company serve valuable customers with a waiting time of fewer than 5 seconds, reducing the number of agents by 15%, saving labor costs, and making data-driven customer segmentation prioritization. The research conducted within this research scope clearly shows that big data methods give better results than expert approaches in prioritizing customers. For this reason, extensive data analysis will be inevitable before the simulation or any optimization method to be implemented.

The research methodology of this study is represented in Figure 1. The literature review includes current studies in call center management through google scholar and web of science. Then, the data analysis phase is processed for input data such as interarrival time and process time. For seasonality and dependency, time series graphs were created, and autocorrelation tests were made from the data, respectively. Next, K-Means and clustering were applied to the customer data for segmentation after k was defined by using the Elbow Method. Then, the RFM Method was used to prioritize the clusters which were a result of clustering. Another important step was DES Modelling. In this step, firstly, suitable distributions were determined through the input analyzer, homogeneity tests were checked, and then, the process was modeled via ARENA simulation software. After the verification and validation tests on the developed model were successful, the scenario analysis step was started. Finally, the scenario analysis was done based on the performance parameters, and then, alternative scenarios were compared.

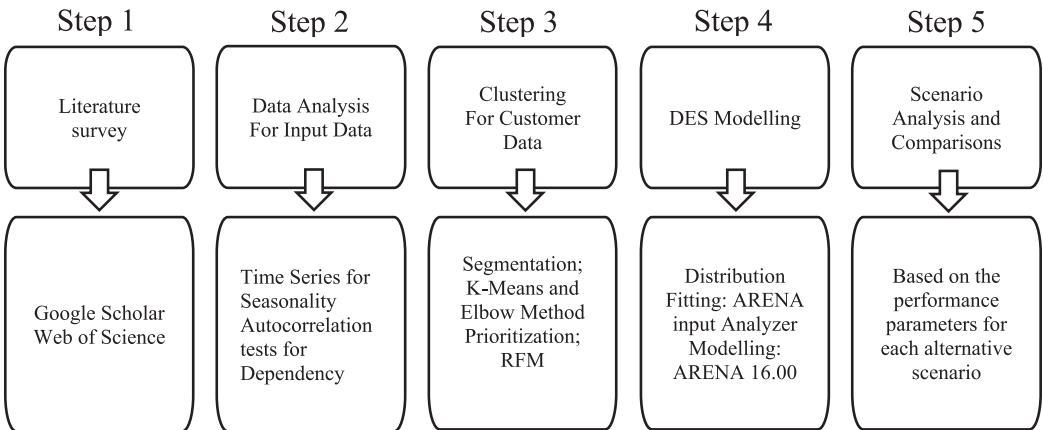


Figure 1. Research Methodology Diagram

The rest of the paper is organized following the strengthening of the reporting of empirical simulation studies (STRESS) guidelines (Monks *et al.*, 2019). STRESS guidelines include the *literature review section*, which demonstrates the current applications of call center management in the literature; the *objectives* section, which explains the purpose and the expectations of the study; the *logic* and *scenario logic* sections, which contain the current and scenario logics and explain the differences between the two models; the *data* section, which contains parameters and assumptions for the model; the *experimentation* section, which shows the initialization parameters of the simulation model; the *implementation* section, which shows the technical background for the running of the simulation model; the *result* section, which contains the comparison of model outputs; and the *conclusion* section, which includes the inferences made by the study, respectively (Monks *et al.*, 2019).

Literature Review

In the literature, there are several studies related to performance management at call centers. Legros et al. (2017) enhanced a Markov chain method that evaluated a call center model's performance, which provides a feature of converting an incoming call to an outgoing call for performance evaluation and queue optimization (Legros et al., 2017). Van Buuren et al. (2017) investigated and equated three discrete-event simulation models for emergency department call centers and then obtained some inferences on how to decrease response time. Simulation is a convenient way to evaluate a call center system's performance since it allows examining the different scenarios and can be combined with data analysis (Lam and Lau, 2004; Doomun and Jungum, 2008).

Ibrahim *et al.* (2016) reviewed the literature on forecasting and modeling call arrivals, discussed the critical points for structuring a qualified statistical arrival model, and measured the proportions of forecasting precision. These values were obtained from call center data, which was collected in real life. Moreover, they stated that to achieve better forecasting accuracy and effective operational decisions, call center arrivals to play an important role were based on scheduling, routing, and staffing. Aktekin (2014) studied how to reduce the paucity of studies on the uncertainty of input distributions and their impact on call center management. Then, he observed that different customer profiles require other agent skills. Thus, the anticipation of service distribution may decrease.

Alotaibi and Liu (2013) developed a new numerical model to improve the average waiting times of a telecommunications contact center by prioritizing customer groups. The authors primarily aimed to improve the customer satisfaction of customer groups with high priority, and they optimized the waiting times of prioritized groups using the proposed model. Abdullateef *et al.* (2010) proposed a conceptual framework for a customer contact center. They aimed to evaluate the critical factors of sufficient caller satisfaction and service delivery. They stated that, in addition to a well-performed first call experience, the four primary elements (client, technology, process, and people) have a crucial role in caller satisfaction. Koole and Pot (2005) committed a model that assigning jobs to employees in multi-skill call centers often occurs according to priority routing policies in conjunction with agent groups. They observed that, compared to the initial model, assigning calls to specialists reduces the average queue length by 50 percent.

To understand customer behavior, customer profiles should be determined (Farruh, 2019; Anshari et al., 2019, Thomas and Shirani, 2020; Greco and Polli, 2020; Gayathri et al., 2020). Determining customer profiles includes five models: segmentation, customer profitability, customer retention, customer clustering, and response analysis (Hahnke, 2001). Customer segmentation is an essential technique to understand customer behavior for decision making

and developing strategy. Segmentation divides customers into discrete, homogenous customer groups based on the similarity of characteristics or purchasing preferences (Hassan, M. M., and Tabasum, M., 2018; Carnein and Trautmann, 2019; Hung et al., 2019). Customer clustering finds similarities/relationships between data sets using data mining techniques and uses those similarities to create meaningful clusters (Saglam et al., 2006; Shih et al., 2010; Rudskaia and Eremenko, 2019). Clustering analysis divides the data records into classes, but the same class data are very similar while the data in different classes are quite distinct (Klement, P., and Snášel, V., 2011; Jintana and Mori, 2019).

In addition to the importance of understanding the customer for call center performance, simulating the process of a call center is another critical point to see the current performance and improve it. Avramidis and L'Ecuyer (2005) mentioned the importance of call centers for companies and explained why call centers need simulations. The main reasons were the complexity of call center problems and a simulation's capability of solving complex problems straightforwardly (Calis, 2016). It was observed in this study that simulations benefited companies as follows: Companies can see the effects of the changes they plan to make without interrupting operations. The call center is finally emerging as a manageable, responsive, and customizable strategic weapon with simulation. Mehrotra and Fama (2003) studied how call centers use simulations to overview call center simulation models, emphasizing characteristic inputs and data sources, modeling challenges, and critical model outputs. They created a simulation model and determined routing strategies for a call center using simulation results obtained from 3 different agent groups.

Objectives

The study was conducted based on the data of a leading heating and ventilation company's call center. The company is a leading company in international markets for heating and ventilation technology and serves Turkey within regional offices with authorized dealers and service technicians. The company's call center receives almost 3.5M calls during the year. This study aims to propose a model to increase customer satisfaction through the determination of the most suitable segment and needed number of agents for the system.

Logic

In this part of the research, the current system analysis and segments defined by the company are presented. Then, the results obtained from big data analytics and the analyses made in this context are explained. Finally, the findings obtained by comparative simulation analyzes are shared.

Base Model Overview

In the company's current model, the customer arrives and directly goes to the interactive voice response (IVR) system, which is an automatic speech system that is used to orient customers for the process (Dillman *et al.*, 2009). In the company's call center, every customer is delayed on IVR for 47 seconds. After IVR, some calls miss, and some of them go to the call process. Then, the customer leaves. Segments defined by the company are given in Table 1

Table 1

Customer segments determined by the company

Segment Name	Rules	Call Priority
S1: Exclusive Device Customer	Customers who have bought determined prioritized hero products.	1
S2: Contracted Loyal Customer	Customers who have purchased a maintenance contract for at least six years at one time or during each renewal period.	2
S3: Contracted Customer	Customers who have purchased a maintenance contract for one year or have purchased a product with no warranty agreement and receive maintenance or breakdown service for three consecutive years.	3
S4: Inactive Customer	Customers who purchased a product more than five years ago with no purchase in the past five years.	4

Data Mining and Customer Segmentation

With technological developments and digital transformation in this age, data grows, and the importance of using data correctly increases (David, 2013; Verhoef *et al.*, 2019). As data grows, it becomes more complex and incomprehensible (Erevelles *et al.*, 2016; Şen *et al.*, 2019; Uslu & Firat, 2019). Companies that cannot improve toward analyzing and using big data may have difficulty keeping up with the trend in terms of competition and performance (Watson, 2012; Uslu, 2020).

The research aims to form customer groups based on their characteristics to prioritize them in the call center. This process is called customer segmentation, which is defined by Tsiptsis and Chorianopoulos (2011) as a division process of customers into homogeneous groups based on their behaviors. Since firms have recently obtained vast customer data, data mining is becoming an appropriate way to analyze it (Rygielski *et al.*, 2002).

In the literature, several studies about customer segmentation exist. When those studies are examined in detail, it can be seen that some researchers analyze behavioral features of clusters after clustering. Rajagopal (2011) used customer clustering to identify five customer groups using a determined number of clusters. After the author determined the clusters, he analyzed their profit profiles using Search Query Language (SQL) to see their lifetime value. Farajian and Mohammadi (2010) analyzed the attitudes of banking customers using clustering and association rule techniques. In the clustering section, first, they applied K-means clustering, and they supposed that k equaled 3. Then, they calculated Recency, Frequency, and Monetary (RFM) scores to reach the meanings of clusters.

Additionally, clustering is applied after analyzing behaviors using some specific techniques by some researchers. Shih and Liu (2003) made K-means clustering based on RFM weights, and they determined k as 8. Then, they ranked the clusters in terms of customer lifetime value. Namvar et al. (2010) made customer clustering using demographic variables on the data of Iranian bank customers. First, they calculated the RFM scores of each customer, and then, they used K-means clustering with 9 clusters. In this project, first, segmentation would be made based on customer transaction data using K-means clustering in R programming language; then, the prioritization would be made using RFM Analysis.

For the customer segmentation, the disinfected customer data taken from the company contained 6,030,355 customers, and 16 attributes of each customer were used applying k-means clustering and RFM analysis. K-means methodology is one of the most common methods used for customer clustering (Figueiredo *et al.*, 2003; Niyagas *et al.*, 2006; Windorto *et al.*, 2019; Maheshwari *et al.*, 2019; Rojlertjanya, 2019; Gustriansyah *et al.*, 2020; Mousavi *et al.*, 2020; Nugraha, 2020). The primary purpose of the k-means clustering is to form clusters that “minimize the squared error criterion” using the predetermined number of k values, which represents the number of clusters (Ye *et al.*, 2013). To obtain an optimal number of clusters, the Elbow Method’s interpretation would be appropriate before applying k-means clustering (Bholowalia and Kumar, 2014; Syakur *et al.*, 2018; Anuşlu and Fırat, 2019; Nainggolan *et al.*, 2019; Cui, 2020; Liu and Deng, 2020; Umargono *et al.*, 2020).

For the clustering phase, the following variables were used: number of products, agreement contracts, number of maintenance contracts, and duration of agreement contracts. First, the Elbow method was applied, and the optimal value of k was found as 8. Then, using the optimum k -value and k-means clustering, data-driven segments were obtained.

For segment prioritization, RFM analysis was made based on customer transactions. During the RFM application, first, *recency value* as the time between the last transaction and the present, *frequency value* as the number of transactions, and *monetary value* as the price of the transactions were calculated for each customer in each cluster based on products and contracts (Zalaghi and Varzi, 2014; Kadir and Achyar, 2019; Maraghi *et al.*, 2020). All criteria scores were then combined and ranked to form an overall RFM score between 1 and 5 (Zalaghi and Varzi, 2014; Sabuncu *et al.*, 2020). Second, according to the average RFM scores, clusters were prioritized as seen in Table 2.

Table 2

The segments which were determined by the clustering method and their calculated RFM scores

Clusters	Rules	RFM Score
Cluster 6	Those have at least one combi, thermosiphon, and agreement contract.	2.996
Cluster 2	Those have not heat pump and/or just have a boiler but have not agreement contract.	1.930
Cluster 4	Those have not heat pump and cascade but have at least one combi or thermosiphon.	1.743
Cluster 8	Those do not have to cascade but have at least two air conditioners.	1.666
Cluster 5	Those have not heat pump and cascade but have thermosiphon.	1.569
Cluster 7	Those have not cascade and agreement contracts but have thermosiphon.	1.390
Cluster 1	Those have not to a heat pump but have the geysers.	1.212
Cluster 3	Those have not to heat pump and cascade but have at least one combi or geysers	1.197

Time Series Analysis and Homogeneity Test

To check the seasonality effect, time-series graphs were formed based on weekly average process times and interarrival times, and the process was considered within four seasons to prevent seasonality (Nwogu *et al.*, 2016). As seen in Figure 2, process times have seasonality. After it was decided to proceed by dividing the data into four seasons to avoid seasonality, autocorrelation graphs were formed with RStudio to measure the dependency in the data (Banks *et al.*, 2005). As can be seen in the example graph for process times of season three in Figure 3, since there were some lines that went beyond the upper line of the graph, it was necessary to analyze the residuals to check whether the residuals had trends or not. Using Excel, residual graphs were formed for both interarrival and process times of each season. According to the residual graphs, all the data points of each season lie flat, so there was no trend on the residual graphs. An example residual graph of the process time of season three can be seen in Figure 4 below. Then, autocorrelation graphs were formed to check data dependency (Banks *et al.*, 2005). Some lines go beyond the graph’s upper line, so it was necessary to analyze the residuals to check whether the residuals had trends. Residual plots were formed for each season’s interarrival and process times, and there was no trend on the residual graphs.

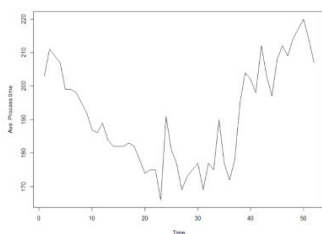


Figure 2. Time series graph for process time

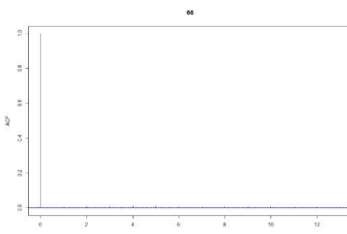


Figure 3. An example autocorrelation graph for process times of Season 3

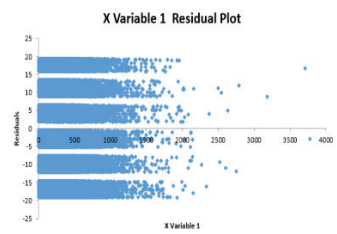


Figure 4. Example residual graph for process times of Season 3

After autocorrelation, using the Input Analyzer tool of ARENA, probability distributions of interarrival times and process times for each season were obtained, as shown in Table V. To decide which distribution had a good fit, the corresponding p-value of the Chi-square test was considered. (Banks *et al.*, 2005; Andrade, 2019).

Resources

Agents are the call center representatives who communicate with customers. In the call center, they are responsible for making inbound and outbound calls. According to the company's information, the ratio of agents making inbound calls changes from season to season depending on the traffic of calls. In the company, 1559 agents are working both in-source and out-source within shifts of 11 hours.

Verification and Validation

Verification is about building the model correctly while validation is about building the correct model (Sargent, 2013). That is why, for verification, a checklist that includes all elements of the model was prepared, and it was asked by an expert from the company whether all the system parameters were considered in the model or not.

Additionally, validation is a statistical analysis that compares observations with the simulation model results (Banks *et al.*, 2005). To validate the simulated model, hypothesis testing was used, and α was selected as 0.01 (Banks *et al.*, 2005). As a result, the model is found valid upon these statistical calculations.

Scenario Logic

There were two scenarios experienced, so the first scenario was prioritization according to the segments determined by the company whereas the second scenario was prioritization according to the segments determined by the clustering method.

First Scenario: Prioritization according to the Company Segments

Only the resource's queue type and schedule were changed to build an alternative scenario in the first scenario. Queue type was first-in, first-out in the current model, but the queue was prioritized according to the first alternative scenario segments. The schedule of resources means that the number of agents was reduced at a rate of 15%. The distribution of customer types is shown in Table 3. These ratios were used for customer arrivals of the call center system.

Second Scenario: Prioritization according to Proposed Data Analytics Segments

In the second scenario, only the queue type and schedule of the resources were changed to build an alternative scenario. Queue type was first-in, first-out in the current model, but the queue was prioritized according to the segments in the second alternative scenario. The schedule of resources means that the number of agents was reduced at a rate of 15%. The eight clusters were obtained by using the clustering method. Then, they were segmented by using the RFM method, and ordered segments were obtained. The distribution of these segments

are shown in Table 3 and Table 4. The ratios seen below were used for customer arrivals of the call center system

Table 3
Distribution of calls by company customer segments for each season

	Segment	Percentage of calls from the segment		Segment	Percentage of calls from the segment
SN1	S1	2.80%	SN3	S1	2.5%
	S2	5.5%		S2	4.9%
	S3	75.2%		S3	76.8%
	S4	16.5%		S4	15.8%
	Segment	Percentage of calls from the segment		Segment	Percentage of calls from the segment
SN2	S1	2.4%	SN4	S1	2.2%
	S2	7.2%		S2	4.3%
	S3	75.0%		S3	76.0%
	S4	15.4%		S4	17.5%

Table 4
Distribution of calls by clustering segments for each season

	Segment	Percentage of calls from the segment		Segment	Percentage of calls from the segment
SN1	Cluster 6	0.1%	SN3	Cluster 6	0.1%
	Cluster 2	0.8%		Cluster 2	1.0%
	Cluster 4	0.8%		Cluster 4	0.8%
	Cluster 8	2.7%		Cluster 8	3.2%
	Cluster 5	8.4%		Cluster 5	10.4%
	Cluster 7	7.4%		Cluster 7	7.2%
	Cluster 1	7.4%		Cluster 1	8.3%
	Cluster 3	72.3%		Cluster 3	69.0%
	Segment	Percentage of calls from the segment		Segment	Percentage of calls from the segment
SN2	Cluster 6	0.1%	SN4	Cluster 6	0.2%
	Cluster 2	0.9%		Cluster 2	0.7%
	Cluster 4	0.6%		Cluster 4	0.8%
	Cluster 8	2.8%		Cluster 8	2.5%
	Cluster 5	10.2%		Cluster 5	8.4%
	Cluster 7	7.0%		Cluster 7	8.1%
	Cluster 1	8.6%		Cluster 1	7.1%
	Cluster 3	69.8%		Cluster 3	72.2%

Data Analysis

There are two different data sets: the device purchases of 6M customers and call center data for one year. Both of the data sets were taken from the company as cleaned, so there was no need to do any pre-processing. The call center data was broken into four seasons to eliminate seasonality effects. The missing call percentage of the system was calculated based on historical data of each season, as the share of missing customers overall. The data set contained arrival time and service time. To illustrate the model of the call center’s current system, input parameters

and their distributions are shown in Table 5. The ARENA Input Analyzer was used to determine appropriate distributions. To decide which distribution had good fit, the corresponding p-value of Chi-square test was considered. If the p-value was less than 0.05, it could be said that the distribution was fit for the data (Banks *et al.*, 2005; Andrade, 2019).

Table 5

Input Parameters of Current Model

Season	Interarrival Time Distribution	Process Time Distribution	Missing Call Percentage
S1	-0.001 + EXPO(7.33)	0.999 + GAMM(109, 1.7)	1.3%
S2	-0.001 + WEIB(9.84,0.783)	0.999 + GAMM102, 1.65)	1.2%
S3	-0.001 + EXPO(9.14)	0.999 + GAMM(106, 1.62)	1.4%
S4	-0.001 + EXPO(4.69)	0.999 + GAMM(112, 1.75)	1.7%

To develop the model, some assumptions were made, and these can be seen in Table 6.

Table 6

*Assumptions of the current model of the call center of the company***Assumptions**

- The capacity of the line is limitless.
- There is no breakaway in the line.
- The call center serves 11 hours a day from 08:00 am to 07:00 pm, and only on weekdays.
- Distributions of process and interarrival times are the same for the current model and alternative models.
- There is no difference between agents in terms of performance.

Experimentation

Both models, current and scenario, had a run length of 90 days for each season. The number of initial replications was determined as five, and there was no warm-up period in both models. No more than five replications were applied because the model was validated. (Banks *et al.*, 2015). All of the estimations were based on an average of 5 replications of each model for each season. Working time was 11 hours per day, five days a week from Monday to Friday. In the beginning, there was no queue in the system. The first call came on the first day, at time zero.

Implementation

Both models were implemented by Arena Simulation Software 16.00.00000 full version on Lenovo Yoga with 6. Generation Intel® Core™ i7 CPU and 8 GB RAM. The average runtime of each season data based on the five replications is given in Tables VII and VIII.

Results

Based on three performance parameters, this part of the study compares three different simulation models to identify the best scenario to increase call center system performance.

These parameters are:

1. Comparison of average waiting times are given in Table 7 and Table 8
2. Comparison of the number of customers by different waiting time scale is given in Table 9
3. Comparison of agent utilization of the current system and agent utilization after reducing the number of agents by 15% is given in Table 10

Table 7

Waiting times of company segments for each season

		Average Waiting Time (sec)		
	Segment Name	Average	Runtime	
Season 1	S1	1.22		
	S2	1.35		
	S3	18.13	00:35:37	
	S4	192.69		
Season 2	S1	3.01	00:53:24	
	S2	3.37		
	S3	22.98		
	S4	274.35		
Season 3	S1	2.57	00:21:50	
	S2	2.73		
	S3	25.93		
	S4	309.66		
Season 4	S1	2.03	01:02:48	
	S2	2.15		
	S3	22.52		
	S4	741.22		

Table 8

Waiting times of clustering segments for each season

		Average Waiting Time (sec)		
	Segment Name	Average	Runtime	
Season 1	C6	1.082		
	C2	1.172		
	C4	1.228		
	C8	1.292		
	C5	1.438	00:49:37	
	C7	1.766		
	C1	2.162		
	C3	62.198		
Season 3	C6	2.79		
	C2	2.90		
	C4	3.08		
	C8	3.14		
	C5	3.69	00:24:53	
	C7	4.44		
	C1	5.49		
	C3	83.73		
Season 1	C6	2.506		
	C2	2.528		
	C4	2.58		
	C8	2.654		
	C5	3.106	00:44:16	
	C7	3.744		
	C1	4.622		
	C3	98.588		
Season 3	C6	2.01		
	C2	2.02		
	C4	2.02		
	C8	2.10		
	C5	2.37	01:23:11	
	C7	2.88		
	C1	3.52		
	C3	202.37		

Comparisons of Current and Proposed Models

For each season and each segment of both from the company and clustering in the study, a simulation was run with the FIFO and a prioritization. In conclusion, it can be said that there was *a reduction with a minimum rate of 90%* on the segments excluding the last ones for both types of segmentation (Please see the Table 7 and Table 8).

Comparison of Average Waiting Times of Company Segments and Clustering Segments

One of the significant performance measures of customer satisfaction of a call center is response time to a customer call (Robinson and Morley, 2006). In this section, a comparison was made based on the number of customers having specific waiting times. Table 9 shows the corresponding number of customers based on waiting time intervals in each season.

When we compare company segments and cluster segments by waiting time, we can see that cluster segments were more valuable to satisfy customers because customers prioritized according to *cluster segments were waiting less than 5 seconds*. Also, company segment prioritization shows that many customers waited for more than 100 seconds in all seasons except the fourth season.

Table 9

Comparison of the number of customers by different waiting time scale

Season 1			Season 2		
Waiting Time	Company Segment	Cluster Segments	Waiting Time	Company Segment	Cluster Segments
0-5 sec	1371	4568	0-5 sec	962	2172
5-25 sec	12407	0	5-25 sec	7511	857
25-65 sec	0	11938	25-65 sec	0	0
65-100 sec	0	0	65-100 sec	0	6991
100+ sec	2723	0	100+ sec	1547	0
Season 3			Season 4		
Waiting Time	Company Segment	Cluster Segments	Waiting Time	Company Segment	Cluster Segments
0-5 sec	794	3317	0-5 sec	1077	4582
5-25 sec	0	0	5-25 sec	12519	0
25-65 sec	8221	0	25-65 sec	0	0
65-100 sec	0	7391	65-100 sec	0	0
100+ sec	1694	0	100+ sec	2877	11891

Resource Utilization of Call Center Agents

Finally, the last comparison is about resource utilization of call center agents. While running simulation models of alternatives, we reduced the number of workers at a rate of 15%. The following table shows the utilization rates of each season before reduction and after reduction.

Table 10

Utilization rates of each season before reduction and after reduction

Season	Utilization of Current System	Utilization after Reduction
S1	53%	62%
S2	62%	72%
S3	61%	72%
S4	71%	82%

As shown in Table 10, the company can save labor costs and increase utilization by reducing the number of employees. Moreover, despite this reduction, it can also have efficient waiting times.

Conclusion

In conclusion, three main findings were obtained. Firstly, applying data mining techniques reduced the average waiting time of most prioritized customers by more than 90%, and for the least prioritized customers, it increased the average waiting time just by approximately 40%. However, with the company segments, the increase in the average waiting time of the least prioritized customers was approximately 300%. Secondly, as a result of the comparison of the number of customers by different waiting time scale, it was seen that customers were waiting less than 5 seconds within the segmentation by big data analysis. Finally, resource utilization was increased by reducing the number of agents with a rate of 15%.

Going forward, two main trends affecting call center simulation were seen. Firstly, the operational complexity will continue to grow with the increase of digitalization. As a result of the rise in outbound services daily, more hybrid methodologies will need to be created, and more queues will occur. Better optimization models for the management of agents will need to be designed to manage call center systems. This will create a significant challenge in defining metrics to be developed for management. The simulation models to be developed not only for the management of incoming calls but also for managing total call volumes, system capacity, and customer satisfaction will also need to include risk analysis and experimental design techniques.

Secondly, with the increasing use of big data globally, big data should be examined with more effective models for developing call center systems. The research conducted within this study clearly shows that big data methods give better results than expert decisions in prioritizing customers. For this reason, data mining will be inevitable before the simulation or any optimization method are implemented.

The key limitation of the study is that it is not suitable for night shifts due to the high variability of input data. In addition to this, each agent's performance is accepted as equal because the case study company did not provide the agents' performance data since the data cannot be anonymized based on Turkish Personal Data Protection Law. Therefore, it needs to

be adjusted for different capabilities where different levels of competence are essential.

The Covid-19 epidemic process showed that the importance of call centers' effective use is increasing day by day. In particular, call centers played an active role in resolving the problems of customers who could not reach the seller directly during this process. It is planned to develop the research in this direction, examine the effect of the Covid-19 outbreak on the call center's process performance, and develop a risk management model in this context.

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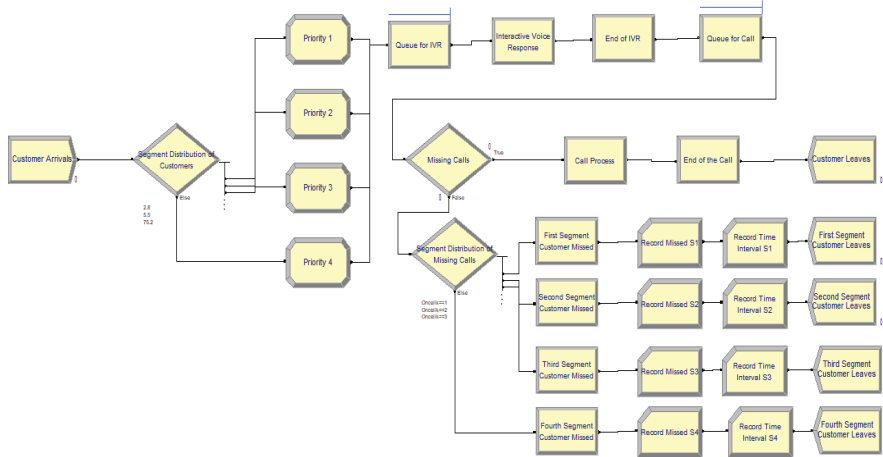
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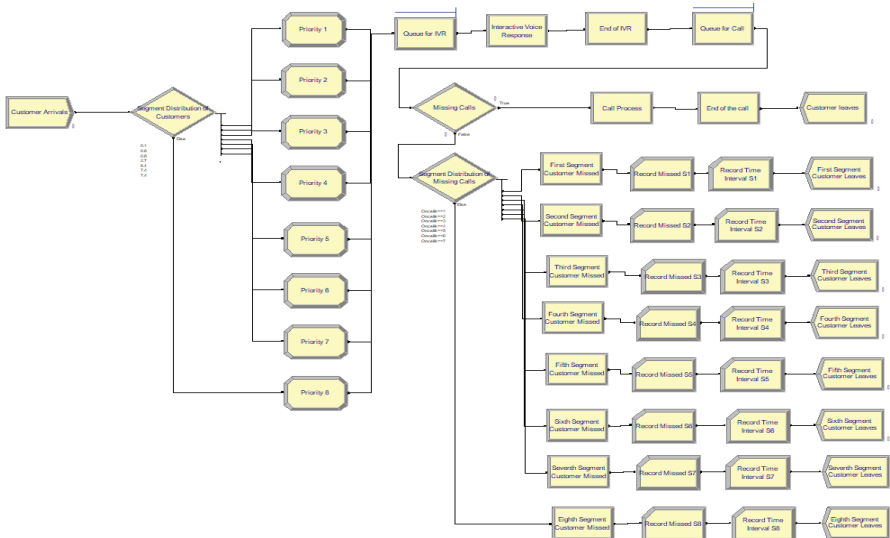
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APPENDIX



Appendix 1: Simulation model prepared according to company segments



Appendix 2: Simulation model prepared according to data analytics segments



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RESEARCH ARTICLE

Multidimensional Measurement of Poverty Among Employed Women in Antalya

Mehmet Zambak¹

Abstract

The aim of this study is to identify the poverty levels of “employed women” living in 5 central districts of Antalya and are among the disadvantaged groups with a measurement method that includes social dimensions. Poverty is measured by using the Alkire-Foster (multidimensional poverty index) method rather than monetary indicators such as income-consumption expenditure and by taking socioeconomic indicators such as education, health, and the physical structure of the household into account. To put it another way, the multidimensional poverty approach eliminates the deficiencies of monetary poverty measures in explaining welfare. For this purpose, a field study conducted through the face-to-face survey method with 400 employed and married women living in Antalya in September 2020 forms the basis for the poverty analysis. 27 indicators representing the dimensions of the socioeconomic structure, employment, income, health, empowerment, social assistance, migration, physical security, and inclusion, without feeling embarrassed, are used in order to reveal the multidimensional poverty of working women.

According to the findings of the study, income and employment are the dimensions in which women in Antalya experience the most deprivation. From this perspective, it is clear that income, particularly employment, should be prioritized in order to alleviate women’s poverty in this city. For example, policies aimed at increasing women’s educational attainment (positive discrimination) may make it easier for them to enter the labor market and, as a result, change their standing at work. Furthermore, expanding their economic liberties can help them enhance their socioeconomic level and gain access to better living conditions.

Keywords

Employed Women’s Poverty, Multidimensional Poverty Index, AF Method, Antalya

Introduction

The aim of this study is to identify the factors affecting the poverty levels of employed women living in Antalya with a multidimensional analysis method other than income-based monetary approaches and present policy proposals. The main motivation to conduct the study is that mostly monetary methods are applied in poverty studies carried out in Turkey, which is believed to be inadequate in explaining social functioning and process. In this study, poverty is addressed with “the multidimensional poverty index-AF method”, which is emphasized by most researchers to give better results, and it is believed that poverty will be reflected more

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realistically as a result of an analysis that prioritizes the socioeconomic and sociocultural gains of women.

The fact that a significant majority of women are disadvantaged in developing countries has directed the focus of the analysis to women. Furthermore, the fact that women's "capabilities" or "abilities" are still being questioned in all layers of society, especially in their own households, and that this leads to deprivation¹ in many areas indicates the necessity of examining women's poverty in Turkey. The empowerment of women, which can also be generalized in the form of participation in household decisions or their freedom, will reflect positively on the entire society, especially their own families, and will bring development along with it. It is of course possible and relatively simple to investigate the poverty of women, particularly those who are marginalized in the labor market and have a labor participation rate of less than 30%, according to monetary indicators. However, this study examines the deprivation of women by focusing on what they have in other social dimensions besides their income, and makes suggestions to policy makers to eliminate the gaps by identifying the areas where they are disadvantaged.

The study derives its unique value from analyzing the "poverty of women" with a "new method for Turkey", which is emphasized as one of the disadvantaged groups facing discrimination and exclusion in all layers of society, labor market and households. Today, the poverty of women is measured by a multi-dimensional approach, which is a method that is increasingly used in the international institutional and academic environment. However, the fact that the subject has never been analyzed using "the method and scope discussed in this study", constitutes the main distinguishing feature of the study. In other words, the fact that a "new subject" for the national literature will be examined by a "new method" can be stated as the unique value of the study.

In addition, it is important for the originality of the study that the issue of "women's poverty", which is new for Turkey, and the method of measuring it are handled specifically in "Antalya". Antalya's role as a locomotive in the agricultural and tourism sectors causes the formation of unique structural situations in the labor market. The fact that these sectors have a high rate of unpaid family workers or low-wage employment and a female-intensive sectoral structure makes women and Antalya stand out as a unit of analysis. In other words, the discovery of the level of well-being of "women" who are disadvantaged in other social dimensions, especially with the lack of income, and the fact that no research has been conducted in the scope specified so far on the Antalya scale, can again be stated among the unique values of the study. The fact that women are subjected to gender discrimination and they are

1 The state of deprivation arises as the inability to reach or achieve any phenomenon, more precisely, the deficiency in reaching a talent (Sen, 1976). Even though deprivation, which is also defined as the inability to achieve the optimum situation that should be, varies according to the method of analysis, it corresponds to poverty if it is experienced in one or more indicators (Zanbak, 2014).

increasingly facing physical and psychological violence both in the family and in the workplace also makes policies to address these grievances inevitable on the scale of in Antalya.

The main reason for the study to be conducted specifically for Antalya is that this city is a pioneer in two sectors, namely agriculture and tourism, and women have an important role in these sectors. In other words, determining the level of poverty of women living in Antalya, which can somehow be associated with these sectors with a labor-intensive production structure and a fairly high number of back-and-forth connections, where the women are intensively employed in the two main economic sectors mentioned above, and highlighting the factors affecting this poverty, are among the main objectives of the study. Since the feminization of poverty is generally associated with employment and the number of unpaid family workers and women working with low wages is quite high due to the sectoral structure in the region, it was deemed appropriate to conduct the analysis in Antalya. Furthermore, Antalya receives migration from all over the country, especially from the surrounding cities, and net migration has been positive for many years due to the agriculture and tourism sectors. For instance, the fact that the population of Antalya, which exceeded 2.4 million at the end of 2018, has increased by about 600 thousand over a period of only 10 years, confirms the determination that it is a city that attracts migration. Given that nearly half of these migrating individuals are women and a significant proportion of them are mothers/wives, the level of women's well-being becomes even more important. In this regard, the study also aims to reveal the reflections of migration to Antalya as a regional center of attraction on women's poverty.

In this context, the main hypotheses of the study are:

- *Women's poverty is a multidimensional concept.*
- *Women's poverty is affected by socioeconomic and sociocultural factors, as well as personal and household income.*
- *Differentiation of districts where women live changes the multidimensional poverty rate (index).*

The aim of the study is to make recommendations to policymakers in order to eliminate the prominent problems that stand out based on the findings, prevent women from being subjected to discrimination, injustice and violence, not to continue their lives dependent on others. In line with these goals and objectives, a field study consisting of 132 questions was conducted through the face-to-face survey method with 400 employed and married women living in 5 central districts (Döşemealtı, Kepez, Muratpaşa, Konyaaltı, Serik) of Antalya in September 2020 in order to measure the poverty of women in a multi-dimensional way. In this survey, personal information and the socioeconomic structure of the household constitute the first dimension, while other topics such as employment, income, health, empowerment,

social assistance, migration, physical safety, and inclusion without feeling embarrassed can be listed as the other dimensions. One of the points aimed to be revealed in the study is the relationship between women and their spouses and/or the place of employment and whether they are exposed to domestic violence or mobbing. Therefore, in the study, the fact that married and employed women are chosen, reflects a situation towards obtaining findings related to the dimension of empowerment.

Accordingly, the conceptual framework of women's poverty constitutes the first part of the study, followed by the multidimensional poverty measurement method. In the third part of the study, the literature on women's poverty is summarized briefly and in the fourth part, women's poverty in Antalya is analyzed. The study's results section includes policy recommendations based on the findings.

Women's Poverty: The Conceptual Framework

Amartya Sen, one of the first scientists to come to mind in the field of development economics, addressed poverty in the mid-70s from the perspective of ability/capacity/capability², and during the same period, Peter Townsend evaluated this situation as a lack of resources (Sen, 1976: 221; Townsend, 1979: 914). Both perspectives continued with the assessment of poverty as a state of deprivation of physical and human needs such as nutrition, clothing, housing, health, education in addition to income. In other words, it is widely accepted that level of income, job opportunities, income distribution, leisure time, education and health opportunities, work opportunities, political independence, good governance, and gender and ethnic equality are all linked to life satisfaction and happiness (Kartal & Zambak, 2020). Human development, which can also be considered as the development of human abilities, includes happiness, being able to do anything freely, the expansion of freedoms and the multiple expectations of life (Krueger & Schkade, 2008). After determining that the conceptual framework of poverty does not depend solely on income, the concept of deprivation has also come to the fore, and the researchers began to focus on the lost dimensions of poverty, namely deprivation (Zambak, 2014).

Both income-based and skill-driven analyses show that the devastating effects of poverty are not reflected in all segments to the same extent. In other words, it can be said that women, together with children, the elderly, and the disabled, constitute the most disadvantaged group affected by poverty. In addition, the reports of the United Nations show that women constitute 70% of the individuals (approximately 1.5 billion) identified as poor worldwide (UNDP, 1995). It can also be noted that the concept of feminization of poverty was first used by Pearce (1978), who preferred this concept to emphasize that nearly 70% of the poor in America

2 It is used to describe an individual's ability to receive various combinations of services such as housing, nutrition and education (Sen, 1999).

are women, and their economic and social development rates are slow, even though women are increasingly taking part in the labor market (Pearce, 1978: 28-36). The point reached requires the definition of the concept of “feminization of poverty” and the creation of specific policies for this disadvantaged group. In the Fourth World Conferences on Women, the concept of women’s poverty came to the fore and attention was drawn to policies and strategies for women’s empowerment (Şener, 2012: 54; Topgül, 2013: 289, Gerşil, 2015: 162). It was emphasized at this conference that women are more likely to remain poor, and that poverty violence is on the rise (Ecevit, 2003: 85; Bayır, 2018: 33; Kartal & Zanbak, 2020: 296). In addition, Arpacı (2010: 6) mentioned that women’s poverty differs according to time and place (region), and Moghadam (2005) pointed out the facts that women are more involved in the household and bear a greater economic burden, and marginalizing attitudes towards women in the household/region and socioeconomic restrictions/exclusion are among the factors that cause poverty (Moghadam, 2005: 1).

Goldberg & Kremen (1990: 6-7) and Peterson (1987: 330) noted that women felt poverty more severe due to their position in the labor market (mostly part-time employment), their black skin, relatively lower hourly wages and exposure to sexist discrimination. On the other hand, the researchers noted that prioritizing men in improvements in employment and social policies, shortcomings in transfer spending, changes in marital status (especially divorce or spouse’s death) and the number of children (especially single motherhood) also drive women into poverty. The responsibilities imposed on women, especially in childcare, and their absence from decision-making mechanisms within or outside the household also negatively affect women in terms of poverty (Wilson, 1987: 21). According to another researcher, Buvinic (1997; cited in Büyükyörük, 2019: 35-36), there are two fundamental reasons that affect women’s poverty, the first of which is that women are in a secondary position in the labor market and they have to work in labor-intensive jobs for low wages, and the second is that they are uneducated compared to men due to their limited/limited access to education, and therefore they are willing to work in informal sectors.

Based on the studies discussed, it can be said that the level of education and the position in the labor market are among the reasons that lead to women’s poverty. In addition to this, the fact that the heads of the households are women and the marital status of these women, the number of children and their income levels can also be listed among the factors affecting the poverty of women and therefore the households.

Multidimensional Poverty Approach

Until recently, poverty has been analyzed with monetary indicators, especially under the leadership of international organizations and in the academic community, and in the light of the findings reached, conclusions have been made primarily for income or consumption. In other words, while the measurement method is preferred by determining an income or

consumption expenditure level, which is also known as the poverty line, individuals below the line are identified as poor. However, developments in development economics have also changed the perspective on poverty, which has resulted in the stretch/diversification of the methods of addressing poverty. This development can be clearly seen in the 1995 World Development Report of the United Nations and the Millennium Development Goals determined by the World Bank in 2000 (UNDP, 1995; World Bank, 2000). In the following period, the “Alkire and Foster (AF) Approach” (2011a; 2011b), which was based on the FGT method developed by Foster, Greer, and Thorbecke (Foster et al., 1984), noted that the social dimensions of poverty should also be taken into consideration and noted that the problem of poverty should be purged from the general acceptance of the individual’s lack of a minimum income level in order to maintain only his biological existence. In this approach, it is emphasized that in addition to household or individual income, dimensions such as education, employment, empowerment, sociality, security also affect individual well-being (Zanbak, 2014).

In this study, which addresses multidimensional women’s poverty, the measurement is based on the AF approach and methods related to this approach are applied.

Multidimensional Poverty Measurement Method

The main stages of the method used to make a multidimensional poverty measurement based on the AF approach can be shown as in the flow diagram in Figure 1 (Zanbak & Çağatay, 2013, Zanbak, 2014). This flow diagram can also be presented algebraically and numerically (Alkire & Foster, 2011a; 2011b; Alkire & Santos, 2014; Alkire & Seth, 2013; Foster, 2007).

It is important to determine the appropriate dimension and the indicators that will represent them at the beginning of the calculation phase of the index. In this study, the said dimension and the number of indicators were determined as 9 and 27, respectively. While determining each indicator’s own deprivation limit is crucial to understand whether the individual is lacking in that indicator, this step is perhaps the turning point of the measurement. Because it is very important to determine the poverty and deprivation limits accurately in order to be able to decide on the poverty of the individual in poverty measurements. The Alkire-Foster (AF) method, which makes counting-based measurement, uses a method of determining poverty, known as the “*dual-cutoff method*”, in which the boundaries of poverty and poverty can be determined effectively, dividing the sample into subgroups and showing the depth, severity and even the intensity of poverty. Therefore, it is also possible to state that the AF method makes measurements with the help of matrices. In this counting-based method, first matrices are defined, then multidimensional poverty and related multidimensional poverty indices are calculated using the censored matrix. At this point, the stages of obtaining the index can be mathematically expressed as follows in order to make it easier to understand the expression (Alkire & Foster, 2011a; 2011b; Zanbak, 2014; Kartal & Zanbak, 2020).

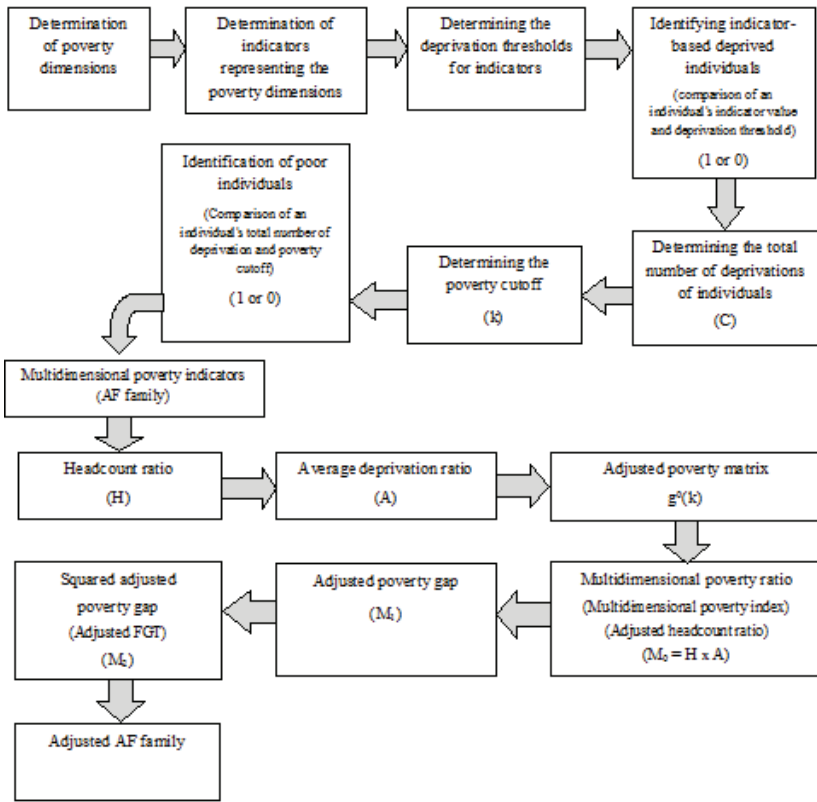


Figure 1. The Stages of Obtaining Multidimensional Poverty Index by the AF Method
 Source: Zanbak & Çağatay, 2013; Zanbak, 2014.

First, the matrix, which is called the objectives-outcomes connectivity matrix and expressed as $A=[A_{ij}]_{n \times d}$, consisting of n observations (individuals) and d dimensions/indicators with $n \times d$ -dimensional raw data is defined (Equation 1). In this $([A_{ij}]_{n \times d})$ matrix, the columns represent the dimensions and the sub-indicators of the dimensions, if any, while the rows reflect the values each individual takes in the dimension/indicator. For example, the point at which the first row and the first column intersect (the value expressed as a_{11} in Equation 1) shows the value of the first observation in the first dimension/indicator.

$$A = \begin{matrix} \text{Dimension (Indicator)} \\ \left[\begin{array}{cccccc} a_{11} & a_{12} & a_{13} & \dots & a_{1j} \\ a_{21} & a_{22} & a_{23} & \dots & a_{2j} \\ a_{31} & a_{32} & a_{33} & \dots & a_{3j} \\ a_{41} & a_{42} & a_{43} & \dots & a_{4j} \\ \dots & \dots & \dots & \dots & \dots \\ a_{i1} & a_{i2} & a_{i3} & \dots & a_{ij} \end{array} \right] \text{Individual} \end{matrix} \quad (1)$$

In the second step, the deprivation limit vector matrix (Z) is defined.

$$Z = [Z_{11} \ Z_{12} \ Z_{13} \ \dots \ Z_{1j}] \quad (2)$$

The matrix expressed in Equation 2 is a $1 \times d$ -dimensional matrix. The value of each dimension and sub-indicator determined by the researcher is compared with the values of the dimension/sub-indicator to which it belongs. Individuals with values less than (or greater than) these are considered deprived in that dimension/indicator, and 1 is written in the corresponding place in the matrix created in the next stage. This is an important indicator in determining which individual is deprived of what dimension/indicator, and 0 is written to the corresponding matrix if the individual is not deprived of that dimension/indicator.

In the third step, the matrix of deprivation numbers is defined.

$$C = [C_{11} \ C_{21} \ C_{31} \ \dots \ C_{i1}]' \quad (3)$$

It is a $n \times 1$ dimensional matrix shown in Equation 3, and it should be noted that the equation in the present representation is the transposition of what should be. The dimensions/indicators in which each individual is considered deprived are counted, the number of these deprived dimensions/indicators is summed and the sum is written into this matrix. In this way, the number of dimensions/indicators in which each individual is deprived in total is revealed. It can also be emphasized that Equation 3 is an important indicator in terms of reflecting the depth of the deprivation of individuals.

The poverty line must be defined in the next step of calculating the index. This value, expressed as k , must be greater than zero and smaller than the total number of dimensions (indicator in some studies) used in the study ($0 < k < d$). If the number of dimensions in which the individual experiences deprivation in matrix C in Equation 3 is equal to or greater than the value of k (the poverty line), this individual is considered poor. This determination is very important in terms of showing how many individuals remain below the k threshold value in the observation group and therefore how many poor people are in the sample. After the identification of poor individuals, a censored deprivation matrix should be created, which is also necessary to determine how many poor individuals there are in total within the observation group covered in this matrix.

Multidimensional Poverty Indices

The multidimensional poverty indices can be listed as the headcount ratio (H), the average deprivation rate (A) and the adjusted headcount ratio (M_0). In addition, it is possible to reach the adjusted poverty gap (M_1) and adjusted squared poverty gap (M_2) index values, but the measurement of these indices is excluded from the scope of this study.

Headcount Ratio (H)

In the AF approach, the calculation of headcount ratio (H) (Equation 4) is the first step to be taken after the creation of the necessary matrices to obtain the multidimensional poverty index and identifying the poor individuals (Alkire & Foster 2011b). In this ratio, which is given in Equation 4, n represents the sample size, and q represents the number of individuals identified as “poor” at the specified poverty line. This value, which can also be expressed as the ratio of poor people in the focused sample group, is between 0-1. Even though at first glance it makes it possible to compare the poverty of different samples, the inability to provide information about the depth of the poverty experienced causes discussions about the adequacy of this ratio. Because Alkire and Foster (2011b) emphasized that this ratio alone is not sufficient to reflect the exact position of whether the poor individual remains below the poverty line or non-poor individual remains above the poverty line. Furthermore, the fact that there is no change in the said ratio if poor individuals become even poorer and that this ratio cannot reflect the development experienced is another issue of criticism. Therefore, another value, the average deprivation rate (A), is needed to measure the multidimensional poverty index.

Average Deprivation Rate (A)

This ratio (calculation method is shown in Equation 5) reflects the severity of the deprivation and eliminates the above-mentioned problem that the headcount ratio alone is not sufficient in terms of identifying the exact situation of the people in deprivation. The average deprivation rate, also expressed as deprivation per dimension, is between 0-1, where 0 means no deprivation per dimension, and 1 corresponds to the deprivation of poor individuals in all dimensions. In the calculation of this ratio, which is also shown in Equation 5, c represents the total of deprivations, q represents the number of poor individuals, and d represents the dimension and/or the number of indicators, although it varies according to the study.

Adjusted Headcount Ratio (M_0)

The adjusted headcount ratio (M_0), obtained as a result of evaluating the ratio of the number of poor people together with the deprivation rate per dimension, is also called the multidimensional poverty index (Alkire & Foster, 2011a). As shown in Equation 6, this ratio, which is obtained from the product of the headcount ratio (H) and the average deprivation rate (A), is important in determining the severity of poverty and is expressed as the average of the censored poverty matrix (where all the values of non-poor individuals are updated to 0). In other words, the increase of this value (approaching 1) between units or times corresponds to an increase in poverty and sheds light on policy makers.

$$H = \frac{q}{n} \quad (4) \quad A = \frac{\text{average deprivation}}{\text{number of indicators}} = \frac{\text{total deprivation}}{\text{number of poor people}} = \frac{(c_1 + c_n)}{q} = \frac{\sum_1^d c_i}{q} \quad (5)$$

$$M_0 = H \times A \quad (6)$$

Summary of Literature on Women's Poverty

The literature discussed in this study is divided into two parts. The first part focuses on monetary approaches based on income and consumption expenditures, whereas the second part focuses on a multidimensional approach that includes social indicators rather than monetary indicators. While poverty is measured with a multidimensional method in this study, which aims to reveal the poverty of working women in Antalya, it differs from income-based studies, which account for a substantial portion of the national literature. However, it should be noted that women's poverty has yet to be measured in Turkey using the AF approach, and this study is unique in this regard.

A significant portion of the "women's poverty" studies in the literature approach poverty with monetary indicators, some of which can be listed as studies conducted by Şener (2012), Açıkgöz (2010), TEPAV (2009), Kardam & Yüksel (2004), Buvinic (1997), and Moghadam (2005). Addressing the issue within the framework of the "feminization of poverty", Sener (2012) emphasized that poverty is mostly associated with women's employment status, and noted that the main factor that causes poverty is the low labor force participation rate, which is close to 30%. In the study, which shows that the non-agricultural unemployment rate of women is about 18%, it is also determined that the share of unpaid family workers in total employment is about 15%. According to the researcher, this naturally leads to female poverty. Açıkgöz (2010) showed the facts such as divorce, family disintegration, male unemployment, wars and internal conflicts are among the main factors affecting the poverty of women in Turkey. From that perspective Açıkgöz defined the concept of feminization of poverty as the fact that women who have to support their households make up the majority among all the poor constitute the majority of the poor. In addition, the researcher stated that gender inequalities are common in Turkey and gender-based division of labor and women's work in unpaid jobs pushes them into economic and social insecurity, which leads to the natural impoverishment of women.

Similarly, Duyan Çamur (2010) listed the factors that cause poverty as women being deprived of income, the fact that poverty being passed down through the family, the conditions of the house they came to as a bride are same as the conditions of their family before they got married, and both of them are poor and they are unable to leave their spouses. Yalçın (2018) noted that inequalities in the household, insufficient education, divorces as a result of wrong marriages, low wage employment of women, being the head of the household, and working as an unpaid family worker in rural areas are the main factors affecting female poverty. Şahin & Şahin (2018) stated that women's poverty is a problem that can be solved in the long term, and pointed out that government policies should be improved and the capacities of institutions serving in this field should be increased to overcome this problem. TEPAV (2009), which approaches women's poverty with an income-based approach

as well as a/the capability method, stated that although women earn high incomes and do not experience income deprivation, they spend more time on household chores than men, especially those who are engaged in childcare for longer periods of time and ultimately face “time deprivation”. Similarly, Kardam & Yüksel (2004) also discussed women’s poverty from the point of view of capability, and evaluated the differences in capabilities of women who are similar to each other financially as a result of face-to-face interviews with 40 low-income women in Ankara. Although differences are seen and improvements are required in issues such as employment, education and health, it has been stated that the first policy that should be applied to women is to protect their physical integrity, ensure their safety and prevent violence against women.

Considering the international literature, there are many studies focusing on women’s poverty by methods including social dimensions, some of which are Moghadam (2005), Buvinic (1997), Bastos, Casaca, Nunes, & Pereirinha (2009), Batana (2013), Wu & QI (2017) and Maduekwe (2018). According to Moghadam (2005) and Buvinic (1997), the main factors that cause feminization of poverty are the position of women in the labor market and the degree to which they benefit from educational opportunities. Although they earn a certain amount of income, discrimination, household inequalities, low wage level, being the head of household are pointed out as negative reflections on poverty. On the other hand, Bastos et al. (2009) highlights that older women, women living alone, and households with women as the head of the family suffer from fairly high levels of income poverty. In addition, the researchers drew attention to the fact that women are exposed to discrimination in the labor market and other gender-based cases, and the point reached is driving women into poverty. Similarly, Batana (2013) conducted a study using the AF method and highlighted the importance of education in women’s poverty. Wu & QI (2017) emphasized gender inequality and drew conclusions about the dilemma of access to opportunities such as education and health, especially in rural areas. A multi-dimensional approach was preferred for identifying the poor in Maduekwe’s (2018) study, and it was emphasized that the key factor affecting women’s poverty in Malawi, a Sub-Saharan African region, is their exclusion from decision-making mechanisms. To put it another way, a significant majority of women in this country are deprived in the dimension of empowerment. According to the researcher, the fact that women in this region cannot decide freely about their individual health increases their poverty by 80%.

Multidimensional Measurement of Employed Women’s Poverty in Antalya

In this section, an AF approach-based analysis is carried out to examine the poverty of employed women living in Antalya, and based on the findings obtained, policy recommendations are presented to reduce the poverty of women living in this city.

Field Study-Obtaining the Primary Database

The study area was composed of 5 districts of Antalya (Döşemealtı, Kepez, Muratpaşa, Konyaaltı, Serik), while the target group was determined as *the female population*³, which is around 840 thousand in Antalya as of 2018, aged between 15+ and 65- (TurkStat, 2019). If the population is specific, but the variance is not specific, the sample size to represent this is found by the formula given in Equation 7-8. At this point, Equation 7-8 and Equation 9-10 can be applied as the population is greater than 10,000.

$$n = \frac{N \cdot P \cdot Q \cdot Z_{\alpha}^2}{(N-1) \cdot d^2} \quad (7) \quad n = \frac{N \cdot P \cdot Q \cdot t_{\alpha, sd}^2}{(N-1) \cdot d^2} \quad (8) \quad n = \frac{\sigma^2 \cdot Z_{\alpha}^2}{d^2} \quad (9) \quad n = \frac{P \cdot Q \cdot Z_{\alpha}^2}{d^2} \quad (10)$$

Where; N: Population size; n: Sample size; P: The rate of observing X in the population; Q (1-P): the rate absence of X; Z_{α} : 1.96, 2.58 and 3.28, respectively for $\alpha=0.05, 0.01, 0.001$ values; d = Sampling error; s= Population standard deviation; $t_{\alpha, sd}$ = t distribution values with sd degree of freedom ($sd=n-1$). $t_{\alpha, sd}$ values can be taken equal to Z_{α} values when $sd=n-1$ →. When using this method, the ideal number of observations is obtained around 400 and statistical representation can be achieved with this number. The sample group was randomly selected from a distribution applied by the Turkish Association of Researchers that placed the provinces into sub-regional definitions A, B, C, D and E according to their socioeconomic levels (TÜAD, 2012). As mentioned, the sample included 5 districts, and 80 working women were interviewed in each district in order to make a comparison between these districts.

The survey applied consists of 10 titles and 9 dimensions. These can be listed as personal information and socioeconomic structure of the household, employment, income, health, empowerment, social assistance, migration, physical safety and inclusion without feeling embarrassed. A total of 132 questions were asked to women about these dimensions, and the answers given to these questions formed the basis for urban and district-based calculation of poverty rates.

Descriptive Statistics

It is possible to present descriptive statistics of the sample of women living in Antalya based on the field study data applied to randomly selected 400 working and married women (Table 1). In this way, the underlying factors of women's poverty and the possible causes will be determined.

Considering the data set obtained, it is seen that approximately 40% of the women in the sample are primary school graduates and 36% are high school graduates, which shows that only 1 out of every 4 women received a university education. A significant majority of

3 In the study, the women interviewed were required to be "married" and "employed" in order to reflect the position/situation of them, especially in the labor market and in the household. In other words, the sample of the study consists of *employed/married women aged between 15 and 65*.

women (75.8%) with an average age of 39 are between the ages of 25-49. On the other hand, the number of women who do not have children is 66, while women with 2 or more children constitute approximately 60% of the total.

When asked about the ownership status of the residence, 56.5% of the women answered that they are living in a rental house. The rate of those who stated that they live in their own house was around 41%, and 8 women stated that they reside in a house that belongs to their relatives (mother/father/mother-in-law/father-in-law) without paying any rent. In addition, out of the number of individuals working in the household, 7 women in the sample provide for the house alone. Considering that the women included in the survey were required to be employed/married, 7 households with 1 employee support this finding. In addition, the rate of women who stated that other members of the household other than their children or spouses also work is around 8.5%, which means that the number of income-generating members is 3 or more in 33 out of 400 households. Considering the status of working women at their workplaces, it is seen that the paid working class stands out with a 60% share, while the ratio of those who say that they are involved in the economy as employers is around 25%. In other words, only 1 out of every 4 women in the sample is in an employer position. However, a detailed examination of the survey shows that 186 out of 400 women earn an income below the minimum wage and 214 of them do not have a formal employment contract with their workplaces. These numbers show that a significant majority of the working class cannot receive even the minimum wage, and they are trying to gain income under difficult conditions in the labor market, mainly in the agriculture-tourism sectors. Furthermore, 75% of women live in debt, while about 70% of them do not have any savings. This seems to be consistent with the response of 4 out of every 5 women that they have more or less financial difficulties. It can also be emphasized that 26.8% of the women in Antalya, the vast majority of whom stated that they had difficulty making a living, also suffer from health problems.

One of the interesting results obtained in regard to the sample is related to the household income, where the lowest income is 1,500 TL, while the highest income is 80,000 TL. However, the average household income is just above 7,000 TL. Given that there are quite a high number of women who report having difficulties in making a living, and the average income is around 7,000 TL, it can be said that women (or their households) who do not have financial difficulties earn quite a high income, which indicates that the income distribution among the women in the sample is concentrated at two different ends. In particular, the high-rate of reports (approximately 72%) regarding the need for social assistance are consistent with responses (about 80%) that women in the lower income group (hence their households) are struggling to make a living. Of the 400 women surveyed in the field study, 214 responded that they settled in Antalya through migration, and approximately half of these women carried out this action over a period of 10 years. However, their migration to Antalya, which they attribute to economic reasons, only strengthened the economy of 46%

of households. In other words, the rate of women who stated that their economic situation deteriorated after emigrating was 12.6%, while the rate of those who stated that there was no change was over 40%.

18 of the women participating in the survey have been subjected to physical violence in the last 5 years, 11 of whom have encountered the incident at home. On the other hand, approximately 17% of women who said that they were subjected to violence during the same period experienced this victimization at school. When it comes to the question of who is the head of the household, which reflects the position of women in the household, the number of women who stated that they are the head of the household is only 54, and this result corresponds to a small minority of the sample. This result, which can also affect the participation and therefore empowerment of women in decisions about themselves or their family (household), reveals the male-dominated family structure in Antalya. However, the number of women stating that they are on top of the ranking, created to reflect whether a woman feels free or not, and where the top ranking (6th step) represents complete freedom, is 144. This is a different indicator showing that the remaining 256 women do not feel completely free, albeit at different levels, and may have to get approval in their decisions. Finally, in the light of the findings obtained from the survey, it can be emphasized that half of the women who were analyzed for poverty wanted to make changes in their lives. Considering that approximately 75% of these women live in debt without any savings and 4 out of every 5 of them had financial difficulties, it is quite surprising that only 50% of them want to make changes in their lives. This result reflects the fact that, despite their difficulties in earning a living, a significant number of women agreed to this and do not want to change their current situation.

Dimensions, Indicators, and Deprivation Conditions Used in the Study

As previously stated, the AF method was used in this study to reveal the level of women's poverty and which indicators the deprivation is concentrated/deepened. Alkire and Foster (2011a) focused on 3 dimensions and 10 indicators when measuring poverty with this method and made an analysis based on these indicators. In order to represent the dimensions of living standards, education and health, assets consisting of household appliances/machines, fuel used in the kitchen, floor of the house, clean water, electricity, nutrition, death, school attendance year and school education period were discussed. In this way, each dimension and indicator used in the study are weighted equally.

Table 1

Descriptive Statistics of Employed Women Living in Antalya and Their Households

		Individual	%			Individual	%
Education	Primary School	160	40.0	Health Status	Poor	7	1.8
	High School	145	36.3		Moderate	100	25.0
	University	86	21.5		Healthy	293	73.3
	Graduate School	9	2.3	Household Income (TL)	Lowest	1.500	-
Age	Average Age	39	-		Highest	80.000	-
	15-24	38	9.5		Average	7.069	-
	25-49	303	75.8	Never	84	21.0	
Number of Children	50+	59	14.8	So Lightly	69	17.3	
	No child	66	16.5	Feel of Financial Difficulties	Lightly	81	20.3
	1	105	26.3		Moderate	111	27.8
	2	164	41.0		Severe	47	11.8
	3	49	12.3	Very Severe	8	2.0	
4 and more	16	4.0	Social Need of the Household	Yes	113	28.3	
Status of the Residence	Own Hose	165		41.3	No	287	71.8
	Rental	226		56.5	Less than 1 Year	2	0.9
	Public Housing	1	0.3	Time Spent in Antalya After Migration	1-5 Years	62	29.0
Not paying any rent	8	2.0	6-10 Years		49	22.9	
Number of Individuals Employed	1	7	1.8		More than 10 Years	101	47.2
	2	360	90.0	Financial Situation after Migration	Improved	99	46.3
	3	26	6.5		Worsened	27	12.6
	4	6	1.5		Didn't Change	88	41.1
	5	1	0.3	The Place of the Violence Experienced	House	11	61.1
Position in the Workplace	Employer	98	24.5		School/Work	3	16.7
	Paid Worker	240	60.0		In Public	1	5.6
	Officer	14	3.5	Other	3	16.7	
	Jobber	4	1.0	Head of the Household	Partner	343	85.8
	At Own Expense	44	11.0		Herself	54	13.5
Debt	Yes	297	74.2		Father	2	0.5
	None	103	25.8	Mother	1	0.3	
Savings	Yes	121	30.2	Willingness to Make Changes in Life	Yes	198	49.5
	None	279	69.8		None	202	51.5

In this study focusing on women's poverty in Antalya, a poverty measurement is carried out with 9 dimensions in which there are 3 indicators in all dimensions and therefore 27 indicators. The first dimension is "information about the socioeconomic structure of the person and the household", which is represented by the indicators of "white appliances, computers and the internet". Women who do not have a washing machine and dishwasher, their own computer and internet access at the same time are considered to be deprived of these indicators. In the indicators of "employment contract, daily working hours and psychological and

physical pressure” of the “employment” dimension used in the measurement, women who do not have an official employment contract with the employer, whose daily working hours are over 8 hours and who are subjected to psychological or physical pressure in the working environment are included in the deprivation matrix. In addition to these, another dimension focused on is the “*net wage, debt and savings*” indicators in the “income dimension”. Individuals whose wages are below the current minimum wage in 2020 are considered to be deprived in the net wage indicator. On the other hand, a woman who is in debt and does not have any savings is considered to be deprived in the aforementioned indicators. Another dimension included in the calculation in poverty measurement is “health”, which is represented by the indicators of “*health status, number of illnesses and effects of health problems*”. Women who stated that they were not in good health, that they had at least 1 chronic illness and that their health problems negatively affected their daily lives were considered deprived. The “empowerment” dimension, which is among the most important dimensions included in the study, whose results arouse curiosity and reflects whether the woman is externally dependent on making decisions about herself or her family, is represented by the indicators of “*personal decision control, possible reasons for inability to work in the future, feeling free*”. If a woman does not feel strong in controlling her personal decisions or feels pressure to quit her job against her will in the future, she is included in the measurement as deprived in these indicators. However, if she has responded 3 or below, which is a half-step on the 6-step dependency/freedom ladder, this woman is considered to be deprived of the feeling free indicator. The sixth dimension of the study, “social assistance”, is included in the measurement based on the indicators of “*financial difficulties, need for social assistance and receiving social assistance*”. Women who reported that they had financial difficulties, needed social assistance, and had to get institutional or individual assistance due to financial difficulties were considered to be deprived in these indicators.

“Migration”, which is another dimension focused on in the study, is represented by the indicators of “*migration, change in living conditions as a result of migration, thinking about migration in the future*”. The women who were forced to migrate at least once in their life, whose living conditions did not change with the migration or whose situation worsened compared to their previous situation and who were considering migration from Antalya in the future were considered to be deprived in the study. In addition, the “physical safety” dimension is perhaps the most important dimension in terms of reflecting whether the environment in which women live is safe and whether they are/will be exposed to violence or not. This dimension included in the measurement is represented by the indicators of “*theft, physical violence/injury and the possibility of being exposed to violence within 1 year*”. The women who have experienced theft in their households in the past, who have been subjected to violence (firearms or beating) against themselves or one of their family members in the past 5 years, and who reported that they will be victims of violence in the next 12 months, even

with a low probability, are considered to be deprived in these indicators. The last dimension in the multidimensional measurement of women's poverty is the dimension of "inclusion without feeling embarrassed" in the society, which is represented by the indicators of "*being embarrassed due to being poor, being treated with prejudice and feeling excluded*". The women who reported that they would be ashamed of their poverty or if they were poor, that they had been treated with prejudice in the last 3 months and felt excluded from the society were included in the study as deprived.

Multidimensional Poverty Index Values of Employed Women in Antalya

In this study, employed women's poverty is measured by calculating the M_0 value by using the data obtained from the field study conducted in Antalya. For this purpose, the steps presented in Figure 1 were followed respectively and the index values (Equation 4-5-6) were obtained.

In this survey, the multidimensional poverty index was calculated using *personal information and the socioeconomic structure of the household, employment, income, health, empowerment, social assistance, migration, physical safety, and inclusion without feeling embarrassed dimensions*, with three indicators for each dimension, for a total of 27 indicators. Subsequently, the deprivation line for these indicators (Annex 1) and whether women were deprived in each indicator were determined and a deprivation matrix was created using Equations 1, 2 and 3. Due to the fact that the number of indicators in each dimension is equal, the indicators were equally weighted and women who experienced deprivation in at least 9 of the 27 indicators were considered to be "poor". In other words, while the poverty line was determined as $k = 9$ in the study, women who were deprived in at least 9 of the 27 indicators (C, equation 3) were accepted as "poor" according to the method discussed, which is consistent with the study of Alkire and Foster (2011a) in terms of the number of indicators/poverty line. Accordingly, the headcount ratio (H-Equation 4) and the average deprivation rate (A-Equation 5) were calculated based on the data of women identified as poor for each district and the overall sample, and the adjusted headcount ratio (multidimensional poverty index) (M_0 -Equation 6) was calculated by multiplying these two values. The high index value, in other words, its proximity to 1, indicates that poverty is higher (Alkire & Foster, 2011a). In other words, policymakers were presented with specific policy suggestions for women, and the areas where priority should be given to reducing women's poverty were proposed by determining the dimensions in which women experience intense deprivation according to the data obtained.

As a result of the measurements, it was determined that 223 of the 400 women in the sample experienced deprivation in at least 9 indicators. In other words, more than half of the 400 women living in Antalya can be considered as poor. Out of these 223 poor women, the number of women deprived in 9 indicators is 49, while the number of women deprived in 10

indicators is 46. Even though the number of poor women decreases as the number of indicators deprived increases, the number of indicators with the highest deprivation rises up to 19. In other words, while 5 women are deprived in 17 indicators at the same time, the number of women deprived in 18 indicators is 2 and the number of women deprived in 19 indicators is 1, respectively. Given that there were 27 indicators included in the study, it is possible to say that this woman, who is deprived of 19 indicators, is the poorest individual in the sample. On the other hand, the average number of indicators in which women experienced deprivation is 11.5, and the multidimensional poverty approach attributes importance to this value along with the number of individuals experiencing deprivation. The average deprivation rate (A), which is the value of deprivation per indicator experienced by the poor, stands out here and carries the analysis to a different dimension compared to the one-dimensional approaches.

Following these findings, the headcount ratio (H) was determined to be 0.557, while the average deprivation rate (A) was 0.426, and the adjusted headcount ratio, namely the multidimensional poverty index (M_0), was 0.237⁴. As previously stated, the closer the index value is to one, the greater/more severe the poverty. In addition to these findings, it is seen that the analysis results differ from region to region. For example, according to the data set of 80 women in each district, it can be said that the district with the highest number of poor women is Döşemealtı (50 women), while the district with the lowest number of poor women is Muratpaşa (41 women). The number of women who live in Kepez, Konyaaltı and Serik and suffer from deprivation in at least 9 indicators, is 43, 43 and 46, respectively. Considering the district-based headcount ratio and average deprivation rate values, the multidimensional poverty rate of each district can be obtained. Döşemealtı district is again negatively differentiated among all districts in terms of women's poverty. In other words, the adjusted headcount ratio, namely the multidimensional poverty index value, is at the highest level in the district of Döşemealtı. Furthermore, while the M_0 value of Döşemealtı is 0.271, this value is about 0.035 points above the Antalya city-wide value (0.237). In other words, women living in Döşemealtı can be considered the most disadvantaged in terms of poverty.

However, considering the multidimensional poverty index, it can be said that women who are positively differentiated between all districts reside in Konyaaltı, which is also supported by the index value of Konyaaltı district, which is 0.217 (Table 3). As highlighted before, the relatively low value of the mentioned index means that poverty is less felt among women living in Konyaaltı district. The multidimensional poverty index values obtained in other districts are 0.247 in Serik and 0.227 in Kepez and Muratpaşa. Based on these findings, it can be said that women living in Serik are struggling with high poverty rates, although not as much as women living in Döşemealtı. In short, Döşemealtı and Serik are the districts where women's poverty is highest, which can shed light on policymakers in terms of regional priority.

$$4 \quad H = \frac{223}{400} = 0.557 \quad (11)$$

$$A = \frac{\left(\frac{2570}{223}\right)}{27} = 0.426 \quad (12)$$

$$M_0 = H \times A = 0.557 \times 0.426 = 0.237 \quad (13)$$

Table 2

Multidimensional Poverty Index Values of Employed Women in Antalya and Selected Districts

	ANTALYA	DÖŞEMEALTI	KEPEZ	KONYAALTI	SERİK	MURATPAŞA
q (poor)	223	50	43	43	46	41
n (sample)	400	80	80	80	80	80
Number of Poverty Line Indicators	9	9	9	9	9	9
Number of Indicators	27	27	27	27	27	27
Average Poverty Rate	11.5	11.7	11.4	10.9	11.6	12.0
H	0.557	0.625	0.538	0.538	0.575	0.513
A	0.426	0.434	0.423	0.403	0.430	0.444
M₀ = H x A	0.237	0.271	0.227	0.217	0.247	0.227

Table 3

Districts with the Highest and Lowest Multidimensional Poverty Index Values

	HIGHEST	LOWEST
H	0.625 (Döşemealtı)	0.513 (Muratpaşa)
A	0.444 (Muratpaşa)	0.403 (Konyaaltı)
M₀	0.271 (Döşemealtı)	0.217 (Konyaaltı)

In the study, at the stage of obtaining the multidimensional poverty index, it is possible to determine which woman experiences deprivation in which indicator by using the deprivation matrix. Thus, Table 4 reflects where the deprivation in question is concentrated in terms of dimensions and indicators, while the findings can be considered as a clue to policy priorities both for poor women and for the overall sample. As emphasized above, 223 women in the sample are poor according to the multidimensional approach. The dimension of income is the one in which these women suffer the most deprivation. On the other hand, about 60% of these poor women are paid below the minimum wage, more than 80% live in debt and have no savings. Similarly, given the entire Antalya sample, approximately one out of every 2 women earns below the minimum wage level. Furthermore, 3 out of every 4 women in Antalya are indebted and continue their lives without any savings. Another dimension in which poor women experience intense deprivation is the employment dimension, where 138 of the 223 poor working women do not have a formal employment contract. In line with this finding, nearly 90% of the same poor women work more than 8 hours/day. It should also be emphasized that only 34 (15.2%) of the women who were found to be poor stated that they were subjected to psychological or physical pressure at the workplace. This reflects that a significant majority of poor women are satisfied with the environment in which they work, even though they earn an income below the minimum wage and do not have formal employment contracts. However, perhaps the most important point that should not be overlooked here is that 34 women are not just statistics, and they are subjected to pressure at work in one way or another so that harm to the physical or mental integrity of even 1 woman can result in irreparable consequences.

ces. The ratio of poor women who feel that their physical safety is/will be in danger not only at the workplace, but also in their household or the environment they live in is not small at all. In other words, the ratio of poor women who think that they may encounter violence in the next 1 year is 54.3%. In the recent past, the number of poor women whose safety was compromised due to theft was 40, while the number of those who stated that they had experienced an incident that resulted in violence/injury in the last 5 years was 17. As in the workplace, no violence or pressure that is experienced in the household or in the immediate environment and could damage human dignity is acceptable. Therefore, it is essential to ensure the physical and mental integrity in the working life, home or close environment of the individual, whether male or female, where policymakers and practitioners have great responsibilities within the framework of reconsidering the laws and implementing the existing ones. 17 poor women who are exposed to violence, which seems to be part of statistical data within these lines, have to be protected by deterrent laws and public power/ingenuity, and moreover, must be empowered to never face such problems again.

Another dimension in which the most deprivation is experienced compared to other dimensions addressed specifically for poor women in Antalya is the dimension of social assistance. The women included in the study were required to be married and employed, which means that the woman brings income to the household whether her husband is working or not. Analyzes made related to the dimension of social assistance indicate that approximately 92% of women who are found to be poor experience difficulties in making a living. On the other hand, while the poor women who reported that they need social assistance accounted for 43% of the sample of 223 people, only 8% of them can access unrequited social assistance from the state, private sector or their relatives. In the meantime, 62.8% of these poor people stated that they migrated for economic reasons at least once in their lives, and 36.8% of them stated that there was no change in their living conditions although they migrated. In addition, 1 out of every 5 women identified as poor are planning to migrate from Antalya in the near future.

Of the 223 poor women in the Antalya sample, 91 stated that their health status was not good, and 60 of them stated that their health issues were affecting their lives negatively. About half of the same group feel that they are being treated with prejudice and excluded. On the other hand, 6.3% of poor women state that they feel/will feel ashamed of their poverty. Furthermore, 19 poor women do not have washing machines and dishwashers (both), while 60% of them do not own a computer. About 1 in every 3 poor women do not have access to the internet.

Along with poor women, similar results are encountered when the entire Antalya sample is evaluated. As mentioned above, approximately half of the women in Antalya earn an income below the minimum wage, and approximately 75% of them have debts. In addition,

the ratio of women who do not have any savings is around 70%. In addition to the income dimension, a brief summary of the dimensions and indicators in which intense deprivation is experienced throughout Antalya, is as follows; 53.5% of working women do not have an employment contract, 72.8% work more than 8 hours a day, 80% have financial difficulties, more than 50% migrate for economic reasons, nearly 40% do not feel free and are dependent on others (husband, father, mother, etc.) when making personal decisions, and approximately one in every three women reports being treated with prejudice and excluded. The ratio of women who have been exposed to violence in the last 5 years is around 5%, while the ratio of women who think that they will encounter violence in the next 1 year exceeds 50%, which is quite a high rate. This result corresponds to the fact that physical safety is an increasingly high-risk factor for women, both from the household (spouse) and the social environment. These findings indicate that approximately half of the women in Antalya do not have a computer of their own, 20% do not have access to the internet, and 1 in 20 women do not have both washing machine and dishwasher.

Table 4
Deprivation of Employed Women in Antalya in Dimensions and Indicators

DIMENSIONS	INDICATORS	POOR (223 Women)			SAMPLE (400 Women)		
		NUMBER OF WOMEN DEPRIVED	TOTAL	PLACE OF THE DEPRIVATION	NUMBER OF WOMEN DEPRIVED	TOTAL	PLACE OF THE DEPRIVATION
SOCIO-ECO-NOMIC STRUCTURE	White appliances (washing machine + dishwasher)	19 (8.5%)	214	8th	22 (5.5%)	277	9th
	Computer	134 (60.1%)			177 (44.3%)		
	Internet	61 (27.4%)			78 (19.5%)		
EMPLOYMENT	Employment contract	138 (61.9%)	364	2nd	214 (53.5%)	556	2nd
	Daily working hours	192 (86.1%)			291 (72.8%)		
	Psychological/physical pressure	34 (15.2%)			51 (12.8%)		
INCOME	Net wage	133 (59.6%)	506	1st	186 (46.5%)	765	1st
	Debt	185 (83.0%)			297 (74.3%)		
	Savings	188 (84.3%)			282 (70.5%)		
HEALTH	Health status	91 (40.8%)	234	6th	107 (26.8%)	284	7th
	Number of health problems	83 (37.2%)			106 (26.5%)		
	Effects of health problems	60 (26.9%)			71 (17.8%)		
EMPOWERMENT	Personal decision control	108 (48.4%)	268	5th	157 (39.3%)	389	5th
	Reasons not to work	41 (18.4%)			60 (15.0%)		
	Feeling free	119 (53.4%)			172 (43.0%)		

SOCIAL ASSISTANCE	Financial difficulty	205 (91.9%)	319	3rd	316 (79.0%)	451	3rd
	Need for social assistance	96 (43.0%)			113 (28.3%)		
	Receiving social aid	18 (8.1%)			22 (5.5%)		
MIGRATION	Migration	140 (62.8%)	271	4th	214 (53.5%)	391	4th
	Changes in living conditions as a result of migration	82 (36.8%)			111 (27.8%)		
	Migration plans in the future	49 (22.0%)			66 (16.5%)		
PHYSICAL SAFETY	Theft	40 (17.9%)	178	9th	58 (14.5%)	279	8th
	Physical violence / injury	17 (7.6%)			18 (4.5%)		
	Possibility of exposure to violence within 1 year	121 (54.3%)			203 (50.8%)		
INCLUSION WITHOUT FEELING EMBARRASSED	Feeling embarrassed due to poverty	14 (6.3%)	216	7th	22 (5.5%)	312	6th
	Being treated with prejudice	99 (44.4%)			141 (35.3%)		
	Feeling excluded	103 (46.2%)			149 (37.3%)		

As a result, the study's findings indicate that a vast majority of women living in Antalya are poor according to the multidimensional poverty approach. This is supported by the fact that the city's headcount ratio is 0.557 and the multidimensional poverty index is 0.237. Furthermore, it is possible to conclude that the indexes of Döşemealtı women are higher than those of the entire city, meaning that they are poorer. Similarly, women living in Serik experience poverty at a higher rate than the Antalya average. Those who live in Kepez, Konyaaltı, and Muratpaşa, on the other hand, are in a better situation in terms of multidimensional poverty. As a result, it could be proposed that the districts of Döşemealtı and Serik be given policy priority in order to reduce women's poverty to the lowest levels possible. Increasing women's initial income (purchasing power), especially in these districts, and allowing them to make more savings will make them stronger. Furthermore, prioritizing changes in job contracts and working hours at the stage of gaining more income could have beneficial effects in favor of women. Furthermore, as women's educational levels rise, their status at work will shift from wage earner to employer. This will help to inspire them and enable them to engage more actively in decision-making processes at work and at home. Women who can stand more strongly on their feet will be able to extend their areas of freedom and increase their capacity to combat discrimination. This would also protect them from physical and psychological pressure as well as abuse in the home and at work. Equal opportunities for men and women in the home will be the secret to raising strong and happy generations, which will pave for social peace and development in the long term.

Conclusions

In this study, the poverty of women in Antalya is assessed using socioeconomic indicators and the multidimensional measurement method (AF Approach), and policy recommendations are made based on the indicators that they are experiencing severe deprivation. In September 2020, a field study was conducted with 400 married and working women between the ages of 15 and 65 in five Antalya districts, including Döşemealtı, Kepez, Konyaaltı, Serik, and Muratpaşa, using a face-to-face survey method, and the data set obtained from it formed the basis of the study. The main goal in adopting the multidimensional measurement method rather than one-dimensional measurements focusing on income or consumption level is to shed light on the issues of women who face socioeconomic inequality while having an income above a certain threshold. The study focuses on 9 dimensions of poverty measurement. These dimensions can be listed as socioeconomic structure, employment, income, health, empowerment, social assistance, migration, physical safety, and inclusion without feeling embarrassed. In addition, each dimension is represented by 3 indicators and women who experience deprivation in at least 9 of 27 indicators in total are considered to be poor. As a result of the study, it is seen that 223 of the 400 women in the Antalya sample are poor according to the multidimensional measurement method and the headcount ratio is 0.557, while the average deprivation rate is 0,426, and the multidimensional poverty index 0.237.

As a result, in the case of Antalya (with the priority of Döşemealtı and Serik districts), the most important steps to be taken in order to strengthen the struggle of women against poverty is to ensure their physical and mental integrity and review the legal framework for eliminating economic and physical violence. Both policymakers and practitioners have a great responsibility to take deterrent measures so that women will be able to feel safe in their homes, close environments and workplaces. Furthermore, increasing educational attainment, especially among women, would socially empower women. In other words, having a population density of universities and higher degrees, especially with a focus on women, would shift their status at work as well as their participation in the labor market, facilitating women's access to better conditions as their economic freedom expands. Women will be able to engage in household decisions and be empowered in a wide range of areas, including health, technical infrastructure, immigration, social assistance, and physical/mental safety, as their income, status in the workplace and socioeconomic class improve. Therefore, as previously mentioned, enhancing women's education, reducing and even eliminating discriminatory and marginalizing judgments, ensuring equality of opportunity in all fields, and fighting poverty are all essential measures to take. Conducting new studies to see how women's poverty (index values) has changed over time in Antalya would provide insight into the fight against women's poverty in the region and across the country. Furthermore, empirical analyses of the poverty in question and the factors that can be successful in combating it will provide an indication of the direction and magnitude of the potential effects and will again guide policymakers.

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Annex 1: Deprivation Conditions Related to Dimensions and Indicators Used in the Multidimensional Poverty Measurement

DIMENSIONS/INDICATORS	DEPRIVATION CONDITIONS
<p>INFORMATION ABOUT THE PERSON AND THE SOCIO-ECONOMIC STRUCTURE OF THE HOUSEHOLD <i>White appliances (Washing machine + Dishwasher)</i> <i>Computer Internet</i></p>	<p>S1.1. Do you have a washing machine and dishwasher (both) in your home? <i>Deprived if the answer is "No"</i></p> <p>S1.2. Do you have your own computer (laptop or desktop)? <i>Deprived if the answer is "No"</i></p> <p>S1.3. Do you have internet access in your home? <i>Deprived if the answer is "No"</i></p>
<p>EMPLOYMENT <i>Employment contract</i> <i>Daily working hours</i> <i>Psychological, physical pressure</i></p>	<p>S2.1. Do you have an employment contract with your employer? <i>Deprived if the answers are one of the following: "No, I don't have a formal contract" "Yes, I have an unofficial contract" "No, I didn't know it had to be"</i></p> <p>S2.2. How many hours do you work daily? <i>Deprived if "over 8 hours"</i></p> <p>S2.3. Do you experience psychological and/or physical pressure in your workplace? <i>Deprived if the answer is one of the following: "So lightly", "Lightly", "Moderate", "Much", "Too Much"</i></p>
<p>INCOME <i>Net wage</i> <i>Debt</i> <i>Savings</i></p>	<p>S3.1. What is the net salary you earned from your main job last month? <i>Deprived "if less than 2324.70 TL"</i></p> <p>S3.2. Do you have any debt? <i>Deprived if the answer is "Yes"</i></p> <p>S3.3. Do you have savings? <i>Deprived if the answer is "No"</i></p>
<p>HEALTH <i>Health status</i> <i>Number of health problems</i> <i>Effects of the health problems</i></p>	<p>S4.1. How would you describe your current health status? <i>Deprived if the answer is one of the following: "Very bad", "Bad", "Normal"</i></p> <p>S4.2. Write down the total number of your health problems. <i>Deprived if the answers is not "0"</i></p> <p>S4.3. How much do these health problems affect your daily routine? <i>Deprived if the answer is one of the following: "Too much", "Excessive", "Tolerable", "Little"</i></p>
<p>EMPOWERMENT <i>Personal decision control</i> <i>Possible reasons for inability to work in the future</i> <i>Feeling free</i></p>	<p>S5.1. To what extent do you feel you can control your personal decisions that affect your daily activities? <i>Deprived if the answer is one of the following: "I can't control any of my decisions", "I can control very little of my decisions", "I can control some of my decisions"</i></p> <p>S5.2. Could you explain the possible reasons why you might work or not take part in any job in the future? Choose the one that suits you best. <i>Deprived if the answer is one of the following: "Zero control", "External pressure", "Obtaining approval"</i></p> <p>S5.3. Which step do you see yourself on today? <i>1 dependent 6 independent</i></p>
<p>SOCIAL ASSISTANCE <i>Financial difficulties</i> <i>Need for social assistance</i> <i>Receiving social aid</i></p>	<div style="text-align: center;">  </div> <p><i>Deprived if the answer is one of the following: "1", "2", "3"</i></p> <p>S6.1. Do you think your household is in financial difficulties? <i>Deprived if the answer is one of the following: "So lightly", "Lightly", "Moderate", "Severe", "Very severe"</i></p> <p>S6.2. Do you think your household needs social assistance for the poor or needy? <i>Deprived if the answer is "Yes"</i></p> <p>S6.3. Did you receive any help other than debt from any institution or persons such as relatives, neighbors, philanthropists due to financial difficulties? <i>Deprived if the answer is "Yes"</i></p>

<p>MIGRATION <i>Migration</i> <i>Changes in living conditions as a result of migration</i> <i>Migration plans in the future</i></p>	<p>S7.1. Have you ever migrated in your lifetime? <i>Deprived if the answer is "Yes"</i> S7.2. How have your living conditions changed after migration? <i>Deprived if the answer is one of the following: "Worsened", "Didn't change"</i> S7.3. Do you have any migration plans in the near future? <i>Deprived if the answer is one of the following: "Not decided", "Yes"</i></p>
<p>PHYSICAL SAFETY <i>Theft</i> <i>Physical violence / injury</i> <i>Possibility of exposure to violence within 1 year</i></p>	<p>S8.1. Has someone trespassed in your home or flat in recent years and has stolen or attempted to steal anything that belongs to you? <i>Deprived if the answer is "Yes"</i> S8.2. Excluding the previous incidents, have you or any member of your family been shot at your home or outside with a firearm (knife, etc.), subjected to violence or beaten in the past 5 years? (kick, push, etc.) <i>Deprived if the answer is "Yes"</i> S8.3. What is the possibility of being a victim of one of the above-mentioned violence events within the following 12 months? <i>Deprived if the answer is one of the following: "Very likely" "Probably" "Low probability but may" "Very unlikely"</i></p>
<p>INCLUSION WITHOUT FEELING EMBARRASSED <i>Feeling embarrassed due to poverty</i> <i>Being treated with prejudice</i> <i>Feeling excluded</i></p>	<p>S9.1. I would be embarrassed if I was poor. <i>Deprived if the answer is one of the following: "I agree", "I have no idea"</i> S9.2. Have you felt people approach you with prejudice during the last 3 months? <i>Deprived if the answer is one of the following: "Always", "Sometimes", "Often", "A little"</i> S9.3. Do you feel excluded? <i>Deprived if the answer is one of the following: "Always", "Sometimes", "Often", "A little"</i></p>



The Relationship between Green Innovation, CO₂ Emissions, Gross Domestic Product, and Renewable Energy Supply: A Panel Data Analysis for BRICS Countries and Turkey

Bekir Sami Oğuztürk¹ , Ferhat Özbay² 

Abstract

This study aims to determine the impact of carbon dioxide (CO₂) emissions, Gross Domestic Product (GDP), and green innovation on the renewable energy (RE) supply (RES) by taking panel heterogeneity and cross-section dependence into account. The dataset of this study covers a panel of BRICS countries (fragile five) and Turkey from 2000 to 2017. Based on the heterogeneity and cross-section dependency, the tests we have applied are the CIPS unit root test, Gengenbach, Urbain and Westerlund's (2016) panel cointegration, Mean Group estimator (MG) and fully modified ordinary least squares (FMOLS), and Panel Dumitrescu and Hurlin's (2012) causality techniques. We have found in this study that the variables are cointegrated in the long term. The results show that the CO₂ emission for the whole sample has a negative impact on RES. On a country basis, it shows that green innovation has a positive and robust relationship with RES in Brazil and Turkey. The impact of green innovation on RES does not have a statistically significant relationship in Russia, China, India, or South Africa. CO₂ emission indicates a negative impact on RES in whole countries. While economic growth reduces RES in India, Turkey and South Africa, this effect is the opposite in Brazil and China. This study provides practical policy implications for policymakers and researchers studying in this field.

Keywords

Green Innovation, Renewable Energy, CO₂ emissions, Environment, Panel Cointegration

Introduction

For a sustainable world, one of the fundamental values targeted globally is a sustainable environment, since all communities are increasingly concerned about the loss of natural resources and environmental pollution (Asadi et al., 2020; Song et al., 2019). The raise in energy demands and CO₂ emissions constitute an obstacle to a sustainable environment. According to Global Footprint Network data, world energy capacity is insufficient to meet this demand.

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Considering that the energy distribution throughout the world is not optimal and non-RE is the leading cause of CO₂ emissions (Dogan & Seker, 2016; Inglesi-Lotz & Dogan, 2018; Nathaniel & Iheonu, 2019; Shafiei & Salim, 2014), the importance of RES is increasing. Given the role of RE in the debate for a future with reliable and sustainable energy, it is essential to understand its main determinants and draw policy implications for energy policy (Omri & Nguyen, 2014).

Bilan et al. (2019), Apergis & Payne (2014), and Sadorsky (2009) examined the determinants of RE in their studies. They emphasized that economic growth, cost and CO₂ emissions have significant impacts on RE. The essential emerging emphasis is that RES should be increased not only for future energy needs but also to reduce CO₂ emissions and provide a sustainable environment. Considering that scarce resources cannot meet this energy need, the importance of environmental technologies (called green innovation in this study) is increasing. Also, it is known that green innovations play a critical role in accelerating the global energy transition (IRENA, 2021). Besides, Dağlı & Kösekahyaoğlu (2021) state that technology will profoundly impact the environment.

It is understood that the increase in energy demand and environmental pollution makes green innovation even more critical since RE technologies provide clean and abundant energy harvested from self-renewing sources such as the sun, wind, soil and plants (Bull, 2001). RE technologies are considered clean energy sources, and optimum use of these resources minimizes environmental impacts. Also, these technologies generate minimal secondary waste and are more sustainable according to current and future economic and social needs (Panwar et al., 2011). Overall, RE technologies offer an excellent opportunity to reduce greenhouse gas (GHG) emissions and global warming by replacing traditional energy sources (Panwar et al., 2011).

Although there is a significant trend in the literature to recognize the value of green innovation towards achieving sustainable development (Afshar Jahanshahi et al., 2020; Afshar Jahanshahi & Brem, 2020; Asadi et al., 2020), it has not received sufficient attention (Bai et al., 2020a). In this context, this study investigated the impact of CO₂ emissions, GDP, and green innovation on RES by considering panel heterogeneity and cross-section dependence. The first purpose of examining this relationship is to put forward important policies to increase RES. The second objective is to determine whether RES move together with economic growth. We believe that a change to RES is significant in terms of energy demand when economic growth occurs. The OECD (2020) emphasizes implementing national and international low-carbon strategies and further decoupling GHG emissions from economic growth. We also examine whether there is a causal relationship between economic growth, CO₂ and RES, as it is vital to separate economic growth from CO₂ in environmental policies.

Furthermore, the ever-increasing energy demand and CO₂ emissions of rapidly growing

developing countries pose a significant environmental risk today. Therefore, it can be accepted that these countries should prioritize formulating policies to combat global warming and use RE resources (Çınar & Yılmaz, 2015). The dataset of this study covers Brazil, Russia, India, China, South Africa, and Turkey (BRICS-T) from 2000 to 2017; also, BRICS-T is the sole cause of almost 43% of CO₂ emissions on Earth (IEA, 2019).

In the first part of this study, we include a literature review which consists of two parts. We first reviewed the topic in the BRICS country’s context and then added a literature review that explores the relationship between green innovation, RES and CO₂ emissions. In the second part of this study, we decided which panel data method to use and the correlation matrix of the model. One of the most neglected assumptions in the models used in the literature is whether the model is heterogeneous or not. A critical shortcoming is whether the method chosen when examining long-term coefficients is resistant to cross-sectional dependence and suitable for heterogeneity. For this purpose, we analyzed the matrix of correlations, cross-section dependence, and homogeneity assumptions. We then implemented the unit root test. For stationary variables at level I (1), Gengenbach, Urbain and Westerlund’s (2016) panel cointegration test was administered, which is error-correction based and allows for unbalanced panels, heterogeneous structure and correlation between units. And then, we analyzed the residues of variables in a cross-section dependence test. With this test, a decision was made between first and second-generation tests to interpret long-term coefficients. The long-term coefficients were estimated with FMOLS and MG coefficients. Finally, we used Dumitrescu and Hurlin’s (2012) panel causality techniques. In the last part of the study, we discussed the results of the analysis. Finally, we provided some policy implications in the conclusion section.

Literature Review

In this section, the studies on the BRICS and BRICS-T context are discussed. In Table 1 below, studies include:

Table 1
RE studies on the BRICS and BRICS-T

Authors	Scope	Methodology	Result
(Anser et al., 2021)	BRICS	Panel AMG	The authors found that RE consumption inhibited CO ₂ emissions, whereas GDP, population, and non-RE consumption increased CO ₂ emissions.
(Bağrıyanık, 2021)	BRICS	Panel AMG	Export diversity and economic growth affect CO ₂ emissions positively.
(Kongbua- mai et al., 2021)	BRICS	DSUR method and panel causality tests	Economic growth, RE, non-RE consumption, and industry positively correlate with the ecological footprint (EF). In contrast, the strictness of environmental policy has a negative relationship with the EF.

Authors	Scope	Methodology	Result
(Muhammad et al., 2021)	BRICS and developed and developing countries	GMM and System GMM	Foreign direct investment (FDI) is the cause of environmental degradation in BRICS and developing countries. However, in developed countries, FDI reduces environmental degradation. As a result, the fuel resources of BRICS and RE consumption help reduce environmental degradation in all samples. Besides, ore and metal resources improve environmental degradation in developed countries.
(Nathaniel et al., 2021)	BRICS	CCEMG, AMG, PMG, FMOLS	This study found that economic growth and natural resources increase EF, and human capital is not yet desired to reduce environmental degradation. Therefore, it is stated that RE reduces EF.
(Younis et al., 2021)	BRICS	GMM	The stock index price has a negative relationship with other countries except for Brazil. The study also reveals that FDI, trade openness and urbanization have a significant positive relationship with environmental degradation.
(Zhao et al., 2021)	BRICS	NARDL	The study showed that an increase in geopolitical risk significantly impacted CO ₂ emissions in Russia and South Africa. While the reduction of geopolitical risk negatively affects CO ₂ emissions in India, China and South Africa, it has a positive coefficient in Russia in the long run.
(Adedoyin et al., 2020)	BRICS	PMG ARDL	The study's findings conclude that an increase in coal rents will not increase CO ₂ emissions. They demonstrated that energy diversification in BRICS economies can reduce the global declining energy market, and environmental sustainability will be achieved by separating CO ₂ from GDP in BRICS economies.
(Akram et al., 2020)	BRICS	Hidden panel cointegration. Nonlinear panel ARDL	The study's findings say that the effect of the selected variables on CO ₂ emissions is asymmetrical and that both energy efficiency and RE help reduce CO ₂ emissions in BRICS countries.
(Aziz et al., 2020)	BRICS	MMQR	CO ₂ emissions can be reduced by choosing renewable sources.
(Banday & Aneja, 2020)	BRICS	Bootstrap Dumitrescu and Hurlin panel causality test	This research showed that there is unidirectional causality from GDP to CO ₂ for all countries except Russia. The causality results from RE consumption to GDP show evidence of the feedback hypothesis for China and Brazil, the growth hypothesis for Russia, the conservation hypothesis for South Africa, and the neutrality hypothesis for India.
(Hassan et al., 2020)	BRICS	Panel CUP-FM and CUP-BC	This study supports the idea that nuclear energy reduces CO ₂ emissions. Also, RE corrects environmental pollution in BRICS countries.
(Şengönül, 2018)	BRICS	Panel VECM and causality	There is a causal relationship between electricity consumption to GDP in the short run and from GDP to electricity consumption in the long run.
(İzgi, 2017)	BRICS and MINT	Panel cointegration and causality	Economic activities are positively affected by renewable and non-RE consumption, and non-RE consumption is more effective on economic growth than RE consumption.
(Özşahin et al., 2016)	BRICS -T	Panel cointegration and ARDL	A positive relationship was found between RE consumption and economic development in the long run.
(Dincer, 2000)	BRICS and MINT ¹	Engle-Granger cointegration and Toda Yamamoto causality	This study determined that RE is vital for sustainable development for Brazil and China. However, no association has been detected in other countries.

1 MIST "Mexico, Indonesia, South Korea and Turkey."

Table 1 includes different studies on BRICS and BRICS-T: RE and economic development, RE and sustainable development, energy and growth, economic growth, export diversification and CO₂ emissions.

Three critical highlights in the literature review for BRICS countries in Table 1 above are:

1. RE reduces CO₂ emissions.
2. Economic Growth increases CO₂ emissions.
3. RE reduces environmental pollution and is vital for sustainable development.

Table 2 below presents the literature examining the relationship between green innovation-based RE and CO₂.

Table 2
International RE Studies on the Context of Green Innovation

Authors	Scope	Methodology	Result
(Lin & Zhu, 2019a)	China's provinces	Panel threshold model	The effect of technological innovations on reducing CO ₂ is low, but the effect on RE is increasing at a growing rate.
(Danish & Ulucak, 2020)	BRICS	Panel CUP-FM and CUP-BC	Environmental technologies contribute positively to green growth. Besides, it has been observed that RE supports green growth, but non-RE harms green growth.
(Yang et al., 2019)	China's provinces	GMM	The effect of energy price on fossil fuel technological innovation is more remarkable than RE. Price support is needed to develop RE technology.
(Lin & Zhu, 2019b)	China's provinces	Panel cointegration, causality and System GMM	The innovation process actively responds to climate change. The energy price has a negligible effect on innovation in RE technologies and is caused by the unreasonable energy price mechanism.
(Santra, 2017)	BRICS	Panel Pooled regression modeling	Environmentally innovative technology has a substantial impact on the sustainable performance of BRICS countries. Green technological innovations reduce energy absorption and CO ₂ emissions for companies and countries as a whole.
(Zhu et al., 2020)	China's provinces	Panel Spatial analysis	Although not significantly associated with sulfur dioxide, technological innovations in RE help reduce nitrogen oxides and respirable suspended particles
(Bai et al., 2020b)	China's provinces	Panel FE regression model and panel threshold model	Technological innovations in RE help reduce CO ₂ emissions per capita. Still, with the increase in income inequality, the possible benefit of technological innovations in RE on CO ₂ emissions per capita is reduced and hindered.
(Cheng & Yao, 2021)	China's provinces	Panel MG, CCEMG and AMG, PMG, DFE estimator	RE technology innovation is not affected by carbon intensity in the short run, but its effects are adverse and significant in the long run.
(Hao et al., 2021)	G7	CS-ARDL model	Linear or nonlinear green growth reduces CO ₂ emissions.
(Saudi et al., 2019)	Malaysia	ARDL	RE consumption and innovation have a significant and negative impact on carbon dioxide emissions, and economic growth has a significant and positive impact on carbon dioxide emissions.

Authors	Scope	Methodology	Result
(Kılınç & Şahbaz, 2021)	24 selected countries	Panel ARDL and Emirmahmutoğlu and Köse casuality test	R&D expenditures and innovation have an impact on RE.
(Khattak et al., 2020)	BRICS	Panel CCEMG	Apart from Brazil, innovation activities do not impair CO ₂ in other BRICS countries.
(Ali et al., 2020)	10 carbon emitter countries	Panel cointegration and CS-ARDL	RE consumption and environmental innovations have a negative impact on consumption-based carbon emissions and region-based carbon emissions.

The general emphasis in Table 2 above is that environmental innovations positively impact RE and negatively impact CO₂ emissions.

Data, Methodology, and Findings

Data and Model

There is not enough discussion on the determinants of RE in the literature. However, it is not the first time that RE is the dependent variable in the literature. Some studies have investigated the effects of variables such as CO₂, per capita GDP and oil prices on RE (Apergis & Payne, 2014; Sadorsky, 2009). This study examines the impact of CO₂ emissions, GDP, and green innovation on the RES with data from 2000 to 2017 in BRICS-T countries.

The model created following the purpose of the study is as in equation 1 below:

$$RES_{it} = \beta_0 + \beta_1 CO_{2,it} + \beta_2 \ln GDP_{it} + \beta_3 \ln greenpatent_{it} + \varepsilon_{it} \quad (1)$$

$$i=1,2,3,\dots,6.$$

$$t= 1,2,3,4,\dots,18.$$

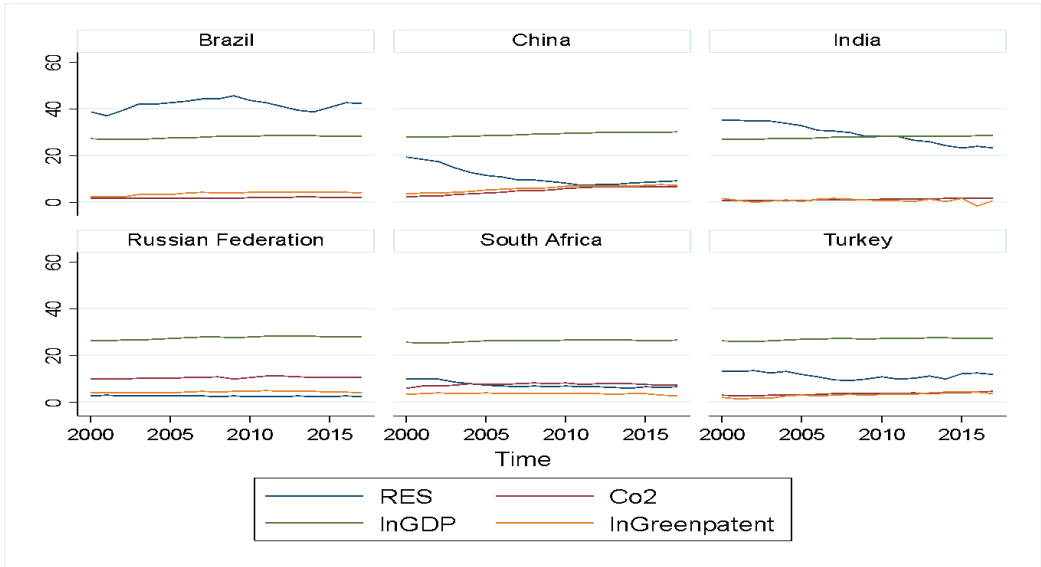
In this study, the variables used definitions, and sources given in Table 3 below.

Table 3
Description of Variables

Variable	Definition	Source
RES	RE supply (percentage of total primary energy supply).	OECD
CO ₂	Carbon Dioxide: determined by dividing the total CO ₂ emissions by the population.	World bank
lnGDP	Gross domestic product: It represents growth.	World bank
lnGreenpatent	Green Innovation: It Includes patents on environmental technologies.	OECD

Furthermore, the change of the variables over the years is given in Graph 1. According to Graph 1, Brazil seems to have the highest share of RES in total energy. The shares of India's RES in total energy have decreased. The country with the lowest percentage of RES in total

energy is Russia. Again, Russia is the leading country in CO₂ emissions per capita. The rise in China’s RES in 2007 and after is remarkable. This rise can be said to have stopped the increase in China’s CO₂ emissions as of 2013. However, it is the country with the highest CO₂ emissions per capita after Russia.



Graph 1. Variables Views by Countries

Before deciding which method to select, we must examine whether there are multicollinearity or singularity problems among the variables. Accordingly, the VIF statistics and correlation matrix of the variables are given in Table 4 below.

Table 4
VIF and Matrix of Correlations

Variables	(1)	(2)	(3)	(4)
(1) RES	1.000			
(2) CO ₂	-0.777	1.000		
(3) lnGDP	0.196	-0.118	1.000	
(4) lnGreenpatent	-0.307	0.495	0.466	1.000
VIF		1/VIF		
2.100		0.476		
1.670		0.600		
1.610		0.622		
Mean: 1.790				

VIF measures the severity of multicollinearity in regression analysis. In this context, it is expected to be between 1 and 5. In the correlation matrix, the variables should not be higher than 0.8. According to findings, the variables in the model do not contain multicollinearity or singularity.

Methodology and Findings

We used the panel data method in this study because the data includes both unit and time dimensions. Panel data models offer many advantages for multi-section analysis to bring together cross-sectional observations over time. In this respect, the most crucial benefit of panel data analysis is that it allows the researcher great flexibility in modeling behavioral differences between individuals (Özbay & Oğuztürk, 2020). Like a time series, spurious regression problems may arise when working with nonstationary data in panel data management (Tatoğlu, 2018). Unit root tests in panel data are divided into first-generation and second-generation tests. In the case of correlation between units in the model, second-generation tests are preferred. In this context, before the unit root test is to be carried out, we should test whether the model is correlated between units.

In the model, the time dimension is higher than the unit dimension. As an inter-unit correlation test, Breusch and Pagan’s LM test does not give consistent results when the time dimension is higher than the unit dimension. Pesaran’s (2004) Test of Cross Section Dependence was chosen in this study, considering that the unit dimension is larger than the time dimension. Table 5 below shows the correlation between units.

Table 5
Pesaran CD Test

Variable	CD	P-value
RES	0.57	0.569
CO ₂	11.11	0.000
lnGDP	15.43	0.000
lnGreenpatent	3.71	0.000

Table 5 above shows that all variables except RES contain inter-unit correlation. In this context, Maddala & Wu’s (1999) first-generation unit root test (MW) and Pesaran’s (2007) second-generation unit root test (CIPS) are used for unit root tests.

Table 6
Unit Root Test

MW Tests					
Without Trend			Without Trend		
Variable	Chi_sq	P-Value	ΔVariable	chi_sq	p-value
RES	9.825	0.631	ΔRES	83.871	0.000
CO ₂	17.200	0.142	ΔCO ₂	63.214	0.000
lnGDP	8.070	0.780	ΔlnGDP	32.541	0.001
lnGreenpatent	19.239	0.083	ΔlnGreenpatent	110.181	0.000
With Trend			With Trend		
Variable	Chi_sq	P-value	ΔVariable	chi_sq	p-value
RES	12.789	0.385	ΔRES	76.602	0.000
CO ₂	7.550	0.819	ΔCO ₂	56.986	0.000
lnGDP	0.357	1.000	ΔlnGDP	44.005	0.000
lnGreenpatent	19.368	0.080	ΔlnGreenpatent	120.518	0.000

CIPS					
Without Trend			Without Trend		
Variable	Zt-bar	p-value	ΔVariable	Zt-bar	p-value
RES	2.402	0.992	ΔRES	-3.021	0.001
CO ₂	0.758	0.776	ΔCO ₂	-2.399	0.008
lnGDP	-1.541	0.062	ΔlnGDP	-3.247	0.001
lnGreenpatent	-1.399	0.081	ΔlnGreenpatent	-8.127	0.000
With Trend			With Trend		
Variable	Zt-bar	p-value	ΔVariable	Zt-bar	p-value
RES	1.828	0.966	ΔRES	-3.391	0.000
CO ₂	2.014	0.978	ΔCO ₂	-1.105	0.135
lnGDP	-1.130	0.129	ΔlnGDP	-0.970	0.166
lnGreenpatent	-0.528	0.299	ΔlnGreenpatent	-6.474	0.000

According to the unit root test results in table 6 above, the series is I (1) determined to be stationary.

If the series that are not stationary at the level are I (1) cointegrated, they contain long-term relationships, and spurious regression is not encountered (Tatoğlu, 2018).

However, when investigating these relationships in the literature, whether the model is homogeneous or not is not determined. Ignoring this assumption causes wrong model selection; therefore, biased results are obtained. In this context, the homogeneity of the variables was tested with Swamy’s (1971) test and Pesaran and Yamagata’s (2008) slope heterogeneity test.

Table 7
Testing for Slope Heterogeneity
Pesaran and Yamagata S Testi

	Delta	p-value
	7.583	0.000
adj.	8.972	0.000
Swamy S Testi		
chi2(20)	13463.46	Prob > chi2: 0.0000
=		

Test results are tested according to H_0 .

H_0 : Slope coefficients are homogeneous.

In this context, hypothesis H_0 was rejected: the model was determined to be heterogeneous.

Gengenbach, Urbain, and Westerlund’s (2016) cointegration test was used because the model is unbalanced and thus allows for group-specific lag selection and heterogeneity. This test is also one of the most up-to-date tests that would enable inter-unit correlation based on the error correction model.

Table 8
Panel EC-test ve Pesaran (2015) CD-test

d.y	Coef	T-bar	P-val*
y(t-1)	-0.747	-15.793	<=0.01

Variable	CD	P-val
RES	1.663	0.096
CO ₂	-1.932	0.053
lnGDP	3.844	0.000
lnGreenpatent	1.248	0.212
e	0.131	0.895

Note: Root mean square error: 0.0466
 Number of observations: 85
 Number of groups: 5

The variables are cointegrated according to the Gengenbach, Urbain, and Westerlund (2016) cointegration test above. It is understood that the cointegration test removes the correlation between units from the residue according to the Pesaran (2015) CD test.

When investigating long-term relationships, the model should take the inter-unit correlation into account. Models that allow heterogeneity should also be tested for correlation between units. First-generation tests can be used when there is no correlation between teams in the remnants of the cointegration model (Tatoğlu, 2018). In this context, we investigated the long-term effects of the variables by considering models that allow heterogeneity. These relations were obtained from Pedroni’s (1996, 2000) FMOLS and Pesaran and Smith’s (1995) MG estimator. Both tests allow heterogeneity.

Table 9
Group-coefficients

	FMOLS		MG(Mean Group)	
	Coef.	t-stat	Coef.	P>z
CO ₂	-4.83	-49.75***	-4.848**	0.028
lnGDP	1.74	10.39***	1.919	0.613
lnGreenpatent	0.85	13.32***	0.709	0.131
Constant			-31.099	0.763

Table 10
Group-Specific Coefficients

		Brazil		China	
		Coef.	t-stat	Coef.	P>z
Brazil	CO ₂	-10.78***	-42.42	-10.751***	0.000
	lnGDP	2.11 ***	9.97	1.960	0.103
	lnGreenpatent	2.18***	14.67	2.326***	0.003
	constant			-1.457	0.960
China	CO ₂	-8.55***	-45.50	-8.271***	0.000
	lnGDP	19.31***	65.00	20.147***	0.000
	lnGreenpatent	0.59*	2.70	-0.432	0.857
	constant			-530.657***	0.000

		Coef.	t-stat	Coef.	P>z
India	CO ₂	-9.84 ***	-15.94	-10.059***	0.000
	lnGDP	-2.34***	-6.72	-2.155**	0.028
	lnGreenpatent	-0.14*	-2.15	-0.157	0.433
	constant			101.545***	0.000
Russian Federation	CO ₂	-0.25***	-18.03	-0.255*	0.080
	lnGDP	-0.10***	-12.33	-0.107	0.175
	lnGreenpatent	0.08***	4.65	0.097	0.582
	constant			7.927***	0.000
South Africa	CO ₂	-0.41*	-2.97	-0.528*	0.075
	lnGDP	-2.48 ***	-16.06	-2.412***	0.000
	lnGreenpatent	0.45**	3.41	0.483	0.184
	constant			73.126***	0.000
Turkey	CO ₂	0.85*	2.98	0.779	0.301
	lnGDP	-6.06 ***	-14.40	-5.917***	0.000
	lnGreenpatent	1.97***	9.36	1.937***	0.000
	constant			162.920***	0.000

Root Mean Squared Error (sigma): 0.7494
 Wald chi2(3) = 7.68
 Prob > chi2 = 0.05

Note: *** $p < .01$, ** $p < .05$, * $p < .1$

Hausman’s (1978) test was used to choose between the MG and FMOLS estimators, and again the inter-unit correlation test was performed for the residue. Accordingly, the average correlation coefficient & Pesaran (2004) CD test and the Hausman (1978) specification test are presented in Table 11 below. According to the results, the MG estimator is more consistent than the FMOLS estimator. Therefore, it was decided that there is no correlation between units for MG. In this context, it has been understood that there is no need for estimators that reveal second-generation long-term relationships that consider the correlation between units.

Table 11
Specification Tests

Average correlation coefficients & Pesaran (2004) CD test			
Variable	CD-test	prob	corr
MG	-0.560	0.577	-0.032
FMOLS	11.510	0.000	0.720
Hausman (1978) test			
			Coef.
Chi-square			1546.872
Prob			0.00

It is understood that the coefficients of FMOLS and MG estimators in Tables 9-10 are very close to each other. The results show that the CO₂ emission for the whole sample has a negative effect on RES. According to MG, while the impact of green innovation is positive, it is statistically insignificant. On a country basis, it shows that green innovation has a positive and robust relationship with RES in Brazil and Turkey. The effect of green innovation on RES in Russia shows a positive but statistically weak relationship. We found no significant relationship

onship in China, India, and South Africa. CO₂ emissions indicate a negative effect on RES as a whole sample. It can be seen that economic growth has increased RES for China. While the exact relationship is in question for Brazil, it is statistically insignificant. In all other countries, economic growth has been found to have a negative effect on RES.

Finally, we decided to perform an optional causality test. It is essential to choose methods that take into account the heterogeneous structure of the model while performing the causality test. In this context, we used Dumitrescu and Hurlin’s (2012)² Granger non-causality test. This test also gives excellent results in small panels, even if it includes cross-sectional dependence. The delay of the model was chosen according to the AIC information criterion.

This inference takes place under two hypotheses:

$$H_0: \not\rightarrow (X \text{ is not the granger cause of } Y).$$

$$H_1: \rightarrow (X \text{ is the granger cause of } Y).$$

Table 12
Dumitrescu & Hurlin (2012) Granger Non-Causality Test Results

Null Hypothesis	W-bar	Z-bar	Optimal number of lags (AIC)	Decision
CO ₂ $\not\rightarrow$ RES	11.0353	6.0928***	4	CO ₂ \rightarrow RES
RES $\not\rightarrow$ CO ₂	2.1159	1.9328*	1	RES \rightarrow CO ₂
RES $\not\rightarrow$ lnGDP	7.7340	11.6636 ***	1	RES \rightarrow lnGDP
lnGDP $\not\rightarrow$ RES	4.0898	1.0898	3	lnGDP $\not\rightarrow$ RES
RES $\not\rightarrow$ Greenpatent	21.7189	15.3450***	4	RES \rightarrow Greenpatent
Greenpatent $\not\rightarrow$ RES	3.2860	3.9594***	1	Greenpatent \rightarrow RES
CO ₂ $\not\rightarrow$ Greepatent	8.3217	5.3646 ***	4	CO ₂ \rightarrow Greepatent
Greepatent $\not\rightarrow$ CO ₂	10.1945	5.3646***	4	Greepatent \rightarrow CO ₂
Greenpatent $\not\rightarrow$ lnGDP	1.1077	0.1866	4	Greenpatent $\not\rightarrow$ lnGDP
lnGDP $\not\rightarrow$ Greenpatent	10.8469	5.9296***	4	lnGDP \rightarrow Greenpatent
lnGDP $\not\rightarrow$ CO ₂	12.4548	7.3220 ***	4	lnGDP \rightarrow CO ₂
CO ₂ $\not\rightarrow$ lnGDP	4.9558	6.8516 ***	1	CO ₂ \rightarrow lnGDP

Note: ****p*<.01, ***p*<.05, **p*<.1

According to the Granger non-causality test, there is a mutual causality relationship between RES and CO₂. It also revealed a one-way causality relationship between RES to economic growth. Furthermore, there appeared to be a bidirectional causality between RES and green innovation, with CO₂ emissions and green innovation. Unidirectional causality from economic growth to green innovation can be observed. Finally, according to the results, there is a bidirectional causality relationship between economic growth and CO₂ emissions.

2 Since the logarithm of the variable “lnGreenpatent” causes the missing value, we used the non-logarithmic version to perform the Granger causality test.

Conclusion

This study has investigated the impact of CO₂ emissions, GDP, and green innovation on RES, and the causality relationship between green innovation, CO₂ emissions, GDP, and RES. We believe that discussing the determinants of RES within the scope of BRICS-T countries in the study contributes to the literature. Also, this study presents green innovation as a determinant of RES for the first time in the literature.

Econometric results confirm that there was a causality relationship between CO₂ and RES. These findings are similar to Dogan and Seker's (2016) paper. Dogan and Seker (2016) state that the EU should support universities and researchers to produce cheaper RE. Also, according to our findings in this study, CO₂ emissions affect RES negatively. Bilan et al. (2019) and Waheed et al. (2018) found similar results to ours, that CO₂ emissions reduced the use of RE.

Dogan and Seker's (2016) study also emphasizes the necessity of environmental technologies for environmental sustainability. Furthermore, Khan et al. (2020) state that green innovation and renewable energy help improve environmental sustainability. We found that green innovation had a positive effect on RES for Brazil and Turkey, in parallel with Kılınc & Sahbaz's (2021) views. Similarly, Khattak et al. 2020, stated that innovation activities do not affect CO₂ in other BRICS countries, except Brazil. In this study, it was seen that there is a causal relationship between CO₂ and green innovation for BRICS-T. This view is indirectly similar to our findings that green innovation only affects RES for Brazil and Turkey.

Bilan et al. (2019) found the effect of economic growth on RES to be positive in European Union member countries but negative for candidate or potential candidate countries. Whereas in our findings, economic growth reduced RES in India, Turkey and South Africa, this effect was positive in Brazil and China. Furthermore, the literature discussion results also showed that economic growth positively affects CO₂ emissions (Chiu & Chang, 2009; Dong, Hochman, et al., 2018; Dong, Sun, et al., 2018; Kesgingöz & Karamelikli, 2015; Özbay & Pehlivan, 2021; Pata & Yurtkuran, 2018). Our study shows that there is a reciprocal causality relationship between CO₂ and economic growth.

The OECD (2020) emphasized that the main task for implementing national and international low carbon strategies and tackling climate change is to further decouple GHG emissions from economic growth. Based on the OECD view, we understand that the BRICS-T countries, except Brazil, do not make sufficient efforts on climate change. These findings reveal important implications for the literature. At the same time, one of the main goals to limit climate change is to reduce energy intensity by adopting energy-efficient production processes, which means increased energy efficiency. Environmental patents can measure the effectiveness and efficiency here. According to our findings, the statistically positive effect

of green innovations on RES in Brazil and Turkey shows the efforts of these countries to increase energy efficiency.

For environmental sustainability, the following summary findings emerge with the literature review and statistical results:

1. There was an inverse relationship between CO₂ and RES. In this context, strengthening incentives and sanctions for RES will create a more sustainable environment.

2. While GDP is growing, if it is positively related to CO₂ and negative with RE, this growth is dangerous for environmental sustainability. For this, policymakers and researchers should put demand-pull policies on the agenda for the price mechanism and the demand for RE supply.

3. It is seen that environmental patents are far from the desired level. For this, a great responsibility falls on researchers and policymakers.

Note for future work

Renewable energy remains the most critical factor for environmental sustainability. However, studies on renewable energy show that its determinants have been ignored. In this context, this model should be developed for future studies by associating the price policy discussed in the literature and renewable energy supply. For this, researchers can use both RE and non-RE prices. At the same time, it is necessary to investigate why green innovation does not show the expected effect in some countries. As such, new studies are necessary.

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APP-1.

Summarize Statistic

Variable		Mean	Std. Dev.	Min	Max	observations
RES	Overall	17.33796	14.024	2.45	45.71	N =108
	Between		15.02679	2.708889	41.75	n = 6
	Within		2.596826	11.07907	25.72574	T = 18
	Ov.	4.998148	3.366214	.8	11.2	N =108
CO ₂	Bet.		3.58338	1.194444	10.56111	n = 6
	Wit.		.7286169	2.453704	6.753704	T = 18
	Ov.	27.63708	1.044173	25.47238	30.14147	N =108
lnGDP	Bet.		.9286339	26.29472	29.08769	n = 6
	Wit.		.6041085	26.27673	28.69086	T = 18
	Ov.	3.69973	1.702722	-1.609438	7.579934	N =105
lnGreenpatent	Bet.		1.6968	.7626755	5.922481	n = 6
	Wit.		.8059962	1.327617	5.357183	T = 17.5



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RESEARCH ARTICLE

Intellectual Capital and Firm Value: An Investigation of Turkish Manufacturing Companies

İlhan Çam¹ , Gökhan Özer² 

Abstract

This paper investigates whether intellectual capital and its components (human, relational, innovation, and process capitals) have meaningful information on firm value. Full sample consists of 148 listed Turkish manufacturing firms over the period of 2005–2017. We show that our extended Ohlson models explain the substantial part of the unexplained variation in firm market values. Specifically, we find that higher levels of measures of human capital, relational capital, process capital, innovation capital, and overall intellectual capital are directly associated with higher stock prices. Furthermore, we find that intellectual capital and its components have lagged effects on market values of firms, and human capital has a moderating effect on the relationship between other intellectual capital components and firm market values. Our main finding still holds when we re-estimate our model by addressing potential endogeneity issues and alternative conditions. Based on our findings, we recommend firm managers to do convenient resources planning on these components to raise the firm's value. Moreover, we recommend accounting standards setters to create a separate financial reporting standard, which includes detailed information on these components that are value-relevant in making business valuation decisions.

Keywords

Intellectual Capital, Human Capital, Relational Capital, Innovation Capital, Process Capital, Firm Value

Introduction

Especially after the 1970s, the business environment has changed from the traditional economy into the knowledge economy. With this economic transformation, successful companies mostly concentrated on intangibles and have started to invest heavily in intangible assets rather than financial and physical sources (Tseng and Goo, 2005). This is because, in the knowledge economy, unique resources of a firm provide competitive advantages, and thus higher performance (Barney, 1991). According to the resource-based view theory, in order for a resource to be seen as a source of continuous competitive advantage, the resource needs to be inimitable and rare, no adequate substitutes must be available, and finally, it must contribute to the value of the company.

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In the literature, these characteristics are merged under the concept of “Intellectual Capital (IC)”. Since IC has become an important value determinant in today’s organizations, it can be argued that an effective assessment cannot be made in capital markets without the IC knowledge of firms. IC assets, such as human resources, innovation capabilities, knowledge, and processes should be regarded in valuation of companies (Wang, 2008). Therefore, many conceptual frameworks have been developed to understand, measure and systematize IC because of the critical role of it in value creation in the knowledge economy.

In this paper, the main objective is to contribute to the examination of the growing gap between market values and book values of firms. We argue that IC might be considered to be value-relevant to market participants because it might have the power to provide a competitive advantage for firms and affect the decisions of related information users. Therefore, we investigate whether IC and its components (human, relational, innovation, and process capitals) have meaningful information on firm value.

The main motivation in this paper is to answer whether market values of Turkish manufacturing firms are positively affected by their IC level. This is because the manufacturing industry is an important and crucial sector in the Turkish economy. The Turkish economy expanded rapidly after the millennium by increasing competitiveness, fostering foreign trade, and attracting foreign investments (Özkara and Atak, 2015). During that period, the highest contribution to the overall productivity growth of Turkey came from the manufacturing industry (Atiyas and Bakis, 2015). Many researchers in the IC literature have focused on the manufacturing sectors in other countries (Cisneros and Hernandez-Perlines, 2018; Tseng and Goo, 2005; Xu and Li, 2020; Xu and Liu, 2020). Therefore, we believe that it is crucial to analyze whether IC has meaningful information on firm value and affects the decisions of related information users in the context of Turkish manufacturing industry which is the industry with the highest number of publicly traded firms in Borsa Istanbul.

Following previous studies (i.e. Alfraih, 2017; Eloff and de Villiers, 2015; Liu et al., 2009; Tseng and Goo, 2005; Tseng et al., 2015; Wang, 2008), in order to examine our research purposes, we based our experimental model on Ohlson (1995) valuation model by separately adding measures of IC components into the model in exchange for ‘other information’. Our sample consists of 148 listed Turkish manufacturing firms over the period 2005–2017.

Our empirical findings confirm Ohlson model suitability, implying that book value and abnormal earnings have explanatory power on the market value of Turkish manufacturing companies. More importantly, we report that our extended Ohlson models explain the substantial part of the unexplained variation in firm market values. Specifically, we show that higher levels of measures of IC components and IC score are directly associated with higher stock prices. Furthermore, we find that IC and its components have lagged effects on market values of firms, and human capital has a moderating effect on the relationship between other IC components and firm market values.

To the best of our knowledge, there is no study that investigates the direct and lagged effects of the overall intellectual capital on firm market value and the moderating effect of human capital on the relationship between other IC components and market value in the context of the Turkish manufacturing companies. Moreover, and most importantly, we add to the literature by following recent studies (Liu et al., 2009; Tseng et al., 2015; Wang 2008), which consider the components of IC as human, relational, innovation, and process capitals.

The rest of the paper is organized as follows. In Section 2, we discuss conceptual framework and hypotheses. In Sections 3 and 4, we describe data, empirical methodology, and empirical evidence, respectively. Section 5 is devoted to discussion. Section 6 concludes the paper.

Conceptual Framework and Hypotheses

Intellectual Capital and its Components

Stewart (1998) defines *intellectual capital (IC)* as the intellectual materials (such as intellectual property, information, knowledge, and experience) that can be used to form value and wealth. IC aggregates “hidden” assets of corporations that are not fully included in balance sheets (Roos and Roos, 1997), and it is a non-financial capital that captures the gap between market and book values of firms (Liu et al., 2009). IC is often discussed in three major components: (i) structural/organizational, (ii) relational/customer, and (iii) human. On the other hand, especially in recent studies, it is seen that innovation and process capitals, which are sub-components of organizational capital, are treated as different IC components based on the framework drawn by Edvinsson and Malone (1997). As process and innovation capitals may need different managerial activities, it is thought that it will be more appropriate to consider them by separating from structural capital (Tseng and Goo, 2005). Therefore, we follow studies (i.e. Liu et al., 2009; Tseng ve Goo 2005; Wang 2008) in which innovation and process capitals are addressed as separate IC components. Thus, we consider IC by dividing it into four components, i.e. human, relational, innovation, and process capitals.

Human capital (HC) is competencies, qualifications, talents, and skills owned by individuals and/or groups within companies and cannot be viewed as an entity, which is legally owned by companies (Stewart, 1998). Therefore, it is an asset that employees take with them when they leave the firm. HC consists of human-related items such as problem-solving ability, career paths, employee satisfaction, employee retention, knowledge, and experience. *Relational capital (RC)* can be expressed as the whole of the relations between the firm and its external stakeholders, such as market, customers, suppliers, trade associations, partners, competitors, society, and state. Among these stakeholders, customers stand out as the most important group. RC consists of external stakeholder-related items such as brands and values of brands, customer loyalty, organizational reputation, stakeholder support, distribution channels, license agreements, and networks. *Innovation capital (INC)* is the capacity of organi-

zations to produce new services and products and to protect intellectual property rights. INC consists of patents, trademarks, copyrights, design rights, trade secrets, know-how for tech transfer, and so on. *Process capital (PC)* is related to the development of an organizational environment that will support employees for value creation by ensuring order and stability within a firm. PC consists of organizational structures such as administrative systems, performance management systems, norms, routines, policies, and culture. INC and PC, unlike HC and RC, can be viewed as entities, which are legally possessed by companies.

Related Literature and Research Hypotheses

There are many studies in the literature that examine the effects of IC on market value in order to investigate whether IC has meaningful information on firm value. For example, Wang (2008) examines the influence of IC on the market values of the US Standard & Poor's 500 publicly traded electronic companies by using the Ohlson value-relevance model and reports the positive relationship between IC and market value. Similarly, Liu et al. (2009) and Tseng et al. (2015) examine the influence of IC on the market values of the Taiwanese IT companies by using the Ohlson value-relevance model. Both studies report that the involvement of IC into valuation models presents significant information. Alfraih (2017) finds that the level of IC disclosure of Kuwait companies is positively related to their market value, implying that IC disclosure is positively valued by investors. Nazir et al. (2020) examine the effect of IC on performance in the context of financial institutions in three countries (such as China, Hong Kong, and Taiwan). They report that IC efficiency positively influences the profitability of financial institutions. Besides, there are studies in the literature that report a positive relationship between IC and firm performance in the context of the Turkish firms (such as Bayraktaroglu et al., 2019; Gülcemal and Çıtak, 2017; Özer et al., 2015; Yılmaz and Acar, 2018). In general, these studies report that IC is one of the leading factors that explain the value together with physical and financial capital in the modern competitive environment.

IC has become an important value determinant in today's companies because it is a unique resource of firms that contributes to value creation and sustainable competitive advantages. Therefore, IC can be regarded to be value-relevant to market participants because it is thought to affect decisions of related information users (see Wang, 2008). Based on these arguments and the findings of prior IC studies, we conjecture that, all else equal, market values of firms are positively affected by their IC level. This leads to our main hypothesis:

H: The higher the intellectual capital of Turkish manufacturing companies, the higher the market values will be.

We also believe that examining the effects of individual IC components will shed more light on understanding the nexus between IC and firm value. Therefore, as supplementary hypotheses, we argue that firm value is positively affected by IC components.

H₁: The higher the human capital of Turkish manufacturing companies, the higher the market values will be.

H₂: The higher the relational capital of Turkish manufacturing companies, the higher the market values will be.

H₃: The higher the innovation capital of Turkish manufacturing companies, the higher the market values will be.

H₄: The higher the process capital of Turkish manufacturing companies, the higher the market values will be.

Data and Empirical Methodology

Sample

To conduct the empirical analysis, we retrieved firm-level data from the FINNET database. We restrict our sample to listed Turkish manufacturing firms. We set the starting point of our sample at 2005, because we aimed to exclude the effects of inflation accounting, which was applied in 2003 and 2004 and ended in 2005. To avoid the effect of outliers and misreported data, we winsorized all variables at their 5th and 95th percentiles. After the data cleaning steps, our sample consists of 1,540 firm-year observations of 148 listed manufacturing firms over the period 2005–2017. Variables and their operational definitions are provided in Table 1.

Table 1
Research Variables

Constructs	Variables	Operational definitions
Firm value	Stock Price	<i>Stock price</i> is the closing price of firms' shares at the last official disclosure of the annual financial statements at time $t+1$.
Financial capital	Book Value	<i>Book Value per Share</i> defined as shareholder's equity value divided by ordinary shares outstanding.
	Abnormal E.	<i>Abnormal Earning</i> defined as net income at time t minus [book value at time $t-1$ multiplied by cost of capital (=the annual weighted average cost of TRY denominated fixed rate coupon bonds)] divided by ordinary shares outstanding.
Human capital	HC_SPE	<i>Sales per Employee</i> defined as net sales (in thousands of TRY) divided by number of employees.
Relational capital	RC_MEPS	<i>Marketing Expenses per Share</i> defined as sales, marketing and distribution expenses divided by ordinary shares outstanding.
Innovation capital	INC_RDPS	<i>R&D expenses per Share</i> defined as research and development expenses divided by ordinary shares outstanding.
Process capital	PC_AEPE	<i>Administrative Expenses per Employee</i> defined as general, managerial and administrative expenses (in thousands of TRY) divided by number of employees.
Intellectual capital	IC_Score	<i>Intellectual Capital Score</i> is the average of four indicators of intellectual capital components. Before averaging the indicators, they were standardized (zero mean and unit variance).

Constructs	Variables	Operational definitions
Control variables	Leverage	<i>Leverage</i> defined as total liabilities divided by shareholder's equity value.
	Liquidity	<i>Liquidity</i> defined as the ratio of current assets to current liabilities.
	Size	<i>Firm Size</i> defined as the natural logarithm of total assets.
	Crisis	<i>Crisis</i> denotes a dummy variable, which equals one for 2007 and 2008 and to zero otherwise to control the effect of the global financial crisis on the financial statements of firms.

Measures of IC Components

Organizations usually measure their IC to evaluate and manage its effects on value creation. As the highest value creation objectives in organizations that are unique are achieved in different ways, there are several methods to measure IC. There are two measurement trends: Monetary measurement, which quantifies the value of IC with monetary figures, and non-monetary measurement, which often uses Likert-type scales (Sydler et al., 2014). Depending on research goals, both measurement methods have advantages as well as disadvantages. In line with our objectives in this paper, however, we decided to use proxy variables for each component. The main reason for using proxy variables is that using these indicators will allow us to benchmark IC of firms with others by relying on publicly available financial statements data of firms, and thus provide reliable and consistent testing opportunities.

Kucharčíková et al. (2015) recommend that indicators should clearly reflect the company's performance and the achievement of current and future objectives. Moreover, Sydler et al. (2014) draw attention to the source of indicators and suggest that the best approximation for components is a measurement procedure based on income statement data in the absence of market prices. Wang (2008) suggests that one or two proxy variables will be sufficient to keep the analysis simple while still providing a meaningful picture. Therefore, following suggestions of previous studies, we decided to use one proxy variable for each IC component.

Lajili and Zeghal (2005) consider net sales per employee as a signal indicating whether human resources are used effectively in the accomplishment of the corporate goals of firms. Similarly, Samudhram et al. (2014) assert that sales per employee is an important human resource indicator for investors. This is because an increase in the value of net sales per employee means that employees create more value, and thus contribute more to the performance of firms. Therefore, we select sales per employee as a proxy indicator for human capital, following the works of Etebar and Darabi (2011), Lajili and Zeghal (2005), Samudhram et al. (2014), and Wang (2008).

Previous studies report that firms that spend more marketing and advertising expenses are more valuable in stock markets (Huang and Wang, 2008). This is because these expenses are seen as intangible capital investments, which have a positive effect on future cash flows. According to Sydler et al. (2014), these findings can be explained by the positive relationship between marketing expenses and brand value because a stronger brand value increases

customer loyalty, establishes greater business partnerships, and increases the effectiveness of marketing communications. Therefore, we select marketing expenses per share as a proxy indicator for relational capital, following the works of Etebar and Darabi (2011), Huang and Wang (2008), Sydler et al. (2014), and Tseng et al. (2015).

The most important function of innovation capital is the adequacy and quality of research and development activities conducted by a company. R&D activities enhance knowledge accumulation of firms through new scientific knowledge flow (Sydler et al., 2014). Therefore, we select research and development expenses per share as a proxy indicator for innovation capital, following the works of Etebar and Darabi (2011), Sydler et al. (2014), and Tseng et al. (2015).

Finally, process capital is about culture, systems, and routines within a firm. Providing order and stability within a firm is one of the important duties of a top management team. The benefits provided to a top management for the order and for the implementation of stronger culture, systems, and routines can be an appropriate indicator of process capital. Therefore, we select administrative expenses per employee as a proxy indicator for process capital, following the works of Etebar and Darabi (2011), Huang and Wang (2008), and Liu et al. (2009).

Empirical Procedure

Ohlson (1995) has developed a benchmark model on how a firm should be valued by simply using accounting information. It has become a widely used model in value-relevance studies that examine whether any information influences the decisions of market participants, since it allows a direct relationship between accounting information and market value of a firm (Barth, 2000). In this paper, we benefit from Ohlson's (1995) residual income model (OM), which needs publicly available data from the financial statements of companies, because we aim to examine the effects of IC on firm value with a method which should allow us a benchmark both across firms and within firms over time and with consistent measures. Similarly, Sydler et al. (2014) argue that OM provides reliable and transparent tests in incorporating IC measures to firm outcomes.

OM regresses stock price on book value, abnormal earnings, and other information. OM is generally modified to test the value relevance of basic accounting information by removing other information, which is hard to measure. However, it is claimed that removing other information from the model will disrupt the suitability of the model (see Al-Hares, 2011). Therefore, following previous studies (i.e. Eloff and de Villiers, 2015; Liu et al., 2009; Wang, 2008; Tseng and Goo, 2005; Tseng et al., 2015), we examine the effect of IC on market value by including IC measures in the OM in response to the other information. OM and our extended OM take the following form, respectively:

$$\text{Stock Price}_{it} = \alpha + \beta_1 \text{Book Value}_{it} + \beta_2 \text{Abnormal E}_{it} + \beta_3 Z_{it} + \varepsilon_{it} \quad (1)$$

$$\text{Stock Price}_{it} = \alpha + \beta_1 \text{Book Value}_{it} + \beta_2 \text{Abnormal E.}_{it} + \beta_3 \text{IC}_{it} + \beta_4 \text{Z}_{it} + \varepsilon_{it} \quad (2)$$

All variables are defined in Table 1. The stock price is the closing price of firms' shares at the last official disclosure of the annual financial statements at time $t+1$. This is because financial statements for time t do not become publicly available until the release date at time $t+1$. IC_{it} is the overall IC score or one of the measures of four IC components. Z_{it} denotes a set of firm-level control variables, and ε_{it} is the error term. These control variables are leverage, liquidity, and firm size. We also control the effect of the global financial crisis on the financial statements of firms by including Crisis dummy variables .

Equations (1)–(2) are estimated using a panel data method, since, in the data set, there is both the firm dimension representing the cross-section and the year dimension representing the time-section. Initially, we run model specification tests to specify which technique is more suitable for our data set (i.e. F (Chow) test to decide pooled or fixed effects; Breusch-Pagan Lagrange Multiplier test to decide pooled or random effects; and Hausman test to decide random or fixed effects). According to the results in Appendix A, we utilize the fixed effects regression model. Later, to ensure validity of the statistical results, we investigated whether assumptions of the underlying regression models are violated. Untabulated results show that our fixed effects models seem to have serial correlation, heteroscedasticity, and cross-sectional dependence problems.¹ Therefore, we estimate Equations (1)–(2) using the Driscoll-Kraay standard errors method, which is robust to heteroscedasticity, cross-sectional dependence, and temporal dependence problems.

Descriptive Statistics

Table 2 displays the descriptive statistics of the variables employed in this paper. The full sample mean (median) of stock price is 8.350 (2.720), while the mean (median) of book value is 6.035 (2.828). On average, our sample firms have positive abnormal earnings. Specifically, mean (median) abnormal earnings is 0.038 (-0.047). The full sample means of measures of human, relational, innovation, and process capitals are 433.7, 1.237, 0.060, and 17.27, respectively, while the mean (median) of the overall IC score is 0.007 (-0.148).

Table 3 reports the correlation matrix for the variables. All paired correlation coefficients between stock price and other variables are statistically significant at the 5% significance level. Stock price is positively correlated with all variables, except for leverage, in line with the findings in Table 4, while it is positively correlated with leverage. A high correlation value (over 0.70) among the variables in the same regression models is not desirable as it may lead to a multicollinearity problem. As can be seen in Table 3, there is no high correlation coefficient value among the independent variables. Moreover, we computed the variance inflation

¹ We do not report the results of assumptions tests in the interest of brevity, but they are available upon request.

factor to see if there is any multicollinearity problem and untabulated results show that there isn't any collinearity problem amongst the variables.

Table 2

Descriptive statistics

Variables	N	Mean	St. Deviation	Median	Minimum	Maximum
Stock Price	1,689	8.350	13.40	2.720	0.622	53.29
Book Value	1,689	6.035	7.840	2.828	0.579	32.29
Abnormal E.	1,540	0.038	0.861	-0.047	-1.692	2.406
HC_SPE	1,382	577.4	433.7	441.0	112.9	1782.4
RC_MEPS	1,682	0.834	1.237	0.324	0.016	4.650
INC_RDPS	1,683	0.031	0.060	0.001	0.000	0.224
PC_AEPE	1,382	27.89	17.27	23.93	7.394	70.93
IC_Score	1,382	0.007	0.616	-0.148	-0.857	2.217
Leverage	1,689	0.441	0.213	0.423	0.109	0.832
Liquidity	1,689	2.228	1.573	1.643	0.687	6.567
Size	1,689	19.54	1.373	19.42	17.35	22.32

This table reports the descriptive statistics of the variables. Operational definitions of research variables are displayed in Table 1. The sample includes 148 listed manufacturing firms over the period 2005–2017. We winsorized all variables at their 5th and 95th percentiles.

Table 3

Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
Stock Price	(1)	1.00										
Book Value	(2)	0.63	1.00									
Abnormal E.	(3)	0.29	0.22	1.00								
HC_SPE	(4)	0.21	0.23	0.26	1.00							
RC_MEPS	(5)	0.58	0.63	0.07	0.06	1.00						
INC_RDPS	(6)	0.32	0.22	0.15	0.00	0.39	1.00					
PC_AEPE	(7)	0.18	0.21	0.10	0.63	0.00	-0.09	1.00				
IC_Score	(8)	0.53	0.53	0.23	0.69	0.60	0.54	0.62	1.00			
Leverage	(9)	-0.05	-0.19	-0.10	0.10	0.05	0.13	-0.07	0.09	1.00		
Liquidity	(10)	0.06	0.13	0.19	-0.10	-0.06	-0.02	0.07	-0.04	-0.53	1.00	
Size	(11)	0.14	0.13	0.20	0.44	0.15	0.21	0.20	0.41	0.14	-0.20	1.00

This table reports the correlation matrix for the variables. Operational definitions of research variables are displayed in Table 1. The sample includes 148 listed manufacturing firms over the period 2005–2017. All paired correlation coefficients between *Stock Price* and other variables are statistically significant at the 5% significance level. We winsorized all variables at their 5th and 95th percentiles.

Empirical Results

Table 4 presents our main results on the effect of IC on market value. In Models 1-7 of the table, we examine the impact of the basic OM, measures of human, relational, innovation, and process capitals, the overall IC score, and the measures of four IC components together on stock price, respectively.

Table 4

Intellectual Capital and Firm Value

	Basic Model	Human Capital	Relational Capital	Innovation Capital	Process Capital	Intellectual Capital	Intellectual Capital
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Book Value	0.294*** (4.93)	0.303*** (6.47)	0.113** (2.32)	0.229*** (3.49)	0.303*** (6.56)	0.129** (2.07)	0.117** (2.06)
Abnormal E.	2.075*** (5.71)	1.377*** (4.07)	2.128*** (5.42)	2.195*** (5.54)	1.671*** (4.74)	1.715*** (4.33)	1.588*** (3.90)
Leverage	0.567*** (2.97)	0.909*** (2.74)	0.309** (2.05)	0.502*** (3.10)	0.794** (2.26)	0.658** (2.42)	0.678** (2.61)
Liquidity	-0.011 (-0.13)	0.380*** (3.05)	0.099 (1.44)	-0.010 (-0.13)	0.340** (2.40)	0.432*** (3.21)	0.436*** (3.29)
Size	3.511*** (5.13)	1.796*** (2.99)	3.774*** (4.82)	3.367*** (4.94)	2.625*** (4.28)	1.852*** (3.18)	1.668*** (2.91)
Crisis	-1.712*** (-2.64)	-1.843*** (-2.82)	-1.586** (-2.41)	-1.641** (-2.41)	-2.043*** (-3.33)	-1.834*** (-2.84)	-1.777*** (-2.66)
HC_SPE		0.006*** (4.52)					0.005*** (4.34)
RC_MEPS			1.605*** (5.12)				1.183*** (5.38)
INC_RDPS				27.276*** (3.30)			17.985** (2.16)
PC_AEPE					0.077*** (3.23)		0.030** (2.26)
IC_Score						5.090*** (4.20)	
Observations	1,540	1,318	1,537	1,537	1,318	1,318	1,318
R-squared	0.852	0.881	0.856	0.855	0.879	0.883	0.884
F - value	1203***	171.7***	276.7***	2349***	147.7***	310.5***	350.5***

This table presents the regression results where the dependent variable is stock price. Columns (1)-(7) analyze the effects of variables of basic model, human capital, relational capital, innovation capital, process capital, intellectual capital, and four intellectual capital components, respectively. Operational definitions of research variables are displayed in Table 1. The sample includes 148 listed manufacturing firms over the period 2005–2017. We winsorized all variables at their 5th and 95th percentiles. Models are estimated using fixed effects regression models with Driscoll-Kraay standard errors methods. Constant terms are included but not reported. T-statistics are in parentheses. *, ** and *** indicate two-tailed statistical significance at the 10%, 5% and 1% levels, respectively.

We begin by considering the coefficient estimates of book value and abnormal earnings variables in the Table to support our results with the findings of previous studies. In all models, the coefficient estimates on book value and abnormal earnings are consistently positive and statistically significant at the 5 percent level, which is consistent with the findings of previous studies (Liu et al., 2009; Tseng et al., 2015; Wang, 2008). Therefore, our empirical findings confirm OM's suitability, implying that book value and abnormal earnings have explanatory power on the market value of Turkish industrial companies. This supporting evidence builds our confidence that our evidence on the relationships between IC and the firm market value is robust.

We now turn to test our hypotheses. First, Table 4 shows that the coefficient on *HC_SPE* in Column (2) is 0.006, and it is significant at the 1 percent level. This result confirms that

our human capital measure has a positive effect on the stock price of firms, as expected and in line with H_1 , which predicts that the higher the human capital of Turkish manufacturing companies, the higher the market values will be. This finding is theoretically rational. This is because human resources, knowledge, and skills have become crucial within the new economic landscape, since they have been a critical ingredient to gain a competitive advantage (Hitt et al., 2001). Therefore, it can be expected that firms with higher HC may have higher market values because higher HC will probably lead to better performance, and investors will see such companies more valuable.

Second, Table 4 shows that the coefficient on *RC_MEPS* in Column (3) is 1.605, and it is significant at the 0.01 level. This result confirms that our relational capital measure has a positive effect on the stock price of firms, as expected and in line with H_2 , which predicts that the higher the relational capital of Turkish manufacturing companies, the higher the market values will be. This finding is theoretically rational because RC is the strength of the relationships between the firm and its external stakeholders. Firms that have strong relationships with all of their stakeholders will increase their brand values, customer loyalty, and stakeholder support. Thus, firms with higher organizational reputations in the markets will gain investor trust and increase their market value.

Third, Table 4 shows that the coefficient on *INC_RDPS* in Column (4) is 27.276, and it is significant at the 0.01 level. This result confirms that our innovation capital measure has a positive effect on the stock price of firms, as expected and in line with H_3 , which predicts that the higher the innovation capital of Turkish manufacturing companies, the higher the market values will be. It can be argued that INC will have a systematic effect on the market values of today's companies because innovation activities allow the production of new technological assets, and markets see such spending as an investment that will generate future cash flow. Therefore, we believe that this finding is theoretically rational.

Fourth, Table 4 shows that the coefficient on *PC_AEPE* in Column (5) is 0.077, and it is significant at the 0.01 level. This result confirms that our process capital measure has a positive effect on the stock price of firms, as expected and in line with H_4 , which predicts that the higher the process capital of Turkish manufacturing companies, the higher the market values will be. This finding is theoretically rational because the better the culture and routines in a firm, the stronger the stability in the firm. Investors attribute more value to stable firms.

Fifth and last, Table 4 shows that the coefficient on *IC_Score* in Column (6) is 5.090, and it is significant at the 0.01 level. This result confirms that our overall IC score has a positive effect on the stock price of firms, as expected and in line with H , which predicts that the higher the intellectual capital of Turkish manufacturing companies, the higher the market values will be. Moreover, Column (7) shows that the explanatory capacity of the model significantly increases from 0.852 to 0.884 when measures of four IC components are included in OM. A significant increase in R-squared reveals the incremental explanatory power of IC on firm

market value, implying that IC is value-relevant to market participants because it affects the market value, and thus decisions of related information users.

Additional Tests: Lagged and Interaction Effects of IC and its Components

In this subsection, to further support our findings, we check whether the results persist when we re-estimate our models by considering potential simultaneity issues. Moreover, by doing so, it will be investigated whether IC has lagged effects on firm value. Columns (1)-(5) of Table 5 analyze the one time-lagged effects of variables of human capital, relational capital, innovation capital, process capital, and overall IC score, respectively. Overall, Table 5 shows that our findings are robust, and IC and its components have lagged effects on market values of firms in Turkish industrial companies. Specifically, Table 5 shows that the coefficients on *HC_SPE*, *RC_MEPS*, *INC_RDPS*, *PC_AEPE*, and *IC_Score* continue to hold their positive signs, and they are highly significant.

Table 5

Lagged Effects of Intellectual Capital and Its Components on Firm Value

	Human Capital	Relational Capital	Innovation Capital	Process Capital	Intellectual Capital
	(1)	(2)	(3)	(4)	(5)
Book Value	0.317*** (5.78)	0.144** (2.03)	0.235*** (3.72)	0.311*** (5.78)	0.164*** (3.19)
Abnormal E.	0.467* (1.97)	1.100*** (4.39)	1.144*** (4.52)	0.743*** (3.26)	0.782*** (3.18)
Leverage	1.584*** (3.91)	0.752*** (2.85)	0.937*** (3.46)	1.440*** (3.12)	1.269*** (3.14)
Liquidity	0.532*** (2.69)	0.190 (1.51)	0.097 (0.83)	0.495** (2.35)	0.556** (2.52)
Size	0.977* (1.77)	3.197*** (2.88)	2.812*** (2.95)	1.754*** (2.64)	1.224** (1.99)
Crisis	-3.620*** (-6.92)	-3.059*** (-4.44)	-3.181*** (-4.63)	-3.667*** (-6.81)	-3.588*** (-6.95)
HC_SPE	0.006*** (3.40)				
RC_MEPS		1.308*** (3.06)			
INC_RDPS			23.248*** (2.89)		
PC_AEPE				0.071*** (3.82)	
IC_Score					4.188*** (3.36)
Observations	1,174	1,388	1,388	1,174	1,174
R-squared	0.899	0.863	0.863	0.897	0.899
F - value	186.1***	964.2***	1359***	263.4***	286.7***

This table presents the regression results where the dependent variable is stock price. Columns (1)-(5) analyze the lagged effects of variables of human capital, relational capital, innovation capital, process capital, intellectual capital, and four intellectual capital components, respectively. Operational definitions of research variables are displayed in Table 1. The sample includes 148 listed manufacturing firms over the period 2005–2017. We winsorized all variables at their 5th and 95th percentiles. Models are estimated using fixed effects regression models with Driscoll-Kraay standard errors methods. Constant terms are included but not reported. T-statistics are in parentheses. *, ** and *** indicate two-tailed statistical significance at the 10%, 5% and 1% levels, respectively.

Table 6

Interaction Effects of Intellectual Capital Components on Firm Value

	Human Capital × Relational Capital	Human Capital × Innovation Capital	Human Capital × Process Capital
	(1)	(2)	(3)
Book Value	0.101 (1.35)	0.033 (0.51)	0.130** (2.23)
Abnormal E.	1.521*** (3.98)	1.341*** (3.83)	1.592*** (3.97)
Leverage	0.618** (2.33)	0.253 (1.29)	0.720*** (2.76)
Liquidity	0.435*** (2.96)	0.289*** (2.65)	0.453*** (3.51)
Size	1.774*** (2.91)	1.926*** (3.14)	1.782*** (3.21)
Crisis	-1.748** (-2.61)	-1.674** (-2.51)	-1.872*** (-2.79)
HC_SPE	0.006*** (3.79)	0.010*** (6.45)	0.005*** (3.51)
RC_MEPS	1.208*** (4.20)	1.166*** (5.21)	1.232*** (5.61)
INC_RDPS	20.486** (2.20)	37.550*** (3.68)	18.212** (2.15)
PC_AEPE	0.028** (2.06)	0.032** (2.41)	0.028** (2.24)
HC × RC	0.003* (1.70)		
HC × INC		0.138*** (6.90)	
HC × PC			0.000*** (3.01)
Observations	1,318	1,318	1,318
R-squared	0.886	0.895	0.884
F - value	424.9***	266.1***	978.6***

This table presents the regression results where the dependent variable is stock price. Columns (1)-(3) analyze the interaction effects between human capital and relational capital, human capital and innovation capital, and human capital and process capital, respectively. Operational definitions of research variables are displayed in Table 1. The sample includes 148 listed manufacturing firms over the period 2005–2017. We winsorized all variables at their 5th and 95th percentiles. Models are estimated using fixed effects regression models with Driscoll-Kraay standard errors methods. Constant terms are included but not reported. T t-statistics are in parentheses. *, ** and *** indicate two-tailed statistical significance at the 10%, 5% and 1% levels, respectively.

Further, an interesting question would be to ask whether HC strengthens or weakens the effects of other IC components on firm value. There are many scholars who argue that IC components are interrelated and operate in an interactive way to contribute value creation processes by forming a higher IC (see Ferraro and Veltri, 2011; Giuliani, 2013; Kamukama et al., 2010). More specifically, the ability of IC to effectively contribute to value creation depends on the interactions among components. Therefore, in Columns (1)-(3) of Table 6, we analyze the interaction effects between human capital and relational capital, human capital and innovation capital, and human capital and process capital, respectively. The Table shows

that HC has a moderating effect on the relationship between other IC components and market values of firms in Turkish industrial companies. Specifically, Table 6 shows that the coefficients on $HC \times RC$, $HC \times INC$, and $HC \times PC$ take positive signs, and they are statistically significant. This implies that higher levels of HC lead to a greater impact of other IC components on market values of firms.

Robustness Tests

In this section, we check whether our main finding still holds when we re-estimate our model by addressing potential endogeneity issues and alternative conditions. Firstly, to deal with potential endogeneity problems which have deleterious effects on OLS estimates, we use two-step system generalized-method-of-moments (system-GMM) estimator for dynamic panel data (Arellano and Bover, 1995; Blundell and Bond, 1998). Robust standard errors are computed using the finite-sample correction for the two-step covariance matrix. We treat the lagged dependent variable as predetermined, all remaining firm-level variables as endogenous, and the crisis dummy variable as exogenous. The predetermined variable is instrumented by its own one-to six-period lags. Endogenous variables are instrumented by their own two-to seven-period lags. The exogenous variable is instrumented by its own instrument. We collapse the matrix of instruments. Column (1) of Table 7 presents the result. Hansen test, which has a statistically non-significant p-value, confirms the validity of our instruments in the regression analysis. Significant AR(1) and insignificant AR(2) statistics confirm that the model is correctly specified. Irrespective of the statistically insignificant results on our control variables coefficients, our main variables, such as *Book Value*, *Abnormal E.*, and *IC_Score* have statistically significant and economically meaningful coefficients. Our conclusion on the effect of IC on the market value of firms in Table 4 continues to hold when we use the two-step system GMM approach.

Secondly, in column (2), to reduce the noise led by firms with non-consecutive observations and provide more consistency, we re-estimate the IC model by using a balanced panel data subsample, which allows observation of the firms in every time period. Thirdly, in column (3), in order to reduce business-cycle effects and measurement error, we re-estimate the IC model by using three-year averages of all variables (between 2006 and 2017).² Fourthly, in column (4), to control for unobserved systematic variations over time such as technological changes that have homogeneous impacts on all firms, we re-estimate the IC model by adding year dummies in the model.

Taken together, our robustness checks do not alter our main finding. The results consistently show that intellectual capital has a positive and statistically significant effect on the market value of firms. This implies that firms with higher IC levels have higher valuations in the market.

² We thank Reviewer 2 for highlighting this important point.

Table 7

Robustness of the Main Result

	System-GMM	Balanced Panel	Three-Year Averages	Year Effects
	(1)	(2)	(3)	(4)
Stock Price _{t-1}	0.859*** (21.36)			
Book Value	0.194** (2.51)	0.129* (1.808)	0.087 (0.804)	0.174*** (3.39)
Abnormal E.	0.814** (2.56)	1.676*** (3.645)	3.200** (5.839)	1.496*** (3.69)
Leverage	0.295 (0.86)	0.752** (2.442)	1.557** (4.297)	0.839** (2.33)
Liquidity	-0.135 (-0.48)	0.501*** (3.451)	0.657* (2.797)	0.536** (2.79)
Size	-0.611 (-1.37)	1.918** (2.902)	1.346** (5.678)	-0.103 (-0.17)
Crisis	0.540 (1.65)	-1.842** (-2.568)		
IC_Score	2.665** (2.48)	5.190*** (3.658)	7.760** (5.215)	3.671*** (4.13)
Observations	1,318	1,146	416	1,318
AR(1) Test	0.000	-	-	-
AR(2) Test	0.903	-	-	-
Hansen Test	0.215	-	-	-
R-squared	-	0.883	0.903	0.891
F - value	1325.6***	372.2***	29.99***	284.3***

This table presents the robustness of the regression results where the dependent variable is stock price. Column (1) reports the two-step system-GMM results of the IC model. Column (2) reports the Driscoll-Kraay standard errors regression results of the IC model by using a balanced panel data subsample. Column (3) reports the Driscoll-Kraay standard errors regression results of the IC model by using three-year averages of all variables. Column (4) reports the Driscoll-Kraay standard errors regression results of the IC model by adding year dummies in the model. Coefficients of year dummies are not reported for brevity. Operational definitions of research variables are displayed in Table 1. We winsorized all variables at their 5th and 95th percentiles. Constant terms are included but not reported. T-statistics are in parentheses. *, ** and *** indicate two-tailed statistical significance at the 10%, 5% and 1% levels, respectively.

Discussion

Our evidence shows that higher levels of IC are directly associated with higher stock prices. This implies that both IC and its components (human, relational, innovation, and process capitals) have meaningful information on the market values of Turkish manufacturing companies. We attribute our results to IC influencing market value by shaping the power to gain a competitive advantage because IC, which are inimitable, rare, and non-substituted, has all the properties of the resource-based view theory's unique resource, which provides competitive advantages, and thus higher valuation in the market.

In this respect, this paper makes several important contributions to the IC literature. First, this paper shows that the value creation function proposed by resource-based theory is fulfil-

led with IC. This result is also in line with previous studies (Cisneros and Hernandez-Perlines, 2018; Nazir et al., 2020; Ramírez et al., 2020; Sardo and Serrasqueiro, 2017; Tseng and Goo, 2005; Tseng et al., 2015; Wang, 2008; Xu and Li, 2020; Xu and Liu, 2020) showing a positive relationship between IC and the outcomes of firms. Therefore, the results allow us to assert that IC is an important resource in today's companies because it is a unique resource of firms that contributes to value creation and sustainable competitive advantages. Consequently, firm managers should do convenient resource planning on IC to raise the firm's competitive advantages and value.

Second, this paper adds to the literature which uses IC as a value determinant of firms in business valuation models. This literature investigates the effect of IC on market value by including IC measures to Ohlson's (1995) residual income model in response to the other information. Our results are in line with previous studies (i.e. Alfraih, 2017; Eloff and de Villiers, 2015; Gümrah and Adiloğlu, 2011; Liu et al., 2009; Silvestri and Veltri, 2012; Tseng and Goo, 2005; Tseng et al., 2015; Wang, 2008) which conclude that IC has become an important value determinant in today's companies and, hence, it should be taken into account in the valuation. Moreover, we also add to this literature by following recent studies (Liu et al., 2009; Tseng et al., 2015; Wang 2008), which consider the components of IC as human, relational, innovation, and process capitals.

Third, this paper adds to the literature on the relationship between IC and firm performance and/or market value in the context of Turkish firms. Our results are in line with previous studies (i.e. Bayraktaroglu et al., 2019; Gülcemal and Çıtak, 2017; Özer et al., 2015; Yılmaz and Acar, 2018). These studies, as well as ours, report a positive relationship between IC and firm performance in the context of the Turkish firms by clarifying that IC is one of the leading factors that explain the value together with physical and financial capital for Turkish manufacturing firms in the modern competitive environment.

Fourth, this paper also adds to the IC literature with new empirical evidence of the moderating effect of HC on the relationship between other IC components and market value. This evidence shows that HC strengthens the effects of other IC components on firm value, implying that HC is the most important component in the organization in value creation. This finding is consistent with Sardo and Serrasqueiro (2017) , who report that HC is the key factor of firms' wealth.³ Therefore, Turkish manufacturing firms should conduct considerable investments in HC to enable employees to create more value, and thus contribute more to the firm's performance.

3 Moreover, according to the unreported results of Table 4, Model 7 on standardized beta coefficients, the IC component that has the most influence in explaining the change in the stock price is HC (standardized $\beta = 0.17$). The second factor is RC with a standardized beta of 0.11.

Conclusions

In the transformation of the business environment from the traditional economy into the knowledge economy, resource-based theory tries to explain why some companies invest not only in physical and financial resources but also in intangibles. The resource-based view theory indicates that a firm's unique resources provide competitive advantages (Samudhram et al., 2014). In that sense, it is suggested that IC should be taken into account in the valuation of today's companies (Wang, 2008). Therefore, IC can be regarded to be value-relevant to market participants because it is thought to have the power to provide a competitive advantage and affect the decisions of related information users.

In this paper, we investigated whether IC and its components (human, relational, innovation, and process capitals) have meaningful information on market values of Turkish manufacturing companies. We based our experimental model on Ohlson (1995) valuation model. We estimated our models using fixed effects regression models with Driscoll-Kraay standard errors method. Our findings confirm our main hypothesis that the higher the intellectual capital of Turkish manufacturing companies, the higher the market values will be. Specifically, we found that higher levels of measures of IC components and IC score are directly associated with higher stock prices. Furthermore, we found that IC and its components have lagged effects on market values of firms and HC has a moderating effect on the relationship between other IC components and firm market value.

Based on our findings, we recommend firm managers to do convenient resources planning on these components to raise the firm's value. Moreover, we recommend accounting standards setters to create a separate financial reporting standard, which includes detailed information on these components that are value-relevant in making business valuation decisions. On the other hand, it may be recommended that firm managers should not ignore the strong demand for disclosure of IC-related information, but voluntarily disclose relevant IC information, even if no obligation exists. This is because information about decisions and activities of employees that may be able to create value for firms and provide a competitive advantage is not often disclosed, and analysts make extra efforts to get information about value creators within the company (see Huang et al., 2013). Not disclosing related information may cause negative effects at all levels. For example, at firm level, business model and future business opportunities may not be properly understood. At market level, it may lead to anomalous market behavior, and the result may also be the misallocation of resources at macro level (Starovic and Marr, 2003). In that sense, as a final word, an important issue to be addressed is that measuring IC with more reliable proxies can lead to more accurate results. In the paper, IC is proxied with one variable for each component in order to overcome the disadvantages of the lack of data. However, when you have more reliable proxies, the number of these proxy variables can also be increased. The biggest obstacle to overcome these two issues is that there is not much information disclosed by the companies related to IC.

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Appendix A

Model Specification Test Results

	F (Chow) Test	Breusch-Pagan LM Test	Hausman Test
	F-value	Chi-bar-square	Chi-square
Basic Model	26.84***	3344.3***	208.8***
Human Capital Model	29.94***	3276.3***	222.2***
Relational Capital Model	24.89***	2883.7***	382.6***
Innovation Capital Model	26.43***	3223.6***	238.2***
Process Capital Model	29.11***	3300.4***	244.3***
Intellectual Capital Model	27.71***	3216.2***	175.1***

*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.



RESEARCH ARTICLE

The Motivations of Women Entrepreneurs in the Tourism Industry

Nilgün Avcı¹ , Selin Gümüş² 

Abstract

Women's entrepreneurship is not just an economic issue; it is seen as an important issue that includes gender equality, democracy, family life quality and social welfare. This study is an effort to specify the motivations of women entrepreneurs in the tourism industry. The study was carried out using a field research method. The questionnaire technique was used in the data collection. The data were collected from women entrepreneurs in the tourism industry in Çeşme, İzmir, and the number of the analyzed data was 120. The entrepreneurial motivations of women are composed of economic expectations (push factors) and psycho-social expectations (pull factors). Psycho-social motivations in women's entrepreneurship are higher than economic motivations and the effect of these motivations differs in accordance with the women's demographical features. It has been seen that an increase in the age and education of women in hospitality work increases their psychosocial motivation. The result of the study is expected to guide the non-governmental organizations and the institutions supporting women's entrepreneurship

Keywords

Entrepreneurship, Women Entrepreneurs, Entrepreneurship Motivations, Tourism Entrepreneurship

Introduction

Tourism shows a feminine characteristic as it is usually regarded as accommodation, cleaning and cooking. Therefore, the number of women employees in the sector is high (Carvalho, Costa, Lykke, & Torres, 2019). In OECD member countries, women have reached 55.9% of the total employees in tourism sector (Stacey, 2015). However, the same numerical superiority cannot be seen in terms of women at the administrative level (Carvalho, Costa, Lykke, & Torres, 2018), in wages (Muñoz-Bullón, 2009; Skalpe, 2007) or in entrepreneurship. Women are not sufficiently represented in leadership positions and a typical gender pyramid can also be seen in the tourism sector (Carvalho, Costa, Lykke, & Torres, 2018). While women work mostly in unqualified, low-paid jobs, men exist in top management (Çiçek, Zencir, & Kozak, 2017). The "glass ceiling" theory (Carvalho et al., 2019) comes to the fore to explain the rea-

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son why so few women are in management as it was created in order to explain the invisible obstacles which women face. The inadequacy of women role models and mentors in working life, the inequality of opportunity to reach significant job positions, and the negative approaches of establishments in appreciating and rewarding women are seen as the experiences in the glass ceiling perception (Mattis, 2004). Women's desire for a work–life balance presents one of the main contributing factors for the glass ceiling in this sector (Segovia-Pérez, Figueroa-Domecq, Fuentes-Moraleda, & Muñoz-Mazón, 2019). Women's entrepreneurship is seen as a reaction to the glass ceiling and inequality in the work life (Mattis, 2004). Women aim for entrepreneurship since they are compatible with the hospitality sector and in order for them to overcome the inequality in their work life.

In Turkey, the Ministry of Family, Labor and Social Services prepared the 2018-2023 Action Plan for the policy to empower women (Ministry of Family, Labor and Social Services, 2018). In the action plan, an objective stating that “Women's entrepreneurship” will be supported and the number of women employers and self-employed women will be increased in our country” exists among the economic targets in order to empower women. The KOSGEB (Small and Medium Enterprises Development Organization) has educational, advisory and loan support for female entrepreneurs, with microloan practices and Public Education Center vocational courses as implementations to support women's entrepreneurship. It is required to specify the motivations of women entrepreneurs so that the action plan can accomplish its objectives. Regarding many jobs as “distaff” especially in the tourism sector and putting forth the entrepreneur's sectoral motivations are thought to contribute to the Ministry's strategy to accomplish the determined objectives. The aim of this study is to specify the motivations of female entrepreneurs in the tourism industry.

Literature Review

Entrepreneurship concerns an individual realizing opportunities and using them either for value creation or economic success. Entrepreneurship is defined as the pioneering, proactive and risk-taking behavioral inclination of an individual to start a new venture (Nandamuri, 2013) and constitutes one of the elements required for economic development and employment opportunities (Nesrine, 2015). Entrepreneurship plays a significant role in creating new employment opportunities, increasing income and reducing poverty and for these reasons, governments support it.

Developing countries especially are inclined to support women's entrepreneurship structurally and financially in order to solve the gender inequality problem and increase social welfare as well as providing economic development. Including women (who constitute half of the population) in work life, not only has a positive effect on family income and life quality, but it also affects social welfare (Bianchi, Parisi, & Salvatore, 2016). The duties of women

within the family cause gender inequality in work life; structural and cultural inequalities within the family, organizations and society pose challenges for women. In Turkey, thanks to tourism, many things that were shameful and forbidden gave way to complaisance and understanding (Çiçek et al., 2017). In Northern Cyprus, immigrant women were employed since local women working in the tourism sector was disapproved of (Scott, 1995). In their study, Nassani, Aldakhil, Abro, Islam, & Zaman's (2018) assert that there is a long-term relationship between the development of tourism and empowerment of women worldwide. Boyacıoğlu (2014) maintains that when rural, tourism-directed women's entrepreneurship improved, the traditional family structure, economic condition of women and society's perception of women underwent a positive transformation.

Due to the fact that tourism is a service-oriented sector, small and medium-sized enterprises are commonly seen in it. Small and medium-sized tourism enterprises are seen as the economic motor of tourism destinations (Getz, Carlsen, & Morrison, 2004). Since many jobs in the tourism sector are related to hospitality, they attract women entrepreneurs. The tourism industry can be called women-intensive as well as a labor-intensive sector (Çiçek et al., 2017). In tourism services, tourist satisfaction and especially in a positive destination image, this kind of management plays a crucial role (Kozak & Rimmington, 1998).

Many abilities are required for entrepreneurship; it is not only about the ability to use financial resources but also consists of such non-financial abilities as innovation, taking initiatives, self-sacrifice, vision and optimism (Nandamuri, 2013). In many studies, a positive relationship has been identified between entrepreneurship success and the individual's inclination towards innovation, taking risky decisions, success and being motivated by the need to become independent (Rauch & Frese, 2007; Ahmetoglu & Chamorro-Premuzic, 2013).

Entrepreneurship motivations are classified as push and pull factors (McClelland, Swail, Bell, & Ibbotson, 2005). While pull factors are related to opportunities, push factors are about requirements. Unemployment, bad working conditions, disappointment at work, no support in child-care and economic requirements are listed among the push factors (Carsrud & Brännback, 2011; Kirkwood, 2009). Push factors usually emphasize the negative conditions leading to entrepreneurship. Freedom, independence, self-realization, success, targets, job satisfaction, social objectives, wealth, and entrepreneurship energy are counted among the pull factors (Cantú Cavada, Bobek, & Maček, 2017). Being independent and free are especially the primary pull factors (Nandamuri, 2013).

In the study by Kirkwood (2009) carried out in New Zealand, push factors are a little bit more effective than the pull factors in women's entrepreneurship decisions. In the study by Erkol Bayram (2018) carried out in Sinop, Turkey, economic reasons are the leading factors directing women to tourism entrepreneurship, followed by psychological reasons. In the study carried out by Das (2000) in India, financial reasons are the primary investment

motivation of female entrepreneurs. In the study, in the pull factors, the need for achievement, possession of one's own, being independent, and showing others one's capacity to accomplish a good job come after financial motivations (Das, 2000).

In the study carried out by Cantú Cavada, Bobek, & Maček (2017) in Mexico using an interview technique, pull factors are found to be more effective. Similarly, in the study of Avolio (2012) carried out in Peru via interviews, it is identified that pull factors direct women to entrepreneurship more than the push factors.

In the study by Premuzic, Rinaldi, Akhtara, & Ahmetoglu (2014), it was determined that women entrepreneurs are motivated by power, commerce, making logical decisions, aesthetics and the need for change. Premuzic et al., (2014) describe aesthetic motivations as creative expression, imagination, culture and attractive environment-oriented life styles and personal values and attribute this definition to the qualified creativity of women and their care for the production standard. The data of their study show that the motivations of women entrepreneurs result from their will to control and affect their environment (power), to be financially successful (commerce) and to express themselves in a creative way in every aspect (aesthetics) (Premuzic et al., 2014).

Although there are many studies about women employees in the tourism sector (Carvalho et al., 2019a; Çiçek, Zencir, & Kozak, 2017; Gentry, 2007; Muñoz-Bullón, 2009; Segovia-Pérez et al., 2019; Skalpe, 2007), it can be seen that the number of the studies regarding women entrepreneurs in tourism is fewer (Carvalho et al., 2018; Tajeddini, Ratten, & Denisa, 2017). It is realized that obstacles for women entrepreneurs still exist; so, specifying the entrepreneurship motivations of women and supporting them provide the motivation for this study.

Methodology

In this study, a quantitative approach is adopted and the field research method and questionnaire techniques are used. During the creation process of the questionnaire, preliminary research was conducted, scales about the subject were examined and statements were listed. It was identified that, in the literature, while the entrepreneurial motivations can be grouped as push and pull factors, they can also be classified as economic and psychosocial. In creation of the scale, the studies of Lynch (1998), Kirkwood (2009) and Cantú Cavada et al. (2017) were adapted. Economic expectations, psycho-social expectations and personal qualifications items are included in the scale. The statement lists created were evaluated by three academics and content validity was ensured. The statements in the questionnaire are measured using a five-point scale "1 totally disagree – 5 totally agree." Questions regarding the profile of the participants are also included in the questionnaire.

In the study, firstly a pilot test was applied to 30 participants and it was seen that the validity and reliability of the test is compatible. The target demographic of the study consists of entrepreneur women who own hotels, cafés and restaurants and sell office operating in Çeşme. From the data obtained from ÇEŞKA (Çeşme Women Entrepreneurs Cooperative) and Alaçatı Tourism agency, it can be identified that the target population of the study is 170 entrepreneurial women. Data were collected face to face from the female entrepreneurs in April, 2018 within a two-week period. During the period the study was carried out, the number of the data collected from the women entrepreneurs who are eager to answer the questions was 120, and this number is enough to represent the population (Sekaran & Bougie, 2010).

The reliability co-efficient (Cronbach's alpha) of the scale used in the research was found to be 0.858, indicating that the reliability of the scale is high (Sekaran & Bougie, 2010). In measuring the construct validity of the data, whose content validity is ensured, explanatory factor analysis was applied and could be seen that, with a KMO value of 0.801, the scale's construct validity is compatible (Hair, Black, Babin, Anderson, & Tatham, 2006). Skewness and kurtosis tests and variance analyses were made in order to see if the data meet the parametric test conditions. Skewness and kurtosis results are found between -1 and 1 ; and their variances are higher than 0.05 . The results are compatible with the application of the parametric tests (Hair, Black, Babin, Anderson, & Tatham, 2006).

Results

Information regarding the profile of the participants is given in Table 1. Analysis of Table 1 shows that 42.5% of the study participants are in the age range of 41–50 and 60% of them are married women. It can be identified that the majority of the participant women (87.5%) do not have any education in tourism. The rate of women who had tourism experience before becoming entrepreneurs (31.7%) is low. It can be seen that 50.8% of the participant have had a high school education, and 45% of them are university graduates. The educational level of the participants can be specified as high.

Table 1
Participants Profile Table

	Number (n)	Percent (%)		Number (n)	Percent (%)
Age			Tourism experience		
21-30	12	10	Yes	38	31.7
31-40	48	40	No	82	68.3
41-50	51	42.5	How many years of entrepreneurship		
51 and above	9	7.5	Less than 1 year	11	9.2
Marital status			1–3 years	35	29.2
Married	72	60	4–6 years	46	38.3
Single	48	40	7–9 years	25	20.8

	Number (n)	Percent (%)		Number (n)	Percent (%)
Age			Tourism experience		
Yes	63	52.5	Business type		
No	57	47.5	Boutique hotel	31	25.8
Education			Cafe	14	11.7
Middle school	5	4.2	Restaurant	12	10
High school	61	50.8	Manual work	27	22.5
University	54	45	Food	20	16.7
Tourism education			Other	16	13.3
Yes	15	12.5	Number of employees in the enterprise		
No	105	87.5	Less than 5	65	54.2
			6–10	49	40.8
			11–15	6	5

A factor analysis was conducted to measure the structural validity of the motivations of the female entrepreneurs. The factor analysis results are presented in Table 2. The KMO value is 0.801, the Bartlett's test value is 1278.984 and the sigma is 0.000. These values' data comply with the factor analysis (Hair et al, 2006). The data were distributed under two dimensions as pull and push factors. It is seen that the expressions in the scale explain 41.944% of the variable.

Table 2
Motivations Of Women Entrepreneurs, Factor Analysis Table

	Factor Load	Mean	Eigen values	Variance %	F	α	P
Factor 1: Pull factors		4,322	6.749	30.250	81.525	0.900	0.000
To have prestige by establishing my own business.	0.834						
Thinking that business ideas are the safest way in practice.	0.776						
To get information about other people and places.	0.771						
Thinking that it is an interesting job.	0.769						
To be my own boss.	0.736						
To deal with something in retirement.	0.732						
To meet interesting people.	0.713						
To be a successful person.	0.691						
To feel happy.	0.688						
Thinking it is fun.	0.679						
To prove myself.	0.654						
To live in a good environment.	0.546						
To evaluate my foreign language skills.	0.357						
To evaluate my free time.	0.342						
To provide a better life.	0.328						

	Factor Load	Mean	Eigen values	Variance %	F	α	P
Factor 2: Push factors		4.224	2.478	11.694	36.404	0.655	0.000
To contribute to household income.	0.734						
To gain financial independence.	0.667						
To avoid perceived income shortfall.	0.666						
To have social security.	0.516						
Make more money.	0.511						
To be rid of unemployment.	0.428						
To provide additional income.	0.314						
Kaiser-Meyer-Olkin sample measurement:0.801; Bartlett's test of sphericity: 1278.984; Total variance %: 41.944							

On examining Table 2 it can be seen that the attracting factors are mostly psychological factors. Meeting new people, having fun, being successful and proving oneself. Entrepreneurs participating in the study gave higher scores to the pull factors (4.322) than the push factors (4.224).

Variance (t-test and ANOVA) analyses are used in order to identify whether the entrepreneurship motivations of the participants differ according to demographic features. All variables in the questionnaire were analyzed and only those with significant differences ($\text{sig} = 0.000 < 0.05$) were included in Table 3. From an analysis of Table 3, it can be seen that having education in tourism makes a difference in women entrepreneurs' pull motivations. In the entrepreneurial motivation of the participants, the pull factors of those who did not have education in tourism was higher than those who had education in tourism.

Table 3
Difference Analysis Table

	Pull Factors	Push Factors
Tourism education		
No	4.3632	4.2408
Yes	4.0763	4.1122
F-test	7.118	0.176
Sig.	0.015	0.259
Age		
40 and below	4.1411	4.1643
41 years and older	4.5022	4.2833
F-test	44.380	2.750
sig.	0.000	0.053
Education		
High school and below	4.1899	4.2641
University	4.4827	4.1746
F-test	17.577	1.232
sig	0.000	0.165

	Pull Factors	Push Factors
Years of entrepreneurship		
Less than 1 year	4.1606	4.0519
1–3 years	4.1771	4.1592
4–6 years	4.3101	4.2702
7 years and above	4.4667	4.2959
F-test	۳,۰۲۰	2.151
Sig.	0.033	0.098

At least 30 items of data are required in each category in order to make a comparison in a variance analysis (Sekaran & Bougie, 2010), so the age groups of the participants are combined in order to carry out the analysis. It is specified that the pull and push factors of the entrepreneurship motivations differ according to the age variable. Pull and push motivations of women above the age of 41 are higher than in women entrepreneurs under 40. Pull factor motivations of the women with only high school and lower levels of education are lower than the university graduates. It can be seen that the duration of entrepreneurship also makes a significant difference in the pull factors of the entrepreneurship motivation of women entrepreneurs. As the entrepreneurship period of women increases, the average of the pull factors increases.

Discussions and Conclusion

Gender inequality still continues around the world. The society provides a role for women and men, and this situation creates pressure in every field to the detriment of women. In the business world, women are in a disadvantaged position compared to men in terms of the administrative level, opportunities for a higher position, salary and education. Bringing women, who comprise half of the population, into production is the responsibility of non-governmental organizations, universities and the private sector as well as the public; all shareholders should do their own part in this matter. Identifying the problems women encounter in business life and solving them are of the highest priority.

The subject of this study is to specify the motivations of female entrepreneurs in the tourism industry. Thus, the aim is to study women's motivations in order to direct and support them in entrepreneurship. The study population is composed of female tourism entrepreneurs from Çeşme, İzmir, which is an important tourist destination for Turkey. In the analyses, the motivations of female entrepreneurs are specified as economic expectations, and psychosocial expectations. Economic expectations are addressed as the push factors for entrepreneurship. These factors usually direct women to entrepreneurship as negative economic conditions.

Psychosocial expectations are expected to be pull motivations for entrepreneurship. These factors state the conditions in which women think they feel better. These include such feelings as being successful, gaining prestige, proving and enjoying oneself and feeling happy.

It can be seen from the analyses that the highest entrepreneurial motivation for women is found in pull factors. In other words, psychosocial expectations are the primary motivation directing women in tourism women towards entrepreneurship. As in Avolio's (2012) study carried out in Peru, Premuzic et al.'s (2014) study in England, the USA and Italy, Tlaiss's (2015) study in the United Arab Emirates and Cantú Cavada et al.'s (2017) study in Mexico, the result that pull factors are the leading entrepreneurial motivations of women, is supported by the results of this study. In Kirkwood's (2009) study, it is identified that in entrepreneurship, pull factors are stronger than push factors for women compared to men. However, in Erkol Bayram's (2018) study, economic reasons are found as the primary motivations of women tourism entrepreneurs and psychological expectations follow these motivations. In the study carried out by Boyacıoğlu (2014) in Edirne on women entrepreneurs in rural tourism, it was found that economic expectations are at the forefront for women entrepreneurs; but it was realized that in the study, women were not asked about the pull factors. In the analysis, it was seen that the first expression among the pushing factors was "To have prestige by establishing my own business" and the second was "Thinking that business ideas are the safest way in practice". It can be said that tourism seems to be safe because it is a business line which is familiar to women with its hospitality features. Krueger, Reilly, & Carsrud, (2000) describe self-efficacy as the ability perceived during the realization of a target behaviour. It can be seen that, due to the fact that women feel inclined towards the tourism business, they are drawn to entrepreneurship. This result supports the finding of Özgül & Yücel's (2018), who state that self-efficacy affects the curiosity for entrepreneurship. It can be seen that having prestige, and considering getting together with people are the primary factors driving women to entrepreneurship in the tourism industry.

Among the economic expectations, "contributing to household income" comes first and second is "gaining financial independence". Solving financial problems was found to be important in the push factors for entrepreneurship; negative economic conditions push women into enterprise (Carsrud & Brännback, 2011).

The fact that economic and psychosocial expectations of women at the age of 41 and over are higher can be explained with the importance of the job in their lives when compared to younger women. Analyzing this gap with an interview can be useful. Women at the age of 41 and over are expected to increase their hospitality competencies. The psychosocial expectations of women who have undergraduate education are higher when compared to women with high school or primary school education. As the education level increases, women's expectations such as success, independence and proving themselves are also expected to increase. As the competency increases through education, expectations can also increase.

Women's entrepreneurship should be supported in order to increase society welfare and remove gender inequality. As specified in the study, the fact that women see themselves as

inclined to tourism businesses motivates them towards entrepreneurship. The importance of training given to increase competency in the hospitality profession to support women is clear. As well as vocational training, training in entrepreneurship, innovation, business administration and management should also be given. It is suggested that future research analyses the problems of women entrepreneurs in the tourism sector. Thus, these findings will guide the training that will be given to support them.

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RESEARCH ARTICLE

Customer Experience in Healthcare: Literature Review

Sümeyye Arslan Kurtuluş¹ , Emrah Cengiz² 

Abstract

This paper provides a perspective on customer experience in healthcare services. The aim of this paper is to make a literature research about customer experience in the healthcare sector. In this context, it is examined how customer experience in healthcare is measured, what dimensions it consists of and how customer experience in healthcare relates to other variables. This paper uses a comprehensive literature research method to customer experience in the healthcare sector. This paper suggests that there is no clear definition of the concept of customer experience in healthcare and it consists of many different dimensions. It is determined that there are very limited studies on customer experience in healthcare. Also a commonly accepted scale measuring the customer experience in healthcare has not been found in the literature. Variables related to customer experience in healthcare in previous studies have been identified. The variables related to customer experience in healthcare are found as customer satisfaction and customer loyalty. Previous studies have shown that providing a good customer experience is an important part of providing customer satisfaction and customer loyalty.

Keywords

Patient Experience, Healthcare, Customer Experience, Satisfaction, Loyalty

Introduction

Patient assessments in healthcare services have become increasingly important in recent years. While the World Health Organization (WHO) underlines the need for more active participation of patients in healthcare services (Buccoliero, Bellio, & Solinas, 2015), it also demands more people-centered healthcare services from healthcare organizations (WHO, 2016). One way to provide people-centered care is through people-centered service designs. Customer participation in service delivery processes, customer suggestions, and experiences are more taken into consideration to redesign an existing service or design a new service. Because there are a series of interactions between the patient, family and physician in healthcare services. Through interactions, comprehensive information about patient experiences can be obtained and thus the design of healthcare services can be guided (Lee, 2019). Patient views are one of the main sources of information to improve health services, to identify problems

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and to develop effective plans for healthcare managers. In order for healthcare organizations to compete in the sector, there is a need for patients' healthcare experiences aside from financial performance indicators. The accepted relationship between healthcare experiences and satisfaction is an essential element in quality control (Buccoliero et al., 2015). Getting evaluation from patients is considered the best way to measure their experience in healthcare. However, rather than asking patients to rate their satisfaction by making general evaluations, it is preferable to ask them to report in detail what is happening in a particular care department (Wong et al., 2015). The specific evaluations provide the opportunity to identify areas in need of improvement. It is also important to bring together patient experiences in order to ensure transparency in healthcare services or to guide the payment policies (Greaves et al., 2012).

The basis of the concept of patient experience is based on the concept of experiential marketing proposed by Schmitt (1999). Experiential marketing is a topic with different content that causes different experiences in different sectors. Experiential marketing is defined as "the consumer having an individual experience in terms of spiritual, emotional, intellectual and physical aspects before, during or after purchasing the product or service" (Küçüksaraç & Saymer, 2016). Kotler emphasized the importance of adding excitement and entertainment to cumbersome products and services by saying "*all companies offer products or services, but ensuring that their customers are accompanied by an experience that cannot be removed from their memories is the main challenge*" (Çiçek, 2015). Healthcare organizations have different marketing strategies (Ho, Li, & Su, 2006). In addition, the experiential marketing strategies that each healthcare organization needs and uses may be different. These strategies may change depending on various factors such as businesses's mission, vision, financial situation and the characteristics of the group addressed by the healthcare organization. Creating a great customer experience is difficult in all sectors without exception. However, some characteristics of healthcare services increase this difficulty even more (Klaus, 2018). To understand the customer experience in healthcare services, it is necessary to be aware of the unique features of healthcare services (Hunter-Jones et al., 2020). Healthcare services are highly emotional services. Patients can feel various emotions and these emotions can create a deep effect on health outcomes. Emotional healthcare service encounters can range from a simple disease to a life-threatening health problem. In this case, patients generally feel weak and do not have control on decisions related with care and treatment (McCull-Kennedy et al., 2017). Sometimes family, friends, service providers can be the decision maker instead of the patient. There is information asymmetry between patients and health professionals- the cost of error can be high, and the risk is high in healthcare services (Berry, Davis, & Wilmet, 2015). Healthcare service providers serve people in the most vulnerable times of their lives (Klaus, 2018) and they are motivated by the call for recovery (Hunter-Jones et al., 2020). Patients have unique biological and psychological needs (Hunter-Jones et al., 2020) and they cannot be simply seen as customers and they generally do not choose to be customers at all

(Klaus, 2018). However, in terms of healthcare service providers, it is not desirable for everyone to be a potential customer for a specific healthcare service. Therefore, the healthcare industry should be considered not as commodity producers, but as highly interactive units that create personalized solutions to unique and complicated problems with various stakeholders (Hunter-Jones et al., 2020). Also, most public health systems are for customer services rather than customer experience (Schivavone, Leone, Sorrentino, & Scaletti, 2020). In public health services, the value created is mostly related to the perceived quality of service and low mortality and disease rates of patients rather than customer experience. When compared with private health organizations, patients in public health organizations are generally not rejected. Therefore, it is difficult to try to satisfy each patient. For this reason, public health organizations are faced with the difficulty of matching demands and service capacity (Kumar, 2020). One of the ways to manage this complexity of the healthcare system is to concentrate on customers' experiences.

When patients are satisfied with a healthcare experience and their expectations are exceeded, they tend to feel great satisfaction with the healthcare service. Satisfied patients tend to show loyalty and the intention to revisit. Healthcare providers that create a memorable patient experience gain a better competitive advantage (Lee, 2019). Loyal customers are extremely critical to the survival of an organization in the market, considering that attracting new customers is much more costly than continuing business with an existing customer. As competition and costs increase to attract new customers, service providers have started to focus their strategic activities more on customer loyalty (Arab et al., 2012). Also patients are more likely to comply with treatment regimens. This situation will in turn lead to better health outcomes.

The purpose of this study is to examine previous studies on customer experience in the healthcare sector. This study contributes to healthcare service marketing knowledge by examining the dimensions of customer experience in the healthcare sector, how it is measured and whether there are other variables related to the customer experience in the healthcare sector. This paper discusses what customer experience is, how it is measured, and how the customer experience in healthcare relates to other variables.

The article continues with relevant theoretical framework; methodology; results; discussion section, and finally the conclusion section.

Theoretical framework

Customer Experience

There are various definitions of customer experience in the literature. Historically, customer experience was treated as an element of satisfaction and service quality. Today, the im-

portance of the concept is recognized and accepted as a distinct construct (Lemon, & Verhoef, 2016). The construct of experience was first proposed by Holbrook and Hirschman, (1982). Researchers addressed the experiential dimensions of consumption and created a general framework that represents typical consumer behavior variables. They mentioned the contrasts between the experiential perspective focusing on the symbolic, aesthetic and hedonic nature of consumption and the classical information processing approach (Holbrook, & Hirschman, 1982). Csikszentmihalyi (1990) expressed the experience with different concepts such as flow state, being in flow, optimal experience. The author argued that what makes the experience truly satisfying is a state of consciousness called flow. The author expressed the flow experience as “an action in which individuals are in a state of complete concentration, they experience inner interest and the concept of time changes and they can be enjoyed”. Carbone and Haeckel (1994) ‘s definition of experience emphasized the cognitive nature of experience. They defined the experience as “customer perception created during the process of learning about, acquiring, using, maintaining, and disposing of a product or service” Afterwards, Pine and Gilmore (1998) mentioned how economic value has changed over the years, how commodities have transformed from goods and services into experience in the article “*Welcome to the economy of experience in Harvard Business Review*” They emphasized the importance of firms to think “experiential” in meeting the demands of today’s customers. They explained how firms that offer memorable experiences to their customers as well as strengthen their products and services, give clues of offering unique experiences. Shaw and Ivens (2002) expressed the customer experience as a mixture of measured emotions and behavioral performance against customer expectations at all contact points of a firm. In this concept, they emphasized that the customer experience is related to behavioral and more importantly emotional experience. It was measured intuitively against customer expectations and it is an experience not only in a store but also in all points where the organization or brand is contacted. Berry, Carbone and Haeckel (2002) argued that it is not enough to provide only products or services to their customers, but organizations should provide satisfactory experience to their customers. They suggested that competing in this dimension means organizing all the “clues” that people have identified during the purchasing process. Prahalad and Ramaswamy (2004) suggested co-creation experiences approach. These authors explained the interactions (e.g., dialog and risk-benefits) between firms and consumers that facilitate co-creation experiences. The customer shifted from a passive role to an active role in the process of co-creation experiences (Vargo & Lusch 2004). Berry, Wall, and Carbone (2006) discussed customer experience with service clues in their later research. They argued that customers use a large number of clues either consciously or unconsciously when choosing services or evaluating service experiences. Customer experience was defined as an “internal and subjective response for customers to communicate directly or indirectly with a company. Direct contact generally occurs in the course of purchase, use, and service and is usually initiated by the customer. Indirect contact most often involves unplanned encounters with representations of

a company's products, services, or brands and takes the form of word-of-mouth recommendations or criticisms, advertising, news reports, reviews" by Meyer and Schwager (2007). According to Gentile, Spiller, and Noci (2007), customer experience stems from a series of interactions that create a reaction between a product, customer, and organization. They explained that the concept of experience is a multi-dimensional structure by giving an example from the medical literature. They argued that most neuropsychological studies have proven that pain is a multi-dimensional experience involving emotional, cognitive, sensory and components. Verhoef et al. (2009) expressed the construct of customer experience as "holistic in nature and involving the customer's cognitive, affective, emotional, social and physical responses to the retailer." Experience is not only with the factors that can be controlled by firms such as; environment, service interface, product variety, and price, but it is also created by factors such as the purpose of shopping / service use, and recommendations of others that are beyond the control of the firms. These authors argued the total experience consists of multiple retail channels: research, purchase, consumption, and postpurchase experience. Grewal, Levy and Kumar (2009) suggested that customer experience could be categorized by retail mix (e.g., price, promotion, location and supply chain management experience). In the same period, Brakus, Schmitt, and Zarantonello (2009) discussed the concept of brand experience and how to measure it. They conceptualized brand experience as internal and subjective responses (cognitions, sensations, and emotions) and behavioral responses. Two years later, Lemke et al. (2011) discussed customer experience quality and related outcomes. Afterwards Klaus and Maklan (2012) developed the customer experience quality (EXQ) scale to measure customer experience. They argued that the customer experience has four aspects: peace of mind, moments of truth, outcome focus, and product experience. De Kessler et al. (2015) defined the customer experience as follows: "it consists of the cognitive, emotional, physical, sensorial, and social elements that mark the customer's direct or indirect interaction with a market actor(s)". Lemon and Verhoef (2016) suggested better understanding of customer experience and the customer journey. According to these authors, customers now interact with firms through multiple channels and numerous touchpoints. They defined the customer experience as "multidimensional construct focusing on a customer's cognitive, emotional, behavioral, sensorial, and social responses to a firm's offerings during the customer's entire purchase journey". McColl-Kennedy et al. (2019) proposed a customer experience framework that combines the aspects of value creation elements, customer discrete emotions, and customer cognitive responses at distinct touchpoints. They adopted an approach that extends and integrates fundamental studies in the existing literature.

As shown, there is a wide research cluster of the concept of customer experience in the existing literature. However, there is a lack of harmony in the concepts considered from different perspectives (De Kessler et al., 2015). Given the historical evolution of the construct of customer experience, initially Halbrook and Hirschman (1982) as an experiential theorist, advocated the critical role of emotions in creating experience, contrary to a utilitarian pers-

pective. Second, Csikszentmihalyi (1990) introduced the concept of extraordinary experience as a peak and flow experience. The author concentrated on the hedonic and cognitive nature of the experience. Here, Schouten, McAlexander, and Koenig (2007) represent the next generation of this approach. Carbone and Haeckel (1994) emphasized the cognitive nature of experience with perception and learning response. Pine and Gilmore (1998) emphasized creating memorable experiences. Here, the unidirectional nature of experience in the customer-firm relationship is considered (Berry et al., 2002; Shaw & Ivens, 2002). This approach does not take into account the role of the customer in the co-creation experience process. Prahalad and Ramaswamy (2004) and Vargo and Lush (2004) suggested co-creation experiences approach based on the active role of the customer. The interactional nature of the experience was emphasized by Meyer and Schwager (2007) and Lemke et al. (2011). A lot of scholars also emphasized the holistic and multi-dimensional nature of the experience. Its dimensions are cognitive, emotional, physical, sensorial, and social experiences (Gentile et al., 2007; Brakus et al., 2009; Verhoef et al., 2009; De Kessler et al., 2015; McColl-Kennedy et al., 2019).

Customer Experience in Healthcare Services

To achieve the goals related to patient satisfaction, patient evaluations need to be analyzed very well. Patients will be more satisfied with a healthcare service designed according to the patient's opinions. Positive customer experience in healthcare is an indicator of how well the system works. Therefore, creating a positive customer experience in healthcare has become an important preference for both policy makers and clinical leaders. Previous studies conducted in different healthcare sectors have found that negative experiences of health services reported by patients were associated with a slower healing of the disease and a lower likelihood of compliance with treatment regimens. As a result of the negative experiences of patients on their recovery time or compliance with treatment regimens, patients will use more healthcare services and this situation will increase healthcare costs (Chatterjee, Joynt, Orav & Jha, 2012). Traditionally, there is a considerable imbalance between healthcare providers and customers. This imbalance is largely due to the inability of customers to comment on the services they experience. In addition to this respect for patients' concerns and needs is a key feature of a high-quality healthcare system. Therefore, it is important to emphasize the aspects of the service that require improvement, and to get feedback from patients about monitoring performance and quality (Jenkinson, Coulter, Reeves, Bruster, & Richards, 2003; Wong, et al., 2015). The concept of customer experience in healthcare services has started to expand considerably with the effect of factors such as changes in public policies that emphasize patient experience, reflection of consumer perspective to health services, and the inclusion of patient relatives in healthcare services. According to Ahmed, Burt, and Roland (2014) "the terms patient experience, patient perspective, patient reports, patient perception and patient satisfaction are often used interchangeably". But experience is not the same as the concept of satisfaction, perception, perspective or reports. Experience is more comprehensive

than these concepts, and it begins to occur the first time the customer encounters the service or product. Klaus (2018) defines the patient experience as follows: “a service provision in an environment where the goals of the customer can be complex, and where appropriate service to the customer may take the provider beyond the typical customer service approach of striving to provide immediate customer gratification with the ultimate outcome of improving the patient’s quality-of-life perceptions” However, the accepted definition of patient experience in the literature is made by the Berly Institute. According to the Berly Institute, patient experience is expressed as “the sum of all interactions shaped by the culture of an institution and affecting patient perceptions throughout the continuity of care” (Wolf & Jason, 2014). All interactions that patients experience throughout the continuity of care arise from the sensory, emotional, cognitive, behavioral and relational dimensions of the experience. Also patient experiences can be co-created by interactions with doctors, administrators (Lee, 2019), counselors, families, and others. The experience quality generated during these interactions depends on the nature of the patient’s participation. Thus, individual participation can transform the process of diagnosis, therapy, health indicators, counseling (Prahalad & Ramaswamy, 2004).

Considering the patient experience measurement tools accepted in some countries, it has been observed that the tools can not measure experience accurately. Patient experience surveys focus on how patients experienced important aspects of healthcare services, not on how satisfied patients are with healthcare services. (Centers for Medicare and Medicaid Services, [CSM]). For example, the English National Health System [NHS], (2011) outlines elements of patient experience. Those elements are defined as follows: “*patient-centred values, preferences, expressed needs, coordination and integration of care, information, communication, education, physical comfort, emotional support, welcoming the involvement of family and friends, transition and continuity and access to care*”. Also the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) survey has been developed by the (CSM), to measure patient experience. The survey contains 19 main questions about important aspects of patients’ experiences (“*communication with nurses and doctors, the responsiveness of hospital staff, the cleanliness and quietness of the hospital environment, communication about medicines, discharge information, overall rating of hospital, and whether or not they would they recommend the hospital*”). The survey also includes five items to adjust for the mix of patients across hospitals, three items to direct patients to relevant questions and two items that support congressionally-mandated reports (CSM). With the effect of such factors, the concept of patient experience in healthcare services has started to expand considerably. Accordingly, the customer is having an experience from the very first moment they come into contact with the healthcare setting. These experiences can occur in a wide range of areas, from the appointment processes, relevant physicians to feelings after service use, and even before coming to the hospital. The experiences can occur in areas such as the atmosphere, smell, furniture, texture of the hospital, behavior of service provider, word of mouth

communication, correct and appropriate diagnosis and treatment methods, technology, food, comfort, patient preference, brand, and hospital services that create a lifestyle for the patient.

The reason why the customer chooses hospital Y rather than hospital X is actually related to the experiences that the hospital offers to the customer, because experiences are memorable. A patient with a negative experience with hospital X may not show loyalty in using the services of that hospital. Instead, when the patient chooses hospital Y they would be willing to use the services of hospital Y if the patient's experience with the hospital services are positive at all points of contact. Or if the diagnosis and treatment methods are up to date. If it is difficult to reach the physician in hospital Y, the patient's choice may not be hospital Y. Since experiences are associated with interaction at all touchpoints such as service provider, manager, family, caregiver, and others; it is important to create an experience environment where patients can create their own unique experiences (Prahalad & Ramaswamy, 2004).

Methodology

The purpose of this study is to make a literature research on the studies about customer experience in healthcare. Studies were evaluated with a content analysis method. In this context, the studies on the subject in the literature have been examined conceptually and methodologically. The studies have been examined in terms of purpose, method and research model and basic findings. As a result, it is determined how customer experience in healthcare is measured, what dimensions it consists of and how customer experience in healthcare relates to other variables.

While the studies in the literature were evaluated, specific inclusion criteria was used. The first of these criterion, to ensure that the publication was in line with the area of interest, keywords "customer experience" and "healthcare" were the selection criteria for the topic (title, keywords or abstract). Second, to identify appropriate and relevant publications, three electronic databases—the ISI Web of Science, Science Direct and Google Scholar—were used. Since it was determined that the first research on customer experience in healthcare services was carried out in 2006, published articles in English in or after 2006 were included in the study. Subsequently, 18 articles met the inclusion criteria (see Table 1).

Table 1
Studies on Customer Experience in Healthcare

Author-Year	Article Name	Purpose of the Study	Research Model	Method	Main Findings	Country	Reference
Buccoliero et al., 2015	Experiential Marketing in Healthcare: How to Improve Through Patients' Eyes	It is measure to the performance of health services from the patient's perspective by defining the elements that they consider important in the care of experience.	The study is a quantitative research. In Italy, patients were surveyed in public and private hospitals.	Correlation-regression analysis: 253 participants	The study found that patient satisfaction has been achieved through positive patient experience in four areas. patient experience consists of these areas: (1) Patient experience, (2) privacy and dignity, (3) Atmosphere and comfort (4) technology.	Italy	Conference Proceedings
Chen and Hsieh, 2010	A Study of the Relationship Among Experiential Marketing, Experiential Value and Customer Satisfaction	It is examine to the relationship between a medical tourists' experience, experience value, and satisfaction.	In the quantitative study, a model is established to determine the relationship between experience, experiential value, and satisfaction. The health tourism medical consumption experience scale is used.	LISREL empirical analysis: 280 participants	The study found that feel, think, and relate experience are positively correlated with brand image. All dimensions of experiential marketing has a positive effect on satisfaction. Also relational experience has the most significant impact on customer satisfaction.	Taiwan	Journal of Statistics and Management Systems
Ho et al., 2006	A Discussion of Refractive Medical Behavior from an Experiential Marketing Viewpoint	The study adopts "strategic modules of experiential marketing" by Schmitt to examine the influence of medical behavior on customers' experiences.	In the qualitative study, it is interviewed 32 patients who had a refractive surgery experience.	Contents analysis: 32 participants.	It is developed 5 experiential modules—feel, sense, act, relate and think of customers' medical experiences	Taiwan	Journal of Hospital Marketing and Public Relations

<p>Kashif et al., 2016</p> <p>EXQ: Measurement of Healthcare Experience Quality in Malaysian Settings A Contextualist Perspective</p>	<p>The study aims to validate EXQ (Customer Experience Quality) scale by linking it to word of mouth, customer satisfaction and loyalty in private healthcare sectors.</p>	<p>In the quantitative study, a model is established to determine the relationship between EXQ, customer satisfaction, loyalty, and word of mouth.</p>	<p>AMOS empirical analysis: 330 participants</p>	<p>The study found that two dimensions of EXQ scale peace of mind and moments of truth and are highly valued by customers. Also, the EXQ perceptions significantly affect customer satisfaction and loyalty. Mediation effect of customer satisfaction in the model is found to be positively and significantly.</p>	<p>Malasia</p> <p>International Journal of Pharmaceutical and Healthcare Marketing</p>
<p>Worlu et al., 2016</p> <p>Effective Customer Experience Management In Healthcare Sector Of Nigeria A Conceptual Model</p>	<p>The study aims to introduce the concept of customer experience management (CEM) as a supportive construct in customer loyalty building.</p>	<p>Literature review</p>	<p>Conceptual model</p>	<p>The study suggests a new conceptualization on CEM consisting of three dimensions: mechanic, functional, and humanic clues on customer loyalty in the Nigerian healthcare sector. It is also determined that CEM is an important construct for building customer loyalty.</p>	<p>Nigeria</p> <p>International Journal of Pharmaceutical and Healthcare Marketing</p>
<p>Deshwal and Bhu-yan, 2018</p> <p>Cancer Patient Service Experience And Satisfaction</p>	<p>The study aims to validate construct of cancer patient services experience. Also this paper discusses the impact of patient services experience dimensions on customer satisfaction.</p>	<p>In the quantitative study, it is to validate construct of cancer patient services experience using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) technique. A model is established to determine the impact of cancer patient services experience on customer satisfaction.</p>	<p>AMOS empirical analysis: 351 participants</p>	<p>The study found that the experience of cancer patient elements of sensorial, emotional, cognitive, behavioral and social factors. All five factors explain customer satisfaction positively.</p>	<p>India</p> <p>International Journal of Healthcare Management</p>

<p>Healthcare Experience Quality: An Empirical Exploration Using Content Analysis Techniques</p> <p>Ponsignon et al., 2015</p>	<p>The aim of the study is to determine how cancer patients perceive and evaluate the healthcare experience.</p>	<p>The stories of 200 cancer patients on a healthcare website are examined and 1,521 experience quality data item are captured using the critical incident method.</p>	<p>Critical incident method: 200 cancer patient stories</p>	<p>In the study, the service dimensions of cancer patients were found as follows: direct interactions, indirect interactions, independent processing, speed and medical outcome.</p>	<p>England</p> <p>Journal of Service Management</p>
<p>Service Experiences And Dyadic Value Co-Creation In Healthcare Service Delivery: A CIT Approach</p> <p>Osci-Frimpong et al., 2014</p>	<p>The aim of the study is to examine value co-creation processes from the focal dyad of the patient and the physician and how their experiences in the consulting room affect the value that is created</p>	<p>In the qualitative study, it is conducted semi-structured interviews with 8 doctors and 24 outpatients. 76 usable data item are captured.</p>	<p>Critical incident method: 32 participations</p>	<p>The study found that three critical areas needed to create the value co-creation process. The important areas comprise of the beliefs and perceptions, partnership between the focal dyad and social context.</p>	<p>Gana</p> <p>Journal of Service Theory and Practice</p>
<p>Can Nurse Innovation Improve Customer Perception Of Service Quality And Experience?</p> <p>Weng et al., 2016</p>	<p>The aim of the study is to clarify how nurse innovation is related to customer experience and service quality.</p>	<p>In the quantitative study, it is employed questionnaire survey method with nurses and inpatients.</p>	<p>Hierarchical regression Analysis: 294 participations</p>	<p>The study found that nurse innovation has no significant effects on customer experience and service quality.</p>	<p>Taiwan</p> <p>Journal of Clinical Nursing</p>
<p>Patient-Centric Quality Assessment Framework For Healthcare Services</p> <p>Park et al., 2016</p>	<p>The aim of this study is to propose a model of quality framework in healthcare services using the concept of customer experience management.</p>	<p>Literature review</p>	<p>Conceptual model</p>	<p>A model is proposed the patient perceived experiential value to measure the quality of healthcare service. The patient experiential value consists of extrinsic and intrinsic values. While intrinsic value includes emotional, epistemic, and intrinsic social value, extrinsic value includes the functional, utilitarian, and social value.</p>	<p>Korea</p> <p>Technological Forecasting & Social Change</p>

Borishade et al., 2018	Dataset on Customer Experience and Satisfaction in Healthcare Sector of Nigeria	The aim of this study is to explain customer experience and customer satisfaction survey results.	In the quantitative study, it is employed questionnaire survey method with patients	Categorical Regression analysis: 365 participations	The results suggested that customer experience have significant effect on customer satisfaction.	Nigeria	Data in Brief
Ozcelik and Burnaz, 2019	Customer Experience Quality Dimensions in Health Care: Perspectives of Industry Experts	The aim of this study is to determine critical dimensions of customer experience in healthcare from the perspectives of industry experts.	In the qualitative study, it is interviewed with 15 people including managers, physicians, and academic researchers	Phenomenological approach: 15 participations	The results showed that critical patient experience dimensions from the perspectives of industry experts found as provider and patient type, touch-point diversity, function, preference, psychology, interaction, and environment.	Turkey	Journal of Management, Marketing and Logistics
Kumar, 2020	The Impact of Patient Recovery Flexibility on Service Experience in Public Healthcare	The aim of this study is to identify the dimensions of patient recovery flexibility and examine its impact on the service experience.	In the qualitative study, semi-structured interviews were conducted with 36 healthcare professionals	Thematic analysis: 36 participations	In the study, various dimensions of patient recovery flexibility are determined. Also, patient recovery flexibility has a positive effect on the service experience.	India	Journal of Business Studies
Lee, 2019	A Model for Designing Healthcare Service Based on The Patient Experience	The aim of this study is to develop a model designing healthcare service from perspective of patient experience	Literature review	Conceptual model	A model is proposed for healthcare services delivery design based on patient experience and value co-creation.	South Korea	International Journal of Healthcare Management
Hunter-Jones et al., 2020	Hospitality-Oriented Patient Experience (Hope) Framework in Health Care	The purpose of this study is to provide alternative patient experience framework based on hospitality oriented.	Literature review	Conceptual model	A new model is developed based on hospitality-oriented patient experience.	UK	Journal of Service Management

Kumar et al., 2018	The Impact of Marketing Activities on Service Brand Equity. The Mediating Role of Evoked Experience	The purpose of this study is to examine marketing activities impact on new concept of customer-based brand equity through customer experience.	Mixed study: While structured interviews are conducted with 60 patients in the qualitative study, the survey method is conducted with 839 patients in the quantitative study.	Mixed Method: Content analysis: 60 patients. AMOS empirical analysis: 839 patients.	The results suggested that customer experience is mediating role for the marketing activities impact on customer-based brand equity.	India	European Journal of Marketing
Lin et al., 2013	Impact of Cultural Differences on Foreign Customers' Perceived Local Services	The purpose of this study is to examine cultural differences on foreign customers' perceptions of local services through customer experience	In the qualitative study, it is conducted semi-structured interviews with 70 participants from services of transportation, convenience stores, restaurants, healthcare, and banking. 286 usable data items are captured	Critical incident method: 70 participations	The results suggested that 286 critical data items in four dimensions of the employee behavior, physical environment, functionality and value. The results also showed that Western customers are more likely than Asian customers to have a negative perception of local services.	Taiwan	Journal of Services Marketing
Schiaivone et al., 2020	Re-Designing the Service Experience in the Value Co-Creation Process: An Exploratory Study of a Healthcare Network	The purpose of this study is to emphasize service experience innovation in healthcare and determine the role of the sharing economy (SE)-based platform in redefining business processes.	As a primary data source: it is conducted 15 interviews with Saluber actors. As a secondary data source: various official reports and publications from Saluber	The results showed that SE-based platform can improve the customer experience and help to redesign the business processes of healthcare facilities.	Italy	Business Process Management Journal	

Results

Studies on Customer Experience in Healthcare

According to the service management literature, when the customer interacts with the service delivery system, customer experience emerges (Meyer & Schwager, 2007). Customer experience structure is holistic in nature and includes various responses (emotional, sensory, behavioral, cognitive, and relational) with the company. These experiences consist of many factors that can be controlled (i.e., retail atmosphere, assortment, service interface, price), or not controlled (i.e., purpose of shopping, influence of others), by the company. (Verhoef et al., 2009). When the customer experience begins to occur, customer experiences at each point of contact with the service are shaped. The customer's experiences at all points of contact with the service are individual and unique. The response from each customer is different from each other when they encounter the service or company. These differences can be caused by many factors such as personality traits, past experiences and expectations. At the same time, Schmitt, (1999) argues that it is not easy to measure these responses, which include sensory, emotional-conceptual, cognitive, behavioral and relational experiences. Therefore, it is seen that the studies which consider or measure the customer experience as a separate structure are very limited. It is observed that the studies are mostly measured indirectly with other related structures such as service quality and behavioral intentions. Especially studies examining customer experience in healthcare are quite insufficient. This is thought to be due to the difficulty of already measuring the concept of experience and/or measuring customer experience in healthcare. In this study, conceptual and empirical studies related to customer experience in healthcare are examined. The main findings, purpose, method and research model findings of the studies are shown in Table 1.

Discussion

As a result of the detailed literature review, it is seen that the studies on "experience" differ in two ways. The studies handled from the first one is the patient experience from a "public health" perspective. The second one is the "experiential marketing". While patient experience studies conducted with a public health perspective integrate experience with concepts such as "satisfaction, and/or service quality" and indirect measure, studies conducted with experiential marketing perspective deal with the concept of customer experience as a whole. It would not be wrong to say that this distinction stems entirely from the academic perspective.

In some countries, governments and regulatory authorities have indicated that there is a need to conduct surveys on patients' views on services (Jenkinson et al., 2003; Wong et al., 2015). Patient surveys are widely used in several countries to evaluate patient experiences. For example, patient experiences are regularly measured by the NHS, (2011) with a stan-

standardized measurement tool and measures are taken based on the results. In the US, patients' opinions are received through patient experience surveys (HCAHPS) developed by CSM (2005). In many countries of Europe, a questionnaire (Picker Patient Experience Questionnaire) developed by the Picker institute in England is used to measure patient experiences (Jenkinson et al., 2002).

Although there are many studies on the patient experience in the literature, it is seen that the studies which handle and measure the experience in all its aspects are quite insufficient. In studies, experience appears as a theme. In this research, the studies in the field of marketing for customer experience in healthcare are included. Also, there is no recognized measurement tool for measuring customer experience in healthcare. It is observed that the study that constitutes the basis of these studies is the research that suggests the emotional, sensory, cognitive, behavioral and relational dimensions of experience with Schmitt's (1999) experiential marketing module. The basis of these studies is the research of Schmitt (1999). Schmitt argued that the experience has sensory, emotional, cognitive, behavioral relational dimensions with the experiential marketing module.

In the literature review regarding the definition of patient experience made by Wolf et al. (2014) several suggestions related to the concept have been identified. According to this; patient experience reflects events that occur independently and collectively throughout the continuity of care. For this reason, experience is more than satisfaction and it is not enough to measure the experience only with surveys. Patient experience should include individualized care and service designs that can meet patients' expectations. While presenting a conceptual framework for the definition of patient experience and how it should be measured in Wolf et al's study; Worlu et al (2016) presented a conceptual framework for the dimensions of customer experience management in the Nigerian healthcare sector. They proposed a conceptual model for customer experience management in the healthcare services. Accordingly, the customer experience management consists of three dimensions: functional, mechanic and humanic clues. Also they advocate that customer loyalty can be achieved through effective customer experience management. Buccoliero et al. (2015) argued that patient satisfaction was achieved through positive patient experience in four areas. These; atmosphere and the comfort of the environment, personal privacy and honor, patient empowerment and technology dimensions. Ho et al. (2006) conducted in-depth interviews with 32 patients who underwent refractive surgery to provide healthcare providers with information on how experiential service providers will be guided to strengthen patients' experiences. They adapted the experiential module proposed by Schmitt (1999) to patient behavior and determined the dimensions of the patient experience. Accordingly, five patient experience dimensions (sensory, emotional, cognitive, behavioral and relational) were determined. The study also found that the relationship between employee attitude and the sensory experiences of the patients with satisfaction was positive and significant. Kashif, Samsi, Awang and Mohamad (2016) examined the effect of

customer experience on customer satisfaction, loyalty and word of mouth communication in healthcare settings. In this context, it has created a structural model and Customer Experience Quality (EXQ) scale previously developed by Klaus and Maklan (2012) to measure customer experience adapted to hospital services. It has been determined that two dimensions of peace of mind and moments of truth are highly valued by customers. The perception of customer service experience significantly contributes to satisfaction and loyalty. Deshwal and Bhuyan (2018) examined the impact of cancer patients' service experience on satisfaction. Based on the literature, service experience dimensions were determined and its validity was determined with the model. It was suggested that the service experience of cancer patients includes five factors: service environment experience, emotional, behavioral, social and experience. It was determined that cancer patients' service experience positively influences patient satisfaction. Ponsignon, Smart, Williams and Hall (2015) analyzed 200 patient stories on a health website to examine the structure consisting of cancer patients' service experience. They found that dimensions of the cancer patients service experience as follows:

- Direct Interactions: "Attitudes and behaviours, Personalisation (recognise and understand patient's particular needs), Communication, Competence (level of staff knowledge and skills), Availability (find and access an appropriate staff member), Dealings with others, Relationship with staff, Efficiency, Reliability".

- Indirect Interactions: "Procedures and processes, Accessibility, Service variety/choice, Premises and facilities, Atmosphere, Communication, Timeliness, Food and beverages",

- Independent Processing: "Reputation and brand, External communication, Timeliness",

- Speed and Medical Outcome.

Osei-Frimpong, Wilson and Owusu-Frimpong (2015) investigated that value co-creating processes from patient-physician relationship and how their experience affects the created value. A semi-structured interview with 24 outpatient patients and 8 physicians was conducted. Three critical areas of experience were required to support elements that reflect the value creation process that should be considered during service delivery. The critical areas consist of the beliefs, social context, perceptions, and patient-physician partnership. The results reveal that patients do not only see improvement as a single value but also see the total experience during patient-physician interaction as a value. Chen and Hsieh (2010) investigated the relationships between experiential value, experiential marketing and customer satisfaction. They used the experiential modules of Schmitt (1999), while measuring experience. The results reveal that all dimensions of experience affect satisfaction positively. In addition to relational experience, dimension has the greatest effect on satisfaction. Therefore, relational experience is important. It relates the self to the health facility and telling others about the health facility. Weng et al. (2016) investigated nursing innovation being related to the customer's perception

of service quality and experience. They used Schmitt's experiential module to measure customer experience. It was found that nursing innovation has no significant effect on service quality and experience.

Borishade et al. (2018) demonstrated a data set examining the relationship between customer experience and customer satisfaction. The study was conducted in four private hospitals in Nigeria. The results showed that customer experience significantly affects customer satisfaction. Hunter-Jones et al. (2020) developed a framework of hospitality-oriented patient experience (HOPE). They integrated three different areas consisting of hospitality literature, customer experience management literature and healthcare literature. HOPE framework integrates the ideas of a vision of a healthcare experience between patients and their caregivers. Also, this approach involves designing and implementing this experience. Kumar (2020) developed several dimensions of patient recovery flexibility. The researcher determined that it has a positive impact on service experience. Kumar, Dash and Malhotra (2018) examined a new improved customer-based brand equity model. They showed that customer experience has a mediating role in the relationship between marketing activities and customer-based brand equity. Lee, (2019) proposed a model that designs healthcare service based on the patient experience. New model is based on interactions between patient, provider and organization in touchpoints. Lin, Nguyen and Lin (2013) investigated that foreign customers' perceptions of the five local services (healthcare, banking, transportation, convenience stores and restaurants) through their consumption experience. The results showed that foreign customers' perceptions consist of four dimensions of the employee behavior, physical environment, functionality and value. Ozcelik and Burnaz (2019) determined the dimensions of customer experience in healthcare from the perspective of industry experts. They found that touchpoint diversity, provider and patient type, function, preference, interaction, psychology, and environment to be patient experience dimensions. Park et al. (2016) proposed a model of quality framework in healthcare services using the concept of customer experience management. Proposed model measured that patient experiential value consists of intrinsic and extrinsic values. Where the intrinsic value consists of epistemic, intrinsic social value and emotional value, the extrinsic value consists of extrinsic social value and functional value. Schiavone et al. (2020) determined the role of the sharing economy (SE) -based platform in redesigning the service experience. They proposed a framework that how re-designing the service experience through the SE platform and showed that using principles of SE that can co-create value for the community, healthcare network and customer.

As can be seen from the studies, the number of both conceptual and empirical studies related to customer experience in healthcare in the field of marketing are insufficient. There is no accepted approach in the literature regarding what exactly the customer experience is in healthcare, how it should be measured, and what structures it consists of. For an effective customer experience management in the healthcare structure should be handled and measured

as a whole. In this sense, more conceptual and empirical studies are needed. Based on this discussion (summarized Table 2), it can be said that this study makes more comprehensive, presenting customer experience dimensions and related variables in healthcare.

Table 2

Comparison Between Customer Experience In Healthcare Framework and Previous Studies

Customer experience dimensions in healthcare	Related variables	Author-Year
Functional, mechanic and humanic clues	Customer satisfaction Customer loyalty	Worlu et al., (2016)
Atmosphere and the comfort of the environment, personal privacy and honor, patient empowerment and technology	Customer satisfaction	Buccoliero et al., (2015)
Product experience, outcome focus, moments of truth and peace of mind	Customer satisfaction Customer loyalty	Kashif et al. (2016)
Service environment experience, emotive experience, behavioral experience, comfort experience, and social experience	Customer satisfaction	Deshwal and Bhuyan, (2018)
Direct interactions, indirect interactions, independent processing, speed and medical outcome	-	Ponsignon et al., (2015)
Social context, beliefs and perceptions, and patient-physician partnership	Perceived value	Osei-Frimpong et al., (2015)
Sensory, emotional, cognitive, behavioral, relational	-	Ho et al., (2006)
Sensory, emotional, cognitive, behavioral, relational	Experiential value Customer satisfaction	Chen, and Hsieh, (2010)
Extrinsic value: Functional/utilitarian Intirinsic value: Emational, epistemic, intrinsic social	-	Park et al., (2016)
Sensory, affective, behavioral, intellectual	Customer-based brand equity	Kumar et al., (2018)
Physical environment, employee behavior, value, and functionality	-	Lin et al., (2013)
Hospital type, function, patient type, preference, touchpoint diversity, mood/feelings/psychology, interaction, environment	-	Ozcelik and Burnmaz, (2019)

Conclusion

This paper provides a perspective on customer experience in healthcare. Very limited studies examining the patient experience from an experiential marketing perspective have been found. Customer experience in healthcare is becoming increasingly important, both in academic research and practices. This research makes a number of theoretical contributions: first of all, it explains concepts that appear in the literature review of customer experience in the healthcare sector. Secondly, it proposes dimensions for the measurement of customer experience in the healthcare sector. Thirdly, it determines the variables related to customer experience

rience in the healthcare sector. It would be observed that customer experience can be used to build satisfaction and loyalty and the implementation of the concept to the healthcare sector.

This study has some limitations. The databases limit the search to papers of the abstracts, keywords and titles. Therefore it may not include some papers in the sample. The few studies on customer experience in healthcare may appear to limit this study. But this may be an opportunity for future studies.

How the customer experience has a conceptual structure in the healthcare sector can be determined in future studies. In addition, studies on how the customer experience should be measured are needed. Studies have shown that positive patient experience is effective for patients to prefer a hospital again and comply with treatment regimens in the future.

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RESEARCH ARTICLE

The Impact of Covid-19 on Selected Turkish Financial Indicators: Empirical Evidence from the Toda Yamamoto Causality Test*

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Abstract

This paper examines the impact of COVID-19 cases and deaths on selected financial indicators in Turkey between March 2020 and July 2020. This study analyzes the causal relationship between COVID-19 and liquidity and risk perception in Turkey. To measure the impact of COVID-19 on liquidity and risk perception in Turkey, financial indicators, such as the BIST100, credit default swap, 2-year Turkish bond yields, and 10-year Turkish bond yields were examined. The stationarity of variables was tested using unit root tests. Since all variables were stationary at the first difference, the Toda Yamamoto causality test was chosen to examine the causality relationship between variables. According to the Johansen co-integration test, there was a co-integration relationship between variables. The empirical results of the Toda Yamamoto causality test show that there was a unidirectional Granger causality from the number of COVID-19 deaths to credit default swap. Moreover, there was a unidirectional Granger causality from the Turkish bond yields (2- 10 years) to BIST 100. However, between March 2020 and July 2020, there is no Granger relationship between the number of COVID-19 cases and the selected financial variables.

Keywords

COVID-19, Financial Indicators, Turkey

Introduction

Humanity has endured outbreaks of fatal infectious diseases throughout history. The plague in the 14th century, bleeding fever in the 16th century, the cholera epidemic in the 19th and 20th centuries, and SARS, MERS, and swine flu in the 21st century are some of the significant epidemics that humanity has witnessed (Peterson, 2002: 48; DeWitte, 2015: 441; da Costa, Morelli, and Saivish, 2020: 1517). Decreasing consumption and job loss as a result of epidemics affect economies negatively (Eichenbaum, Rebelo, and Trabandt, 2020: 1). The economic and financial consequences of outbreaks of infectious disease have been revealed

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in the literature (Haacker, 2004; Ding, Levine, Lin, and Xie, 2020). Similarly, COVID-19 has also affected the world economy.

COVID-19 is an infectious disease that has affected the world. (WHO, 2019a). As a result of the outbreak of this infectious disease that started in December 2019, there has been a sharp fall in global stock markets. In the first quarter of 2020, the S&P 500, Brazil, Hong Kong, Italy, and Japanese exchanges decreased by 34%, 46%, 25%, 42% and 31% respectively (Ding, Levine, Lin, and Xie, 2020: 1). According to the OECD, in April 2020, the unemployment rate in member countries rose to 8.4%. The OECD stated that this increase had been unexpected and that COVID-19 had harmed the labor market (OECD, 2020). The US economy contracted by 32.9% in the second quarter of 2020 due to the new type of coronavirus pandemic (Bureau of Economic Analysis U.S. Department of Commerce, 2020). According to Eurostat, in the Euro Zone (consists of 19 countries), the economy contracted by 12.1% in the second quarter of 2020 (EuroStat, 2020). The IMF stated that the economic devastation resulting from COVID-19 could be dangerous for any gains made in reducing extreme poverty across the world (IMF, 2020). Production and confidence in the Turkish economy fell sharply due to the pandemic. Stakeholders' risk perception of the economy and public debt increased. The increasing numbers of Covid-19 cases affected every aspect of life in Turkey. The Turkish economy experienced a negative change, especially due to quarantine measures, reduced production, and general panic. According to the Turkish Statistics Institute, the Turkish economy contracted 9.9% (Turkish Statistics Institute, 2020).

This study investigates if there is any causal relationship between COVID-19 and liquidity and risk perception in Turkey. Due to the emerging atmosphere of panic and increasing economic devastation, COVID-19 may affect the liquidity and risk perception of countries. Additionally, the pandemic period has also affected investors' decisions. Countries' credit default swap and bond rates reflect the liquidity and risk perception. Stock markets are one of the areas that reveal investors' risk perception. Therefore, to measure the impact of COVID-19 on liquidity and risk perception in Turkey, financial indicators such as the BIST100, credit default swap, 2-year Turkish bond yields, and 10-year Turkish bond yields were examined.

This study aims to analyze the relationship between COVID 19 and the selected financial indicators in Turkey from 11 March 2020, when the first case was announced, to 31 July 2020.

Literature Review

Some studies have found a statistical relationship between public health variables (life expectancy, maternal mortality, etc.) and the economy (Bloom and Sachs, 1998; Robalino et

al., 2002). One of the public health elements that can have direct or indirect effects on economies is an outbreak of infectious disease. Such outbreaks directly affect economies in terms of their impact on the health system, medical care, and supporting services (Mckibbin and Fernando 2020: 3). Job loss, emerging panic, and reduced production are indirect effects of an infectious disease outbreak on economies. Risk and uncertainty reduce investments during an outbreak of an infectious disease. Moreover, consumer confidence decreases as a result of fear and uncertainty and in turn, consumption of goods and services, especially face-to-face services (transport, tourism, etc.), decreases (Eichenbaum, Rebelo, and Trabandt, 2020: 1).

Economic Impact of Outbreaks Infectious Diseases

In the literature, the economic effects of different outbreaks of infectious disease have been examined. Barnett et al. (2000) argued that AIDS affected economic growth negatively. Haacker (2004) pointed out that the AIDS virus affected governments, households, and businesses economically. The decrease in labor efficiency and income affected businesses negatively. Households bear the costs of healthcare spending. AIDS caused more health and social costs for governments. Tekola et al. (2000) analyzed the financial effects of AIDS-related deaths on households in Ethiopia. It was found that AIDS-related deaths increased the level of poverty. Conelly and Rosen (2005) examined the situation of small and medium-sized businesses (SMEs) regarding AIDS services with a survey. The survey results showed that SMEs were inadequate in terms of AIDS services.

Gong, Jiang, and Lu (2020) examined the relationship between the H1N1 virus and bank credit in 37 countries from 2009 to 2010. The empirical results showed that the H1N1 virus limited bank credits and increased the cost of these credits. Verikios et al. (2012) examined the effect of H1N1 virus on the Australian economy. According to Verikios et al. (2012), H1N1 had a short-run macroeconomic effect on the Australian economy.

Wang, Yang, and Chen (2013) examined the changes of biotechnical stocks in Taiwan using the Ordinary Least Square method during the outbreak of infectious disease. The empirical results of the study, which examined 38 biotechnical companies, showed that investors acted rationally and adjusted portfolio allocation during the outbreak of infectious disease.

Bloom et al. (2005) estimated the effect of the avian influenza strain on the Asian economy using the Oxford economic forecasting model. In the scenario, in which the mortality rate was 0.5%, it was emphasized that a 3% consumption shock would occur. Prager, Wei, and Rose (2017) examined the effect of the influenza outbreak on the American economy for different scenarios. It was concluded that in different scenarios, the loss of GDP would be \$ 25.4 billion. In the scenario modelled with a vaccine, the GDP loss was \$19.9 billion.

Studies in the literature have revealed the economic impact of previous outbreaks of disease on countries, businesses, and households.

Economic Impacts of COVID-19

COVID-19 has been studied in the literature in terms of economic and financial results. Huo and Qiu (2020) examined the effect of COVID-19 on the stock market in China using the Cumulative abnormal returns method. According to Huo and Qiu (2020), retail investors reacted more strongly to the lockdown news. Baker et al. (2020) argued that the consumption of households changed radically in the COVID-19 pandemic process. Households' credit card spending, food items, and retail spending increased. Bartik et al. (2020) analyzed the effect of COVID-19 on small businesses in the USA using a survey. The survey included 5.819 participants. According to the survey, 43% of the participants temporarily closed their businesses, and businesses reduced their employee numbers by 40%. Liu et al. (2020) showed that COVID-19 harmed the world's leading stock markets. According to the fixed effect panel model, Asian stock markets were more affected by COVID-19 than other stock markets. Luo and Tsang (2020) pointed out the importance of China in the world supply chain. According to Luo and Tsang (2000), the economic loss due to COVID-19 in China could reduce world production by at least 1%. Estrada et al (2020) argued that China's economic growth would see a decrease of 2% due to COVID-19 in 2020.

Aydın and Ari (2020) analyzed the impact of COVID-19 on non-recoverable economic sectors in Turkey with ORANI-G, a multisectoral computable general equilibrium model. The empirical results showed that COVID-19 decreased gross domestic product by 1.16 but falling oil prices compensate for this decrease. Kartal (2020) examined how Credit Default Swaps (CDS) behaved during COVID-19. The result of the analysis showed that CDS was affected by the BIST100 index, VIX index, MSCI Turkey index, and USD/TL foreign exchange rates during COVID-19. There was no statistically significant relationship between COVID-19 and CDS. Cakmaklı et. al. (2020) stated that a partial lockdown was more harmful than a full lockdown for the Turkish economy. As normalization takes a long time in partial lockdown, the cost to the economy can increase.

Chaouachi and Chaouachi (2020) analyzed the effects of the COVID-19 disease on the Saudi Arabian stock market using the Toda Yamamoto Causality test. The Toda Yamamoto Causality test revealed that the number of COVID-19 cases affected the stock market. According to Wang and Enilov (2020), there was a Granger causality between COVID-19 case numbers and stock markets in G7. Erokhin and Gao (2020) investigated the effect of COVID-19 on trade and economy in terms of food security in 45 countries. According to the results of the Toda Yamamoto Causality Test, there was a causal relationship between the number of COVID-19 cases and poor nutrition in Colombia, Latin Africa, Peru, and Turkey. Unvan (2020) examined the causal relationship between COVID-19 and the dollar, gram gold prices, BIST 100 Index, euro, and 2-year bond yields in Turkey. According to Unvan (2020), there was no causality relationship between COVID-19 and other variables. Mele and Magazzino (2020) analyzed the causality relationship between COVID-19 death numbers,

economic growth, and pollution in India using the Toda Yamamoto causality test. According to Mele and Magazzino (2020), the mortality of COVID-19 did not affect economic growth. Saleh and Musa (2020) showed that the number of COVID-19 cases affected the exchange rate in Nigeria. Andrieş, Ongena, and Sprincian (2020) stated that there was a Granger causality between the number of COVID-19 cases and deaths and the 5-year sovereign Credit Default Swap (CDS) in Europe.

The literature has revealed that COVID-19 had a wide impact on economic growth, money and capital markets, food security and production-consumption balance.

Methodology

The Toda Yamamoto Causality test was applied to analyze the causality relationship between COVID-19 and financial indicators in Turkey. In VAR analysis, the loss of information is experienced in the level of values of the integrated variables that are stationary at the first difference. In the analysis developed by Toda and Yamamoto (1995), this loss of information is prevented, and variables are included in the analysis with their level values (Dua-sa, 2007:87). The Toda Yamamoto test is suitable for integrated and co-integrated variables. Thus, the maximum order of integration of series (D_{max}) should be calculated. Then, the optimal lag of the vector auto-regression model is determined with the Schwarz Information Criterion (SIC). The VAR model can be calculated with (k) and (D_{max}) values with seemingly unrelated regression. Lastly, the Wald test is performed on the model to test the hypothesis (Siami-Namini, 2017: 604). The Toda Yamamoto model is as follows:

$$Y_t = a_1 + \sum_{i=1}^{k+D_{max}} \theta_{1,i} X_{t-i} + \sum_{i=1}^{k+D_{max}} \theta_{2,i} Y_{t-i} + \varepsilon_{y,t} \quad (1)$$

$$X_t = a_2 + \sum_{i=1}^{k+D_{max}} \theta_{1,i} X_{t-i} + \sum_{i=1}^{k+D_{max}} \theta_{2,i} Y_{t-i} + \varepsilon_{x,t} \quad (2)$$

The above equations are examined for the presence of a Granger causality relationship between X and Y with the Wald test. Before the Toda Yamamoto test, unit root tests are used to test the stationarity of the series. Then, the Johansen co-integration test is applied and finally, the causality relationship of the variables is analyzed with the Toda Yamamoto test.

The Toda Yamamoto Causality test has been frequently used to examine the relationship between COVID-19 and financial variables (Sahoo, 2021; Chaouachi and Chaouachi, 2020; Andrieş, Ongena, and Sprincian, 2020). In our study, the Toda Yamamoto Causality test was chosen to reveal the causality relationship between COVID-19 and financial variables and the direction of this relationship with daily data from Turkey. Using this method means that the cause and effect relationship between the variables can be mutually analyzed beyond the one-way effect. In addition, all variables are not stationary at the level. For this reason, the Toda Yamamoto Causality test is applied instead of the Granger Causality test.

Econometric Data Description

The analysis is based on daily time series data from Turkey for the period of 11 March 2020 to 31 July 2020. The period was narrowed down between 17 March 2020 and 31 July 2020 to analyze the impact of deaths resulting from COVID-19. The variables used were: the number of COVID-19 cases (CASE), the number of COVID-19 related deaths (DEATH), the BIST 100 index (BIST100), 5 years credit default swap (CDS), 10-year Turkish bond yields (BONDY10), and 2-year Turkish bond yields (BONDY2). All of the data were available from The Health Ministry of the Republic of Turkey and Bloomberg.

The Health Ministry of the Republic of Turkey announced that all people testing positive for COVID-19 would be counted as “Cases” starting from March 11th, 2020 until July 29th 2020.

However, after July 29th, 2020, policy changes were made and it was decided not to announce the number of cases without symptoms. Only the number of patients was shared with the public. As of December 10th, 2020, the number of cases and patients started to be announced separately.

This study covers the period of March 2020 - July 2020 in its analysis. For this reason, the data relating to COVID-19 cases that is used in the analysis reflects the number of both cases and patients combined.

During the pandemic period, businesses have stopped their activities, and production and consumption have been interrupted. There have been problems in the cash flow of governments, businesses, and households. Therefore, changes may occur in cash needs and risk perception of economic factors. This study aims to examine the impact of COVID-19 on Turkey in the context of liquidity and risk perception in Turkey. The bond market for liquidity, CDS, and stock market for risk perception are included in the analysis. CDS is insurance against credit risk. In addition, CDS is also used to measure country risk.. COVID-19 is an important risk factor for the economy. Therefore, CDS is useful to analyze the economic effects of COVID-19 (Andries, Ongena, and Sprincean, 2020: 4; Kartal, 2020: 493). Stock markets are one of the indicators that reflect investor risk perception. Some studies have revealed the relationship between country risk and stock markets (Fung et al., 2008; Perotti and Van Oijen, 2001). The effect of COVID 19 on the economy and the risk perception of investors can be examined in stock markets. In the literature, some studies have found a statistically significant relationship between COVID-19 and stock markets (Huo and Qiu, 2020; Liu et al. 2020). Bond yields are important data revealing the risk perception and liquidity of countries. Unvan (2020) used the bond yields variable to examine the economic effect of COVID-19 in Turkey.

Table 1

Descriptive Statistic (10 March- 31 July)

	CASE	BIST100	CDS	BONDY10	BONDY2
Mean	1,604.73	1,040.98	524.24	12.35	10.12
Median	1.186	1,021.58	516.44	12.11	9.74
Maximum	4.801	1,195.67	651.91	14.56	12.71
Minimum	0	842.46	407.70	11.33	7.01
Std. Dev.	1,204.79	104.92	65.09	816.24	1.30

Table 1 shows descriptive statistics for the dataset with 97 observations. In Turkey, the highest number of COVID-19 cases, recorded was 4.801. Between 10 March and 31 July, the CDS value was a maximum of 651,91. The highest 10-year and 2-year Turkish bond yields were 14,56 and 12,71 respectively. The lowest value of the BIST 100 index was 842,46.

Table 2

Descriptive Statistic (17 March- 31 July)

	DEATH	BIST100	CDS	BONDY10	BONDY2
Mean	41.17	1,045.47	528.81	12.39	10.06
Median	23.00	1,039.89	517.32	12.19	9.45
Maximum	126	1,195.67	651.91	14.56	12.71
Minimum	1	842.46	414.79	11.33	7.01
Std. Dev.	34.68	105.28	63.33	821.91	1.31

Table 2 shows descriptive statistics for a dataset with 92 observations. In Turkey, the highest number of COVID-19 deaths recorded was 126. There was no significant difference in other variables in Table 1.

Empirical Results

The stationarity of the data was analyzed using unit root tests. Table 3 and 4 show Augmented Dickey-Fuller (ADF) and Philips Peron (PP) unit root tests. For the optimal lag length, Schwarz Information Criteria was used.

Table 3

ADF and PP Unit Root Tests (COVID-19 Case Impact)

	ADF				PP			
	Level		First Difference		Level		First Difference	
	T stat.	P-value	T stat.	P-value	T stat.	P-value	T stat.	P-value
CASE	-1.72	0.41	-10.88	0.00	-1.72	0.41	-10.82	0.00
BIST100	-0.65	0.85	-10.67	0.00	-0.70	0.83	-10.63	0.00
CDS	-3.64	0.01	-12.86	0.00	-2.56	0.01	-12.86	0.00
BONDY10	-2.38	0.14	-10.47	0.00	-2.58	0.09	-10.44	0.00
BONDY2	-1.70	0.42	-12.09	0.00	-1.63	0.46	-11.93	0.00

According to Table 3 and 4, some variables had a unit root problem in the level. All variables were stationary in the first difference. Therefore, the Toda Yamamoto causality test was suitable for these variables.

Table 4

ADF and PP Unit Root Tests (COVID-19 Death Impact)

	ADF				PP			
	Level		First Difference		Level		First Difference	
	T stat.	P-value	T stat.	P-value	T stat.	P-value	T stat.	P-value
DEATH	-1.11	0.70	-7.18	0.00	-1.44	0.55	-7.37	0.00
BIST100	-1.53	0.51	-10.44	0.00	-1.59	0.48	-10.52	0.00
CDS	-2.64	0.08	-12.42	0.00	-3.34	0.01	-12.43	0.00
BONDY10	-2.17	0.21	-10.27	0.00	-2.31	0.17	-10.24	0.00
BONDY2	-1.68	0.43	-11.78	0.00	-1.61	0.47	-11.64	0.00

Tables 5 and 6 show that the VAR model was stable, the residuals were normally distributed and they did not demonstrate heteroscedasticity problems and serial correlation.

Table 5

VAR Model Normality, Heteroscedasticity, and Serial Correlations Tests Results (COVID-19 Case Impact)

	P-Value
LM Test For Serial Correlation	0.24
Normality	0.34
Test For Heteroscedasticity	0.10

Table 6

VAR Model Normality, Heteroscedasticity, and Serial Correlations Tests Results (COVID-19 Death Impact)

	P-Value
LM Test For Serial Correlation	0.17
Normality	0.31
Test For Heteroscedasticity	0.14

Table 7 and 8 show the Johansen co-integration test. The Johansen test consists of trace test and eigenvalues of transformations values.

Table 7

Johansen Co-integration test (COVID-19 Case Impact)

Based on the trace of the stochastic matrix			Based on the maximal Eigenvalue of the stochastic matrix		
Hypothesized no. of CE(s)	Statistic	5% Critical Value	Hypothesized no. of CE(s)	Statistic	5% Critical Value
None	82.89112	76.97277	None	35.55457	34.80587
At Most 1	49.33655	54.07904	At Most 1	29.78624	28.8808
At Most 2	21.55031	35.19275	At Most 2	10.20918	22.29962
At Most 3	11.34113	20.26184	At Most 3	7.984861	15.89210
At Most 4	3.356267	9.164546	At Most 4	3.356267	9.164546

Table 7 and 8 show that the variables had a co-integration relationship. According to the results, there was co-movement between the variables in the study. There was a co-integrating vector; thus, a long-term association was established between variables. In the case impact, a maximum of 1 long-term relationship was found according to the trace test and there were 2 long-term relationships according to the max test. Also, there was a maximum of 1 long-term relationship according to trace and max tests for death impact.

Table 8

Johansen Co-integration test (COVID-19 Death Impact)

Based on the trace of the stochastic matrix			Based on the maximal Eigenvalue of the stochastic matrix		
Hypothesized no. of CE(s)	Statistic	5% Critical Value	Hypothesized no. of CE(s)	Statistic	5% Critical Value
None	98.91058	76.97277	None	48.59392	34.80587
At Most 1	50.31666	54.07904	At Most 1	23.44138	28.58808
At Most 2	26.87528	35.19275	At Most 2	11.59998	22.29962
At Most 3	15.27530	20.26184	At Most 3	8.713215	15.89210
At Most 4	6.562085	9.164546	At Most 4	6.562085	9.164546

The Granger causality relationship between variables was analyzed with the Toda Yamamoto test. The optimal lag length was calculated with the Schwarz Information Criteria (SIC). 1 lag length was determined for both the case impact and the death impact models.

Table 9

Toda Yamamoto test (COVID-19 Case Impact)

Dependent Variable	Independent Variable				
	CASE	BIST100	CDS	BONDY10	BONDY2
CASE	-	0.003553 (0.9525)	0.037626 (0.8462)	1.449299 (0.2286)	1.015111 (0.3137)
BIST100	0.269999 (0.6033)	-	0.429721 (0.5121)	15.55289 (0.0001)	14.94355 (0.0001)
CDS	2.008696 (0.1564)	1.395268 (0.2375)	-	5.132735 (0.0235)	3.743853 (0.0480)
BONDY10	0.001196 (0.9724)	4.911979 (0.0267)	2.187512 (0.1391)	-	2.365290 (0.1241)
BONDY2	0.649572 (0.4203)	0.443731 (0.5053)	2.057437 (0.1515)	0.133398 (0.7149)	-

In Table 9, the causality relationship between the number of cases between 11 March and 31 July and financial indicators was examined. The number of cases does not affect any financial indicator variables. The BIST 100 and 10-year bond yields affected each other mutually. There was unidirectional causality from bond yields (both 2 and 10 years) to CDS. Likewise, there was unidirectional causality from 2-year bond yields to the BIST 100.

Table 10

Toda Yamamoto test (COVID-19 Death Impact)

Dep. Variable	Independent Variable				
	DEATH	BIST100	CDS	BONDY10	BONDY2
DEATH	-	1.764780 (0.1840)	2.891648 (0.0890)	0.078674 (0.7149)	4.335028 (0.0573)
BIST100	0.023680 (0.8777)	-	0.100700 (0.7510)	5.972094 (0.0145)	5.502051 (0.0190)
CDS	6.896844 (0.0086)	0.033513 (0.8547)	-	6.486684 (0.0109)	4.708490 (0.0300)
BONDY10	0.268708 (0.6042)	8.554247 (0.0034)	2.215009 (0.1367)	-	5.273460 (0.0217)
BONDY2	2.059819 (0.1512)	1.011040 (0.3147)	0.961555 (0.3268)	0.001959 (0.9647)	-

In Table 10, the causality relationship between the number of deaths between 17 March and 31 July and financial indicators was examined. There was a one-way causality from the number of deaths to CDS. The number of COVID-19 deaths affected CDS. A bidirectional causality relationship was found between BIST 100 and 10-year bond yields. 2-year bond yields affected 10-year bond yields. Similar to the case effect, there was unidirectional causality from bond yields (both 2 and 10 years) to CDS. There was a one-way causality from 2-year bond yields to BIST 100.

Conclusion

Humanity has experienced outbreaks of infectious disease throughout its history. The last such outbreak of infectious disease was COVID-19. The first official case of COVID-19, (a member of the coronavirus family), occurred in Wuhan, China in December 2019. Countries have been affected economically due to healthcare, social supports, and loss of production caused by COVID-19. Also, businesses have closed, unemployment has increased and consumption has decreased. As a result of panic and a decrease in investor confidence, there has been a sharp fall in stock markets. The effects of COVID-19 have been analyzed in the literature with variables such as credit, stock market, bond market, CDS, production, and unemployment.

In this paper, the effects of COVID-19 on the selected financial indicators in Turkey were examined. The causality relationship was analyzed using the Toda Yamamoto test. The empirical results show that 10-year bond yields and BIST 100 affected each other. Also, 10-year bond yields and 2-year bond yields affected CDS. There was a unidirectional Granger causality from the number of COVID-19 deaths to CDS.

The Toda Yamamoto causality test showed that the number of COVID-19 cases did not affect any financial indicators in Turkey. However, there was a unidirectional Granger causality

from the number of COVID-19 deaths to CDS. COVID-19 deaths affected CDS. The increase in the severity of the pandemic affected Turkey's country risk. Our findings show that bond yields had an effect on CDS. An increase in bond yields can be perceived as a country's liquidity problem. Moreover, increased debt can increase a country's risk perception. Therefore, an increase in bond yields may affect investor perception and country risk.

Considering these findings, policymakers should manage the pandemic process to reduce country risk. However, CDS is affected by more than one indicator. The pandemic and measures taken to fight it may also cause an increase in CDS. A lockdown decision may cause a decrease in economic growth. Therefore, rational policies should be established by striking a balance which takes management of a pandemic process and the economy into consideration.

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RESEARCH ARTICLE

The Impact of Countries' Credit Rating Scores on the Export Performance of Companies*

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Abstract

In the research, a conceptual model with the export performance scale EXPERF (Export Performance Scale) being the dependent variable and with country credit ratings being the independent variables has been developed, and it is intended to empirically investigate the impact of the country credit rating score on the export performance of enterprises by focusing on the country credit rating among many factors that affect the export performance of enterprises. Regarding the model, in the first stage, the relation between the country's credit rating covering the years between 1993-2016 and the export performance of the enterprises is examined using secondary data through panel unit root tests analysis. In this context, the H_1 hypothesis that the country credit rating score given by the credit rating agencies has an impact on the export performance of companies is supported, and it is found that the credit rating score of Turkey affects the export performance of businesses. In the field research covering the second stage of the research, ISO 500 enterprises constitute the universe in which the data is collected.

A questionnaire regarding the perceptions of business executives about the export performance of companies in 2013, when Turkey's credit rating score was raised up to investable level, and in 2016, when Turkey's credit rating score was lowered, was developed based on the EXPERF scale, and the export performance was measured with online or face-to-face application of the questionnaire to the business executives who participated in the study voluntarily. A judicial sampling method was used in the study, and 306 business executives responded to the questionnaire. The H_2 hypothesis that there is a difference between the change in the country credit rating and the export performance of the enterprises is not rejected according to the EXPERF scale, which measures the increase in the country credit rating in 2013 and the decrease in the country credit rating in 2016. Export performance of enterprises differs significantly in the periods when the credit rating of the country decreases and rises.

Keywords

Export Performance Scale, EXPERF, Country Credit Rating Score, Panel Data Analysis

Introduction

It is a known fact that businesses have to obtain and maintain competitive advantage in order to survive in local and global markets and to be among the leading businesses in the sector in which they operate. Likewise, the level of exports and export performance of businesses

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engaged in export, which has an effective role in foreign trade between countries, depends on their competitive advantage. Export-oriented businesses may want to realize export strategies that will benefit them in an intense competition environment while also considering the possible effects of credit rating scores given by credit rating agencies on export performance. However, the main question here is “Whether or not the country’s credit rating has a significant impact on the export performance of the enterprises, and if any, the direction (positive or negative) and severity of this effect occurs”. Tookey’s works in the 1960s underlie the research in the field of export performance. Tookey is the first researcher to identify performance-related factors in export activities in his studies (Kahveci, 2013: 54-55). In the literature, while the export performance of the businesses and the credit ratings of the countries are evaluated in different studies independently, the effect of the credit ratings given by the credit rating agencies on the export performance of the enterprises has not been examined. The lack of a study investigating the effect of the credit rating of a country on its export performance makes it essential to investigate this issue.

The credit rating of a country may also be considered among the factors that are thought to have an impact on the export performance of the businesses, and it can be evaluated among the uncontrollable factors. The credit rating scores that are given to Turkey by three major credit rating agencies, namely Standard & Poor’s, Moody’s, and Fitch, can be assessed in the factors affecting the performance of the export business, which is described as a key issue. Since the country credit rating affects different parameters in the country’s economy, it may also have an impact on the export performance of businesses. Factors affecting country credit ratings and export performance may not be completely independent from each other, and country credit rating may have an impact on the export performance of businesses as well. Therefore, the impact of country credit ratings given by credit rating agencies on export performance of the businesses is considered to be a research subject worth investigating. Credit rating scores that credit rating agencies give to businesses at the micro-level and to countries at the macro-level are among the factors affecting the export performance of businesses. The purpose of the research is to determine whether the credit rating score given to a country by the credit rating agencies has a statistically significant effect on the export performance of the companies in that country. The research also aims to find out the level and direction (positive/negative) of that effect, if any.

The study is considered significant as it focuses on the credit rating as a factor that affects the export performance of businesses, and it analyses the issue in a two-stage process. The results obtained in the research are also considered significant because they will bring recommendations to the practitioners in terms of shaping the marketing and export strategies of the companies according to the credit rating of the countries given by the international credit rating agencies. The study is thought to have important contributions not only to the literature, but also to practitioners. When the relevant literature is analysed, it is seen in many

of the empirical studies that the factors affecting the credit rating of countries given by the credit rating agencies and the factors affecting the export performance of the companies are studied separately and that the variables related to these factors are different from each other. Another important contribution of the study to the literature is that there is no study in which a country's credit rating is associated with the export performance of the companies. The investigation of the effect of the country's credit rating score on its export performance specific to Turkey is thought to contribute both to the literature and application. In the first stage, econometric panel data analysis and panel unit root tests were used, and in the second stage, an empirical study was carried out with the survey method.

Export Performance Measurement

In strategic management literature, the concept of performance is expressed with the sales of businesses and the changes in sales profit and market share. Accordingly, a proactive increase in sales, sales profit and market share is a measure of good performance for a business. From this perspective, export performance can be closely related to the satisfaction levels of the business owner, manager, employee and shareholders from export sales, export sales profits, the development of the market share in the foreign country and the positive change in the sales, profits, and foreign market shares (Gray et al., 2000: 151). Export performance is the level of achievement of both economic and strategic objectives of a business in order to export its product in the foreign market through the planning and implementation of its export marketing strategy. A business usually undertakes an export initiative that covers a number of objectives which can be economic (profits, sales, costs, etc.) and / or strategic (market growth, success in competition, adherence to the foreign market, increase in product / business awareness, etc.). The degree to which a business achieves its strategic and economic goals is the measure of its export performance. The most widely used measures of export performance are at economic and business levels such as export sales, export-based growth, and export profits. Export performance measures may consist of the measures (i) at the product-market export initiative level, (ii) combination of both economic and strategic dimensions, and (iii) both the subjective and objective measures (Cavusgil & Zou, 1994: 4-5).

In the literature, export performance is generally discussed within three aspects namely (i) financial, (ii) strategic, and (iii) performance satisfaction. In particular, a popular trend is to approach performance metrics and satisfaction together within a single export performance dimension. It is the approach described as a compound psychological variable (emotional state) that evaluates the effectiveness of a marketing program in terms of sales revenue, sales volume, profitability, market share, and overall performance (Lages & Montgomery, 2004: 1190). Rosson & Ford (1982) state that export marketing strategy affects export performance (Rosson & Ford, 1982: 70). According to the results of the research conducted by Cavusgil & Zou (1994), international competence and managerial commitment of a business are the key

determinants of its export performance. Marketing variables, the competency of the business, and management promises all have a direct impact on export performance. Export marketing strategy is affected by internal factors (business and product features) and external factors (industry and export market features) (Cavusgil & Zou, 1994: 1).

Export performance is also evaluated in terms of businesses' abilities to increase their sales in overseas markets, strengthen their competitive position, develop new products, increase product quality, reduce the time to provide products and services for customers, and increase their market shares (Rekarti et al., 2018: 110). Ibrahim & Ogunyemi (2012) handle the export performance of businesses in 3 dimensions: (i) financial performance (revenues, profit margins, return on investment, etc.), (ii) strategic or market performance (competitiveness, market share etc.), and (iii) achieving subjective goals of a business (the number of geographic markets served, strategies to penetrate export markets, etc.) (Ibrahim & Ogunyemi, 2012: 443). Cavusgil & Zou (1994) suggest that the most popular indicators of export performance are (i) marketing variables (ii) firm competence, and (iii) management commitment (Cavusgil & Zou, 1994).

When the related literature is reviewed, it is seen that there are very few agreements among researchers on how to define and measure success in exports. Researchers have mostly measured export success using quantitative or qualitative measures. The most popular quantitative export success measures are (i) growth of export sales, (ii) intensity of exports (the percentage of total sales exported), (iii) export market share, and (iv) combined measures using the combination of the first three variables. Researchers using the interactive approach to examine exporter/importer relationships also prefer the use of qualitative measurement such as perceived satisfaction from the relationship. None of the above-mentioned measurements are exempt from criticism. For example, export intensity may be affected by changes in the denominator (i.e., sales) and the numerator. It is often very difficult to measure the export market share, especially for small businesses. It is also suggested to use different methods according to business size. Qualitative measurements, though they provide more information about the relationship, have weaknesses as well due to the fact that real performance is related to measuring performance perceptions rather than itself (Das, 1994: 21-22).

Export performance is generally measured in three different ways which are associated with different conceptualizations of the structure. The most common form of conceptualizing export performance focuses on the financial results of exports. Export performance is usually measured by determinants such as export sales, export sales growth, export profits, and export intensity (export/sales ratio). Another important way to conceptualize export performance is based on the strategic outcome of exports. In this method, businesses usually have some strategic targets in exports, i.e., financial targets. This view advocates that achieving strategic goals such as increased competitiveness, increased market share or enhanced strategic po-

sition should be seen as an integral part of export performance. Another conceptualization of export performance supports the use of perceptual or attitudinal performance measures. The logic behind this conceptualization, taking up exports positively and / or being satisfied with export operations is a strong indicator of success in exports. In this approach, the export performance of a business is evaluated either directly through indicators such as perceived export success and satisfaction with the export initiative, or indirectly by measuring the changes in the attitudes of the business towards export tendency, attitude towards export, and overcoming the obstacles to export (Ural, 2009: 149).

In the study conducted by Beleska-Spasova (2014), it is stated that there are several internal (business-specific) and external (environment-specific) factors as the potential determinants of export outcomes in literature and that these factors may give positive, negative, neutral, or even contradictory results as to export performance. It is also asserted that export performance criteria are usually classified in two wide groups such as economic/financial criteria (sales-related and market-related) and noneconomic criteria (meeting expectations, export success, customer satisfaction, and business reputation) and that there exists objective (experimental) and subjective (perceptual) criteria.

Focusing on the relevant literature published between 1987 and 1997, Zou & Stan (1998) determined that there is no agreement on how export performance can be measured. They divided all measures of export performance into seven categories consisting of 33 variables representing that represent financial (sales, profit, growth measures), non-financial (perceived success, satisfaction, goal success), and composite scales. These categories are determined as internal (4 factors) and external (3 factors) determinants. External factors consist of (1) industry characteristics, (2) foreign market characteristics, and (3) internal market characteristics while the internal factors are comprised of (4) export marketing strategy (5) management attitudes and perceptions, (6) management characteristics, and (7) business characteristics and capabilities (Zou & Stan, 1998: 342-343). Chen et al. (2016) examined 124 articles published in 30 journals between 2006 and 2014 to evaluate the determinants of export performance and concluded that there was a low consensus in measuring export performance. Among the 124 studies reviewed, export performance is measured in 53 ways, with only 23 different measures used once or twice. Although several broad classifications such as the EXPERF Scale by Zou et al. (1998) have been developed in these studies, there is still no uniform conceptualization and operationalization of export performance. The economic criteria such as export profitability (51 studies), export sales growth (45 studies), export sales (38 studies), and export intensity (36 studies) are the most frequently used export performance criteria. While non-economic performance criteria are used less frequently, it has been determined in some studies that satisfaction with export performance (25 studies) and export target success (15 studies) are frequently used. Remarkably, among the revised articles, there are 41 studies that made use of only one indicator of export performance (Chen et al., 2016: 629).

Sousa et al. (2008) evaluated 52 articles published between 1998 and 2005 and discovered that there were 40 different determinants of export performance. 31 out of these 40 determinants are internal factors, and 9 of them are external factors. They have classified the internal factors under the title of export marketing strategy, business characteristics and management characteristics while external factors are classified within foreign and domestic market characteristics (Sousa et al., 2008: 353). The variables and measures of export performance obtained from this and other research carried out in the literature are given in Tables 1, 2, and 3.

Table 1

Internal Variables of Export Performance in the Literature

Name of the Variable	Authors						
	Aaby and Slater 1988	Madsen, 1989	Zou and Stan, 1998	Sousa et al. 2008	Grandi-netti and Mason 2012	Hasa-ballah et al. 2019	Gertner et al. 2007
Internal Factors							
<i>Export Marketing Strategy</i>	✓		✓	✓	✓		
Market Selection	✓						
Use of Intermediaries	✓						
Staffing	✓						✓
Product Strategy	✓	✓	✓	✓			
Price Strategy	✓	✓	✓	✓			
Promotion Strategy	✓	✓	✓	✓			
Distribution Strategy	✓	✓	✓	✓			
Internalisation of Marketing Functions		✓					
Adaptation of Marketing Policy		✓					
Propensity to Export	✓						
Export Sales	✓						
Export Problems	✓						
Exporters versus Non-Exporters	✓						
Level of Export	✓						
Perceptions towards Export	✓						
Export Growth Intensity	✓						
Barriers to Export	✓						
Proactivity / Reactivity				✓			
Market Research		✓	✓	✓			
Market Growth				✓			
Service Strategy				✓			
General Export Strategy				✓			
Innovation				✓			
Risk Taking				✓			
Export Planning	✓	✓	✓	✓			
Export Organization			✓		✓		✓
Export Policy	✓	✓					
Export Executive							✓

Name of the Variable	Authors						
	Aaby and Slater 1988	Madsen, 1989	Zou and Stan, 1998	Sousa et al. 2008	Grandi-netti and Mason 2012	Hasa-ballah et al. 2019	Gertner et al. 2007
Number of Export Markets							✓
Export Regularity							✓
Distribution Channel Relationship			✓	✓			
Control	✓	✓		✓			
Process				✓			
Cooperation Strategy				✓			
Capital Origin							✓
Company Features and Competencies	✓	✓		✓	✓		✓
Company Size	✓		✓	✓	✓		✓
International Experience		✓		✓	✓		✓
Market Versatility				✓			
Market Planning							
Export Exploration Analysis							
General Firm Resources		✓					
Top Management Support		✓					
Status of Internal Export Organization		✓					
Company Capability / Competence	✓		✓	✓			
Export/Market Knowledge	✓	✓					
Idle Capacity							✓
Number of Years Exporting							✓
Internationalization Degree				✓			
Internationalization Modes				✓			
Company Age			✓	✓	✓		
Sector / Product Type				✓			
Organization Culture				✓			
Ownership Structure				✓			
Production Management				✓			
Adaptation				✓		✓	
Loyalty				✓			
Trust				✓		✓	
Commitment	✓			✓		✓	
Cooperation				✓		✓	
Communication	✓			✓		✓	
Conflict				✓			
Company Performance				✓			
Company Technology	✓	✓	✓				
Quality	✓						
Profit Likelihood							
<i>Management Features/Attitudes and Perception</i>	✓		✓	✓			

Name of the Variable	Authors						
	Aaby and Slater 1988	Madsen, 1989	Zou and Stan, 1998	Sousa et al. 2008	Grandi-netti and Mason 2012	Hasa-ballah et al. 2019	Gertner et al. 2007
Export Commitment and Support			✓	✓			
Education			✓	✓			
International Experience			✓	✓			
International Orientation			✓				
Age				✓			
Innovation				✓			
Financial Incentives	✓						
Competition	✓						
Domestic Market Potential							
Market Potential	✓						
Risk	✓						
Profit	✓						
Service Government Incentives	✓						
Perceived Export Advantages			✓				
Perceived Export Motivation			✓				
Perceived Export Barriers			✓				

Table 2

External Variables of Export Performance in the Literature

Name of the Variable	Aaby and Slater, 1988	Madsen, 1989	Zou and Stan, 1998	Sousa et al. 2008	Gertner et al. 2007
<i>Environment</i>	✓				
<i>Foreign Market Features</i>		✓	✓	✓	✓
Export Market Attractiveness		✓	✓		
Domestic Market Attractiveness		✓	✓		
Legal and Political				✓	
Environmental Turbulence				✓	
Cultural Similarity				✓	
Market Competition			✓	✓	
Export Market Barriers		✓	✓		
Environmental Hostility				✓	
Economic Similarity				✓	
Channel Accessibility				✓	
Exploring the Consumer				✓	
Physical Proximity of Main Export Markets		✓			✓
Cultural Proximity		✓			✓
Market Diversity					✓
One Industrialized Market					✓
All Industrialized Markets					✓
<i>Industry Characteristics</i>			✓		

Name of the Variable	Aaby and Slater, 1988	Madsen, 1989	Zou and Stan, 1998	Sousa et al. 2008	Gertner et al. 2007
External Factors					
Industry's Technological Intensity			✓		
Industry's Level of Instability			✓		
Internal Market Features			✓	✓	
Export Support				✓	
Environmental Hostility				✓	

Table 3

Measures of Export Performance in the Literature

Measures of Export Performance	Authors				
	Zou and Stan, 1998	Katsikeas et al. 1996	Gertner et al. 2007	Madsen, 1989	Zou et al. 1998
<i>Financial Measures</i>	✓		✓		✓
Sales Measures	✓	✓	✓	✓	✓
Profit Measures	✓	✓		✓	✓
Growth Measures	✓		✓	✓	✓
Market Share	✓	✓			
Export Intensity			✓		
<i>Non-Financial Measures</i>	✓		✓		
Perceived Success	✓				
Satisfaction	✓				
Goal Achievement	✓				
Perceived Export Experience			✓		
Perceived Export Performance			✓		
Perceived Export Goals Accomplishment			✓		
<i>Composite Scales</i>	✓				
<i>Objective Firm Characteristics</i>		✓			
Size		✓			
Exporting Experience (Length, Scope)		✓			
<i>Export Related Perception Variables</i>		✓			
Export Stimuli		✓			
Exporting Problems		✓			
Competitive Advantages		✓			
<i>Export Commitment</i>		✓			
Separate Export Department		✓			
Foreign Market Entry and Customer Selection Criteria		✓			
Regular Export Market Visits		✓			
Export Planning and Control		✓			
<i>Strategic Measures</i>					✓
Global Competitiveness					✓

Measures of Export Performance	Authors				
	Zou and Stan, 1998	Katsikeas et al. 1996	Gertner et al. 2007	Madsen, 1989	Zou et al. 1998
Strategic Position					✓
Global Market Share					✓
<i>Satisfaction Measures</i>					✓
The Satisfactoriness of the Export Venture					✓
The Success of the Export Venture					✓
The Rate of Export Venture's Meeting the Expectations					✓

Zou et al. (1998) developed the EXPERF scale, which they applied in a sample of US (United States of America) and Japanese companies. They emphasized that the scale may not be suitable for use in different countries as the studies in the literature were conducted in one single country context and there was not an internationally consistent measurement scale. The EXPERF scale is comprised of 9 items each consisting of three sub-variables that measure the financial, strategic, and satisfaction dimensions of performance in the context of export initiative. Measures such as export profit, sales, and sales growth are indicators of a company's financial export performance. When a company exports, it is often driven by profit motive and growth opportunities. Making profits in the export market, ensuring sales growth, and selling in large quantities help the company achieve its financial goals. However, in addition to financial goals, a company often sets strategic goals for the export initiative. The contribution of the export initiative to the company's global competitiveness, global strategic position, and global market share shows how far the company has achieved its strategic goals. As achieving strategic goals will often make a company positively competitive in the global market, long-term benefits can increase in the form of financial rewards or the ability to prevent competitive attacks. In addition, the company's satisfaction with its export initiative is an important measure of export performance. Management is more likely to support and maintain the export initiative in the event of greater perceived success and greater satisfaction from an export initiative. Satisfaction can also strengthen management's attitudes towards export and increase the tendency of the company to expand its export operations (Zou et al., 1998: 52).

Country Credit Rating and Business Export Performance

Recent unpredictable socio-political events and economic developments that have triggered each other have affected countries at the macro level and businesses at the micro level. The development and growth of a country's economy are directly proportional to the export performance of the companies operating as well as the financial activities in that country. The credit rating of any company in a country corresponds to the credit rating of that country, and

the credit ratings of the companies operating in that country cannot be higher than the credit rating of the country.

Credit rating is a system that has been developing continuously since the 19th century and aims to improve the functioning of the markets by solving the problem of asymmetric information. The globalization of capital has played an important role in the development of credit ratings. Although there are many credit rating agencies operating throughout the world today, S&P, Moody's, and Fitch are the dominant ones in the global market. These institutions provide information to investors by measuring the risk levels of countries (Kılıçaslan & Giter, 2016: 61). Credit rating of all three organizations contains two main components, namely credit rating and appearance. The credit rating of an economy is used to indicate the long-term reliability and condition of the country's economy while the credit scoring is an assessment made on the basis of short-term macroeconomic movements for the same economy. For example, while the credit rating of a country is BBB-, the agency that has determined this rating declares its opinions about the economy of the country through periodically compiled reports and announces appearances such as static, positive, or negative consisting of the risks related to the short-term macroeconomic situation (Kargı, 2014: 358). "A credit rating is a formal, independent opinion of a borrower's ability to fulfil the debt obligations. It indicates an entity's ability to pay its financial obligations. This is also referred to as "*creditworthiness*". According to John Moody, who is the founder of Moody's, a credit rating indicates creditworthiness of a government by assessing two main aspects: "*capability to pay and willingness to pay*" (Bheenick, 2005 as cited in Pirdal, 2017:109).

Credit rating is defined as "*The determination of the risk that the investor takes in the event of investment in the instruments issued by the borrower in order to provide an objective measure in line with the criteria in the international capital markets in terms of the possibility of repayment of the loans to be granted on time and in full*" (Karagöl & Mihçioğur, 2012 as cited in Kargı, 2014: 356). Credit rating or credit scoring systems are important tools to estimate the borrower's creditworthiness and show the borrower's future status. The distinctive power of a credit rating or credit scoring system refers to its ability to distinguish two or more debtor classes (Coolen-Maturi & Coolen, 2018: 1). There are a growing number of empirical studies examining the effects of credit rating changes on capital structure decisions. Credit rating agencies have access to different information such as the business plan of the companies, capital expenditures, and the intended dividend policy not offered to the investors. In addition, bank regulations, insurance companies and broker bond investments are the main factors that determine a company's rating in the bond market. Credit ratings can help to identify financial threats and can be used to identify investment and financial policies not only at the business level, but also at the country level (Sajjad & Zakaria, 2018: 2).

Some economists have predicted the determinants of credit ratings in both advanced and emerging markets with econometric analysis. In these studies, a small number of variables explains 90 percent of the variation in the ratings (Cantor & Packer, 1995, 1996; Haque et

al., 1996, 1997; Reisen & Von Maltzan 1999; Juttner & McCarthy, 2000; and Bhatia, 2002 as cited in Elkhoury, 2008:6).

- ✓ GDP per capita,
- ✓ GDP growth,
- ✓ Inflation,
- ✓ The ratio of non-gold foreign exchange reserves to imports,
- ✓ The ratio of the current account balance to GDP,
- ✓ Default history and the level of economic development.

Rating agencies must clearly state their evaluation criteria. To this end, S&P (Standard & Poor's) Ratings direct explains that country credit rating depends on both the willingness and capacity to pay, and that the main factors affecting the rating process are as follows (Dang & Partington, 2020: 3):

- ✓ Corporate and managerial effectiveness and security risks reflected in the corporate and managerial effectiveness score.
- ✓ Economic structure and growth forecasts stated in the economic score.
- ✓ External liquidity and international investment position stated in the foreign relations score.
- ✓ Financial performance, flexibility and debt burden stated in the financial score.
- ✓ Monetary flexibility specified in the monetary score.

The symbols used by credit rating agencies that give credit ratings to countries and businesses are similar in content. Each letter or symbol created by any rating agency about a country and a business represents about the same meaning as that of other agencies. Country credit ratings enable assessment of the probability of default in government debt. Credit rating agencies state that they consider many economic and political factors and make qualitative and quantitative evaluations while rating the country's credit rating. A change in sovereign credit rating score can reveal new information about a country and affect its investments in holding private equities (Lee, Supriza & Wu, 2016: 99). Especially the declarations on the decrease in the credit rating cause an increase in the outflow of foreign liquidity from the country. The lowering of the credit rating score causes international banks to refuse to approve export credit guarantees provided to businesses by the national banks operating in these countries, which negatively affects the country's international trade and exports (Badinger & Url, 2013: 1117).

A summary of the general rating system used by credit rating agencies and the credit rating system of the three major credit rating agencies (S&P, Moody's, and Fitch) grading system together with their symbols and meanings are shown in Table 4.

Table 4
Grading System Used by Credit Rating Agencies

S&P	Fitch	Moody's	Rating Description	Level	Risk Weight
AAA	AAA	Aaa	Highest Credit Rating	<i>Investable Level</i>	0%
AA+	AA+	Aa1	High Credit Rate		
AA	AA	Aa2			
AA-	AA-	Aa3			
A+	A+	A1	Good Credit Rating	20%	
A	A	A2			
A-	A-	A3			
BBB+	BBB+	Baa1	Sub-Medium Level	50%	
BBB	BBB	Baa2			
BBB-	BBB-	Baa3			
BB+	BB+	Ba1	Disinvestable	<i>Speculative Level</i>	100%
BB	BB	Ba2			
BB-	BB-	Ba3			
B+	B+	B1			
B	B	B2	Significantly Speculative		
B-	B-	B3			
CCC+	CCC	Caa1			Highly Risky
CCC	CCC	Caa2			
CCC-	CCC-	Caa3			
CC	C	Ca	Too Speculative	<i>Too Speculative Level</i>	
C		C			
	DDD		Does not fulfil its obligation	<i>Bankruptcy Level</i>	200%
D	DD	D			
	D				

Source: <https://www.moodys.com> , <http://www.standardandpoors.com> , <https://www.fitchratings.com>:12.04. 2018.

Haque et al. (1997) defined a country's credit rating as being frequently affected by its regional location and the types of goods it exports. Although international financial market conditions are rarely mentioned as the factors influencing a country's credit rating, it was found that an increase in international interest rates would adversely affect all develo-

ping country ratings, regardless of quality of domestic economic fundamentals (Haque et al., 1997: 13). The most important domestic economic variables influencing the credit ratings of a country were found to be non-gold foreign exchange reserves to imports ratio, the current account balance to GDP, the country's growth rate, and its inflation rate. In terms of elasticities, the largest values were often associated with non-gold foreign exchange ratio reserves to imports. In addition, the effect of inflation on credit ratings was found to be non-linear, with high-inflation countries penalized more than countries with low or moderate inflation. Moreover, a country's credit rating has often been affected by its regional location and the structure of its export such as whether it is a primarily exporter of fuel or manufactured products (Haque et al., 1996: 718).

Although there are many studies in the literature on export performance and credit rating issues, there is no study evaluating the possible effects of both subjects together. It is expected that investigating the effect of the country's credit rating on export performance will contribute to this gap.

Methodology

The study specifically deals with the effects of the credit rating scores given to Turkey by credit rating agencies on the export performance of businesses operating in the country. To achieve the aim of this study, the direction and the level of the relationship between the credit ratings assigned by the credit rating agencies to Turkey between 1993 and 2016 and the export performance of the companies in the country is explained through econometric panel data analysis. Then, a conceptual model is developed, and the validity of this model is tested through analysis using field research data. The conceptual model has also enabled the verification of the relationship validity between the ratings given by credit rating agencies and export performance.

Literature review shows that the findings of the studies on the issue reveal different results. In the study, the effect of the credit ratings given by credit rating agencies on export figures of ISO 500 companies¹ between 1993 and 2016 is explained through panel data analysis. Executives of ISO 500 businesses are asked, either in person or via e-mail, to fill in a questionnaire in order to analyse the effect of the country credit rating on the export performance of the companies both during the period that started with the upgrade of the credit rating of Turkey to investable level in 2013 and after the period that started with the lowering of the rating in 2016, which is considered significant as it enables the analysis of the issue in a two-stage process.

1 Turkey's Top 500 Industrial Enterprises.

Conceptual Model and Research Hypothesis

In order to investigate the problem statement of the research and to achieve the research objectives, a conceptual model related to the field research, which is the second part of the research, has been developed, and the data obtained from the survey method have been analysed using appropriate statistical analysis methods. Three main dimensions and nine sub-dimensions in the EXPERF (Export Performance Scale) developed by Zou et al. (1998:47) are used as the export performance indicators of the companies while developing the model of the research. The research model is presented in Figure 1. The secondary data obtained from the first stage of the research regarding the relationship between the export performance of ISO 500 companies and the credit rating of Turkey between 1993 and 2016 are analysed through root panel data test² and supported by the results of the field research.

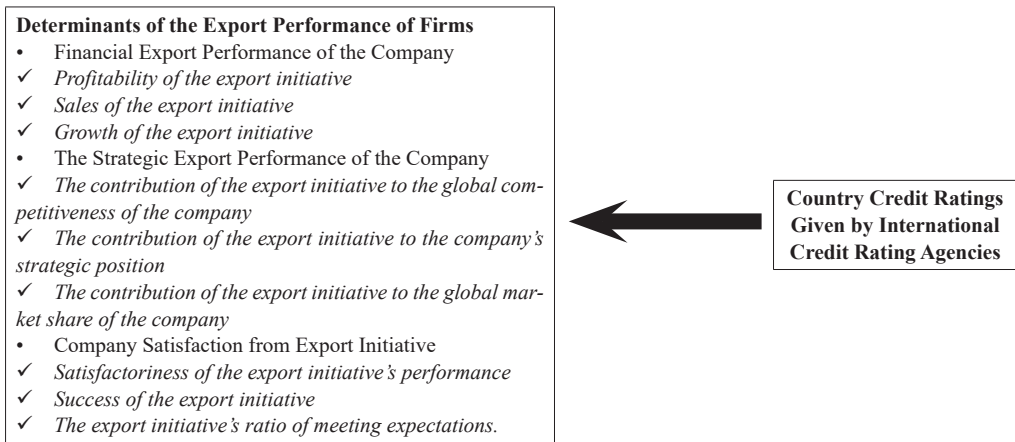


Figure 1. The Conceptual Model of the Research

2 Within the scope of the resulting variables, whether there is a significant relationship between the annual export figures of ISO 500 companies and the credit rating scores that the credit rating agencies give to Turkey is investigated through panel limit test (Autoregressive Distributed Lag-ARDL). First generation panel unit root tests can be applied in the absence of correlation between cross section units, and they consist of two groups, namely, homogeneous, and heterogeneous tests. Homogeneous tests are Levin, Lin, and Chu (LLC) (2002), Breitung (2000), and Hadri (2000) tests while heterogeneous ones are Maddala and Wu (1999), Choi (2001) & Im, Pesaran & Shin (2003) tests (as cited in Baltagi, 1995: 6-7). According to the unit root result, ARDL analysis is preferred if the variables are not stable at the same level. Accordingly, as the variables are not stationary at the same level, ARDL analysis method is used in this study. In addition, no other study in which the ARDL analysis is used as a method to examine the effect of credit rating agencies on the export performance of the companies exists in the literature. However, the ARDL limit test approach can test the existence of a cointegration relationship between series with different degrees of stability. Therefore, the relationship between the annual export figures of top ISO 500 companies in Turkey from 1993 to 2016 and the credit rating scores of Turkey in the same period have been tested using ARDL limit test approach.

In the research model, there are three dependent variables, nine factors under these variables, and an independent variable which is assumed to have an impact on these factors. The first variable in the conceptual model is seen as the determinants of companies' export performance in EXPERF scale. These determinants are dependent variables determined as EXPERF scale consisting of the factors 'the financial export performance of the company', 'the strategic export performance of the company' and 'the company satisfaction from export initiative'. The company's financial export performance is composed of three sub-dimensions, which are represented by the profitability of the export initiative, sales of the export initiative, and growth of the export initiative. The strategic export performance dimensions of the company are accepted as the contribution of the export initiative to the global competitiveness of the company, the contribution of the export initiative to the company's strategic position, and the contribution of the export initiative to the global market share of the company. Finally, the satisfaction of the enterprise from the export initiative is comprised of three sub-dimensions, namely satisfactoriness of the export initiative's performance, success of the export initiative, and the export initiative's ratio of meeting expectations. (Zou, Taylor & Osland, 1998: 47). The independent variable of the research is the country credit ratings given by international credit rating agencies. Based on this conceptual model and the objectives of the research, research hypotheses are assumed to be H_1 in relation to secondary data and H_2 in relation to primary data:

H1: The credit rating of the country given by the credit rating agencies has a statistically significant impact on the export performance of the companies.

H2: There is a significant difference between the change in country credit ratings and export performance of the companies.

In the first stage of the research, panel data analysis is performed using the export figures of ISO 500 companies between 1993 and 2015 and the data obtained from websites regarding the credit ratings of Turkey given by S&P, Moody's, and Fitch during the same period (<http://www.iso500.org.tr> : 12.10.2017). After that, the relationship between the credit ratings of Turkey from 1993 to 2016 and the export performance of the ISO 500 companies in the same period are examined with panel border test (Autoregressive Distributed Lag-ARDL) and panel unit root to determine the stability of the variables. In the second stage of the research, a standardized questionnaire form is used as the data collection tool. The questionnaire is applied to the executives of ISO 500 companies selected through intentional (judicial) sampling method either via e-mail or face-to-face. The credit rating scores of Turkey between 1993 and 2016 are presented in Table 5.

Table 5

Improvement in Turkey's Credit Ratings between the Years 1993-2016

Date	S&P	Moody's	Fitch
1993	BBB (negative)	Baa1	-
1994	B+ (stable)	Ba3	B
1995	B+ (stable)	Ba3	BB-
1996	B (stable)	Ba3	B+
1997	B (stable)	B1	B+
1998	B (positive)	B1	B+
1999	B (positive)	B1 (positive)	B+
2000	B+ (stable)	B1 (positive)	BB-
2001	B- (stable)	B1 (negative)	B (negative)
2002	B- (stable)	B1 (negative)	B (stable)
2003	B+ (stable)	B1 (stable)	B (positive)
2004	BB- (stable)	B1 (stable)	B + (positive)
2005	BB- (stable)	Ba3 (stable)	BB – (positive)
2006	BB- (stable)	Ba3 (stable)	BB – (positive)
2007	BB- (stable)	Ba3 (stable)	BB – (stable)
2008	BB- (negative)	Ba3 (stable)	BB – (stable)
2009	BB- (stable)	Ba3 (positive)	BB+ (stable)
2010	BB (positive)	Ba2 (positive)	BB+ (stable)
2011	BB (positive)	Ba2 (positive)	BB+ (stable)
2012	BB+ (stable)	Ba1 (positive)	BBB- (stable)
2013	BB+ (stable)	Baa3 (stable)	BBB- (stable)
2014	BB + (negative)	Baa3 (negative)	BBB- (stable)
2015	BB + (negative)	Baa3 (negative)	BBB- (stable)
2016	BB (stable)	Ba1 (stable)	BBB- (negative)

Source: <https://www.fitchratings.com/gws/en/sector/overview/sovereigns>: 14.04.2018, <https://www.moody.com/credit-ratings/> Turkey-Governmentof-credit-rating-768337 : 14.04.2018, t- https://www.standardandpoors.com/en_US/web/guest/home: 21.07.2017.

Data Set in the Models Used in the Research

For this research, data on the annual export figures of top ISO 500 companies in Turkey from 1993 to 2016 and the credit rating scores of Turkey in the same period were collected annually. The time series of the variables used in the research have been obtained from the ISO 500 (<http://www.iso500.org.tr> :12.10.2017) website and the official websites of S&P, Moody's, and Fitch rating agencies. For the years in which no export figures of the companies were available, those figures were found through time-series analysis by calculating the arithmetic means of the figures in the previous and next years. A time series analysis enables us to understand the trend of change over a particular period of time (Velicer & Fava, p.2, 2003). In the context of this study, the trend of change refers to the change in the export figures of companies.

The data for the periods of several consecutive years when the export figures of some companies were not available were obtained by dividing the foreign sales (export sales) of

those companies in those years (export figure) by the general average exchange rate of the same periods. The explanation of all the variables used in the models is summarized in Table 6.

Table 6

Variables Used in the Effect of Country Credit Rating on the Export of ISO 500 Firms

Variables Used in the Analysis	Names Used in the Models	The Definition of the Variables
LNE	Export Performance (Export Sales)	ISO 500 Companies
SP	S&P	Standard & Poor's
M	M	Moody's
F	F	Fitch
1994D*	1994D*	The 1994 Economic Crisis in Turkey
2001D*	2001D*	The 2001 Economic Crisis in Turkey
2013D*	2013D*	The Year 2013 When Credit Rating Agencies Upgraded the County's Credit Rating to Investable Level for the First Time

* Dummy variables

** The table are included their symbols of the variables used in this research.

In Table 6, in which the LLC unit root results are presented, LNE shows the export performance of ISO 500 companies while SP, M, and F refer to the credit rating agencies. While the variables LNE, SP, and M are stationary on the level, that is, I (0), the dummy variables F, 1994D, 2001D, and 2013D are stationary in their first differences, i.e. I (1). In addition, the data related to these models are discussed in the Findings section.

Panel Unit Root Test Results

E-views 9.5 beta econometric program was used for panel unit root test and limit test necessary for the analysis of the data. The findings as to the first hypothesis of the research; “The credit rating of the country given by the rating agencies has an impact on the export performance of the enterprises”, was analysed by panel data analysis, and the data about the hypothesis are given in Table 7.

Table 7

LLC Unit Root Test Results as to the Effect of Country Credit Rating on ISO 500 Firms Exports

VARIABLES	LEVEL VALUE		1st GAP	
	LLC VALUES	PROBABILITY VALUES	LLC VALUES	PROBABILITY VALUES
LNE	8.33374	0.0000		
SP	82.1748	0.0000		
M	30.9567	0.0000		
F	61.7843	1.0000	192.372	0.0000

VARIABLES	LEVEL VALUE		1 st GAP	
	LLC VALUES	PROBABILITY VALUES	LLC VALUES	PROBABILITY VALUES
1994D*	16.8706	1.0000	80.4721	0.0000
2001D*	11.6795	1.0000	100.547	0.0000
2013D*	15.4763	1.0000	111.038	0.0000

** Dummy variables.

** The table are included results and their symbols of the variables used in this research.

According to the unit root results, the variables are not stable at the same level. Therefore, ARDL test, which is one of the cointegration tests, was used to determine the long-term relationship. Four different models were decided to determine the different effects of other variables on the dependent variable, the LNE being dependent variable. Accordingly, Model 1 is as follows.

Model 1:

Dependent Variable: LNE

Independent Variable: F, M, SP

$$D(\text{LNE}) = -0,1699F - 0,6989M + 1,7364SP$$

When the S&P credit rating agency made a 1-unit increase in Turkey's credit rating between the years 1993 and 2016, the exports of ISO 500 companies as dependent variable went up by 1.7364%. However, the exports of ISO 500 companies as dependent variable decreased by 0.6989% when the Moody's credit rating agency made a 1-unit increase in Turkey's credit rating in the same period. Similarly, the exports of ISO 500 companies as dependent variable decreased by 0,1699% when the Fitch credit rating agency made a 1-unit increase in Turkey's credit rating in the same period. As a result of the test which was conducted to investigate the effect of Turkey's credit rating scores in the years 1994 and 2001, which were the times of great domestic economic crisis, and in 2013, when Turkey gained the investable rating for the first time, on the exports of the dependent variable ISO 500 companies, the following results were obtained.

Model 2:

Dependent Variable: LNE

Independent Variable: F, M, SP, 1994D

$$D(\text{LNE}) = -0,3085F - 1,0785M + 2,3729SP - 2,05891994D$$

The data covers the years between 1993-2015, and 1994 is the dummy variable. When the period after the economic crisis in 1994 is examined, it is seen that a 1-unit increase that S&P credit rating agency made in Turkey's credit rating resulted in 2,373% increase in the exports

of companies as dependent variables. On the other hand, the exports of companies decreased by 1,0785% when Moody's credit rating agency made the same amount of increase in Turkey's credit rating in the same period. The 1-unit increase in Turkey's credit rating made by Fitch during the same period also caused a decline in the exports of ISO 500 companies by 0.3085%. In parallel to the period after the economic crisis in Turkey in 1994, the exports of ISO companies decreased by 2.0589% as there was a 1-unit increase in the index values of Fitch, Moody's, and S&P international credit rating agencies.

Model 3:

Dependent Variable: LNE

Independent Variable: F, M, SP, 2001D

$$D(LNE) = 0,1118F + 0,1164M + 0,068SP + 0,19542001D$$

When the period after the economic crisis in 2001 is examined, it is seen that a 1-unit increase that S&P credit rating agency made in Turkey's credit rating resulted in 0,068% increase in the exports of companies as dependent variables. Similarly, a 0,1164%-increase is observed in the exports ISO 500 companies following the 1-unit increase in Turkey's credit rating score made by Moody's credit rating agency in the same period. Likewise, a 1-unit increase in Turkey's credit rating score by Fitch also resulted in an increase by 0,1118% in the export rates of ISO 500 companies during the same period. In parallel to the period after the economic crisis in Turkey in 2001, a 1-unit increase in the index values of Fitch, Moody's, and S&P international credit rating agencies resulted in an increase by 0,1954% in the exports of ISO companies.

Model 4:

Dependent Variable: LNE

Independent Variable: F, M, SP, 2013D

$$D(LNE) = -0,3693F + 1,4286M - 0.4736SP + 0.74782013D$$

When the period between 2013, in which Turkey was given the investable credit rating score for the first time, and 2016, in which Turkey's credit rating was lowered, is examined, it is seen that a 1-unit increase made in Turkey's credit rating by S&P credit rating agency led to 0,4736% increase in the exports of companies as dependent variables. During the same period, the exports of ISO 500 companies as dependent variables went up by 1,4286% following a 1-unit increase in Turkey's credit rating score made by Moody's credit rating agency that made the same amount of increase in Turkey's credit rating in the same period. However, the 1-unit increase in Turkey's credit rating made by Fitch during the same period caused a decline in the exports of ISO 500 companies by 0.3693%. In parallel to the investable credit

rating score given to Turkey in 2013, an increase of 0,7478% in the exports of ISO companies was observed as there was a 1-unit increase in the index values of Fitch, Moody's, and S&P international credit rating agencies.

Especially when the periods after economic crisis in Turkey are evaluated, it is seen that a 1-unit increase the international credit rating agencies made in Turkey's credit rating score resulted in a decrease in the exports of ISO 500 companies in the post-1994 economic crisis, which is the result of Model-2, while it led to an increase in the exports of ISO 500 companies in the post-2001 economic crisis and post-2013 period, which were the results of Model-2 and Model-3.

Table 8

Model Results as to the Effect of the Country Credit Rating on the Export of ISO 500 Firms

MODELS	S&P	MOODY'S	FITCH	1994D, 2001D, 2013D
Model1 (1993-2016)	Increase	Decrease	Decrease	-
Model2 (After 1994)	Increase	Decrease	Decrease	Decrease
Model3 (After 2001)	Increase	Increase	Increase	Increase
Model4 (After 2013)	Decrease	Increase	Decrease	Increase

According to Table 8, when only S&P made a one-unit increase in Turkey's credit rating score except for the period after 2013, the exports of the ISO 500 companies went up from 1993 to 2016, which is Model 1, during the period after 1994, which is Model 2, and in the whole period following 2001, which is Model 3. The exports of ISO 500 enterprises increased. Taking this finding into consideration, it is understood that H1 hypothesis is not rejected. As a result, it is understood that the credit rating scores of countries given by the credit rating agencies have a significant effect on the export performance of companies.

Field Research

The most important goal in testing the data collection method, the data collection tool, the selection of the sample and the analysis techniques, and the research hypotheses is to support the panel data analysis results with the results of the field research.

Data Collection Method

The data in the first hypothesis of the research is obtained through the information published on the official website of the Istanbul Chamber of Industry (<http://www.iso500.org.tr>:12.10.2017), the information obtained from the official websites of the researched companies, and the credit rating scores of Turkey given by the credit rating agencies, namely S&P, Moody's, and Fitch, between 1993 and 2016.

Survey method is used in the second hypothesis developed to support the results obtained from the panel data analysis with primary data. The dependency relationship between the data obtained from the EXPERF scale and the export performance of the companies during

the period in which the country's credit rating was increased (2013) and decreased (2016) is examined. The questionnaire method involves the recording of questions asked verbally or in writing to the respondents by the interviewer or the respondent in person. Data is collected with the EXPERF scale by surveyors or the researcher via e-mail or face-to-face through the questionnaire by making appointments in advance with the factory managers, marketing, foreign trade and export managers or their assistants between 1 February 2018 and 1 August 2018.

Development of the Data Collection Tool

EXPERF scale is used in the questionnaire items prepared for this study. The EXPERF scale used in companies' export performance measurement is given in Table 9 (Zou et al., 1998: 45-46).

Table 9

The Variables of the Companies' Export Performance (EXPERF)

Dimensions	Export Performance (EXPERF) Variables
Financial Export Performance	(Per1) Profitability of the Export Venture
	(Per2) Sales of the Export Venture
	(Per3) Growth of the Export Venture
Strategic Export Performance	(Per4) Contribution of the Export Venture to the Global Competitiveness of the Company Competitiveness
	(Per5) The Contribution of the Export Venture to the Company's Strategic Position
	(Per6) The Contribution of the Export Venture to the Company's Global Market Share
Degree of Satisfaction from the Venture	(Per7) The Satisfaction of the Export Venture
	(Per8) The Success of the Export Venture
	(Per9) The Rate of Export Venture's Meeting the Expectations

Source: Zou, Taylor & Osland, (1998: 45-46).

The statements uttered by the managers of the ISO 500 companies, which are the main variables of the research, about the country credit ratings and companies' export performance were constructed with 5-Likert rating. The questionnaire was developed on the basis of the relevant literature. A pre-test was conducted to eliminate potential problems in the content of the questions so that the respondents could comprehend them clearly and correctly. The participants in the pre-test were academicians in the field and foreign trade and export managers of ISO 500-certified export trading companies which operated in Niğde. At this stage, the questionnaire was finalized by taking into consideration the recommendations and criticisms from academicians in practice and business marketing, foreign trade, and export managers in practice.

The Population and the Sampling

The population of the research is comprised of ISO 500 companies. In the research, in which the deliberate (judicial) sampling method was applied, 312 company managers res-

ponded the questionnaire. The minimum sample number was calculated using the sample formula whose main mass number is known (Balçı, 2006: 95):

$$n = \frac{\frac{t^2 (PQ)}{d^2}}{1 + \frac{1}{N} \cdot \frac{t^2 (PQ)}{d^2}}$$

$$n = \frac{\frac{1,96^2 (.25)}{0,05^2}}{1 + \frac{1}{500} \cdot \frac{1,96^2 (.25)}{0,05^2}} = 217$$

If a sample is to represent the whole population, it is important for the response rate to be as high as possible, and a response rate over about 70% is generally acceptable (Johnson & Christensen, 2014: 219). Since 306 out of 312 questionnaires were filled in completely, the remaining six questionnaires were excluded from the study.

Findings

The information about the different features of the ISO 500 companies published on the official website of the Istanbul Chamber of Industry (<http://www.iso500.org.tr> : 12.10.2017), data obtained from the official websites of the companies examined and the introductory business information obtained after the analysis of the questions aimed at determining the different characteristics of the companies or factories are presented in Table 10.

As can be seen in Table 10, 71.9% of the enterprises or factories that respond to the questionnaire forms have 251 and above employees. 21.9% and 6.2% of them have between 51-250 and less than 50 employees, respectively. This may be because ISO 500 companies can be determined not only by the number of employees but also by criteria such as turnover size.

Table 10
Introductory Information on Companies Participating in the Research

Company Characteristics		n	Number of Companies	%
Number of Employees	Less than 50 (Small)	306	19	6.2
	Between 51 and 250 (Medium-sized)		67	21.9
	251 and over (Big)		220	71.9
Year of Activity	1-10 years	306	31	10.1
	11-20 years		43	14.1
	21-30 years		81	26.5
	31 and over		151	49.3

Company Characteristics	n	Number of Companies	%
Food and Beverage		47	15.4
Textile		46	15.0
Automotive		34	11.1
Iron Steel		29	9.5
Mining-Metal		19	6.2
Chemistry-Petroleum		17	5.6
Construction and Construction Materials		17	5.6
Business Sector			
Agriculture-Fertilizer	306	16	5.2
Cement		16	5.2
White Goods - Electronic- Electrical Household Appliances		16	5.2
Furniture		15	4.9
Energy		11	3.6
Plastic		11	3.6
Packaging		7	2.3
Health-Pharmaceutical		5	1.6
Number of Importing Countries			
Between 1 and 25		111	36.3
Between 26 and 50		81	26.5
Between 51 and 100	306	91	29.7
Between 101 and 150		19	6.2
151 and over		4	1.3

When the activity years of the enterprises are analysed, it can be seen that almost half of the enterprises (49.3%) participating in the research are 31 years old and over. As 90% of the companies participating in the research have been operating in a period of more than 10 years, the managers of those companies are thought to have market experience and, as a result, to be competent in their responses to the research topic. As for the distribution of the companies participating in the research by sectors, it is seen that approximately 15%, 15%, and 11% of them have been operating in food and beverage sectors, textile sector and automotive sector, respectively. The percentage weight of enterprises operating in other sectors is below 10. It is seen that the number of companies that export goods to more than 101 countries is really low (7.5%).

The Determination of Test Statistics

In this research, five-point Likert rating was used to scale the variables. In line with the purpose and design of the research, the hypotheses were analysed through descriptive analysis, Exploratory Factor Analysis (EFA) and related sample tests. For the related sample tests, the distribution of the data between 2013 and 2016 was examined, and whether the data showed normal distribution was analysed with Kolmogorov-Smirnov and Shapiro-Wilk tests. As a result of the Kolmogorov-Smirnov (2013 and 2016 $p < 0.05$) and Shapiro-Wilk (2013 and 2016 $p < 0.05$) tests, it was concluded that the data did not show normal distribution. As a

result, the Wilcoxon Signed Ranks Test was conducted for the difference between 2013 data and 2016 data. SPSS 23 package program was used in descriptive statistics of the research and in the execution of statistical methods related to the difference of the data.

Analysis and Findings

In this section, the findings obtained by analysing the data collected from the field with statistical methods are presented in order to reach more detailed information and to test the research hypotheses.

The Validity and Reliability of the Data Collection Tool

Content validity of the research has been tested in several steps. Firstly, the related literature has been thoroughly reviewed, and great care has been taken to use scales that have already been validated. EXPERF scale is a scale developed and tested for validity and reliability by Zou et al. (1998). In order to eliminate the translation errors that may occur during the translation of the EXPERF scale into Turkish, the questions were evaluated by academicians who are language experts. The results of the factor analysis (Principal Component) and reliability analysis are given in Table 11.

Table 11

Exploratory Factor Analysis Results of the EXPERF Scale between 2013 and 2016

Item No	Analysis as to the 2013 Data			Analysis as to the 2016 Data		
	Factor Covariance	Factor-1 Loading	Cronbach Alpha	Factor Covariance	Factor-1 Loading	Cronbach Alpha
Per1	.582	.848		.811	.931	
Per2	.559	.840		.831	.929	
Per3	.700	.837		.823	.928	
Per4	.683	.826		.862	.924	
Per5	.663	.817	.935	.849	.921	.977
Per6	.667	.814		.862	.915	
Per7	.660	.813		.854	.911	
Per8	.719	.763		.838	.907	
Per9	.706	.748		.866	.900	

Table 11 shows the factor analysis results of the EXPERF scale and alpha coefficients. As a result of the factor analysis performed on the EXPERF scale, there are no items that are not included in any factor or whose factor loading values are under .40. Although the EXPERF scale is referred to in three dimensions (financial export performance dimension, strategic export performance dimension, and the size of satisfaction with the export initiative) in the literature, the results of the factor analysis conducted for this sampling show that the scale has

a single-factor structure in both 2013 and 2016 data. According to 2013 data, 65.99% of the total variance related to the scale is explained in the single-factor structure while, according to 2016 data, the single-factor structure of the scale explains 84.39% of the total variance. The reliability of the scale was tested through Cronbach Alpha, and the Cronbach Alpha coefficients for 2013 data and 2016 data were found as ,935 and ,977 respectively, which reveals that the scale is highly reliable.

Descriptive Statistics Concerning the Research

Descriptive statistics regarding export performance variables are given in Table 12. When the descriptive statistics about the variables are examined in Table 12, it is seen that the arithmetic averages for 2013 are higher than those of 2016. ISO 500 business managers have perceived the 2013 export performance more positively, when the country's credit rating was increased, compared to 2016 export performance, when the country's credit rating was lowered.

Table 12

Descriptive Statistics: EXPERF Scale

Items	n	2013 Data		2016 Data	
			s		s
Per1		3.74	.749	3.08	1.055
Per2		3.80	.711	3.09	1.105
Per3		3.83	.730	3.09	1.131
Per4		3.65	.837	2.99	1.091
Per5	306	3.76	.822	3.01	1.128
Per6		3.71	.840	3.02	1.106
Per7		3.73	.843	2.93	1.149
Per8		3.75	.863	2.92	1.193
Per9		3.76	.869	2.97	1.275
Total		3.74	.807	3.01	1.137

Field Research Hypothesis Test Results

The findings regarding the second hypothesis of the research, which claims that there is a significant difference between the change in the country credit rating and the export performance of the enterprises, are given in Table 13.

Table 13

Wilcoxon Signed Ranks Test for the Difference between the Change in the Country Credit Rating and Export Performance of Companies

	n	Means of the Orders	Sum of Orders	Wilcoxon	
				z	p
2016 - 2013	Negative Order	219 ^a	150.01	-10.358 ^b	.000
	Positive Order	57 ^b	94.26		
	Equal	30 ^c	32853.00		
	Total	306	5373.00		

a. 2016 < 2013

b. 2016 > 2013

c. 2016 = 2013

According to the figures in Table 13, export performance of enterprises differs significantly between the increase in the country credit rating in 2013 and the decrease in the country credit rating in 2016 ($z=10,358$; $p<0.05$). When the export performance of the companies in 2013 and 2016 is analysed in order to examine the source of the difference (the means of order in 2013 is 150.01; the means of order in 2016 is 94.26), the difference is seen to be in favour of 2013. The arithmetic means obtained from the scale (year 2013 =3,75; year 2016 =3,01) also show similar findings. According to this finding, increasing the credit rating of the country also increases the export performance. This finding collected from the field supports the findings obtained by panel data analysis. According to this finding, the H_2 hypothesis was not rejected. There exists a significant difference between the change of the country credit rating and the export performance of the enterprises.

Results

The statements of the international credit rating agencies about countries and the credit ratings they give to the countries not only trigger the investment in those countries by large funds, foreign investors, or capital owners, but also have an impact on export performance of the companies in those countries. In the first stage of the investigation of the effects of the credit ratings of the international credit rating agencies on the business performance, the annual export figures of ISO 500 companies that perform almost half of the annual exports of the country between the years 1993 and 2016 and credit rating scores that Turkey was given by credit rating agencies during the same period are analysed through panel root test analysis. In the second stage, the results of the panel data analysis were supported by the data collected from the field using the questionnaire which was developed using the EXPERF scale and applied to the managers of ISO 500 companies who were determined by the intentional sampling method.

According to the Panel Root Test Results

✓ It is found that when only the S&P credit rating agency increased the country's credit rating by one unit between 1993 and 2013, this was accompanied by a positive effect, resulting in an increase in the exports of the dependent-variable ISO 500 firms. On the other hand, a one-unit increase in the credit rating scores given by Moody's and Fitch credit rating agencies in different years within the same period of time led to a decrease in the exports of ISO 500 firms. The differences between the effects of the credit ratings given by different credit rating agencies may result from the conjunctural changes in different years.

✓ It is determined that when the S&P and Fitch credit rating agencies increased the country's credit rating by one unit between 2013 and 2016, the exports of the dependent variable ISO 500 firms went down while a one-unit increase in the credit rating scores given by Moody's credit rating agency caused an increase in the exports of ISO 500 firms.

✓ In parallel with the investable level score given to Turkey in 2013, a one unit increase in the index value of the Fitch, Moody's, and S&P credit rating agencies also raised the exports of ISO 500 companies by 0.7478%.

✓ When only the S&P credit rating agency increased the country's credit rating by one unit after the 1994 economic crisis, an increase in the exports of the dependent variable ISO 500 firms was observed. On the other hand, the one-unit increase made by Moody's and Fitch credit rating agencies in the credit rating score of Turkey in the same period caused a decrease in the exports of the dependent variable ISO 500 firms. In parallel with the period after the 1994 economic crisis in Turkey, a one unit increase in the index values of the Fitch, Moody's, and S&P credit rating agencies accompanied with a decline in the exports of ISO 500 companies. The differences between the effects of the credit ratings given by different credit rating agencies may result from the conjunctural changes in different years.

✓ In the period after the 2001 economic crisis experienced in Turkey, the credit rating scores determined by all three credit rating agencies (Fitch, Moody's, and S&P) had a positive effect on the exports of ISO 500 firms.

When the results obtained in 2001 and those between 1993 and 2016 are analysed, it is seen that the results appear to be compatible with S&P, but not with Moody's and Fitch. Increasing the credit rating of the country affects the export performance of the enterprises, and the H_1 hypothesis is supported. The direction of this effect may be downwards or upwards, which shows that credit rating agencies have a decisive role in the export performance of businesses.

It is supported by the findings that country credit ratings given by credit rating agencies are among the factors which affect the export performance of companies positively or ne-

gatively, are out of the controllable inner factors and are among the uncontrollable external factors in the export performance of companies. In order to be successful in their export performance, businesses must constantly follow the credit rating scores of their countries given by the credit rating agencies whose decisions they cannot control. From this point of view, business managers, who we assume are rational, should add the credit rating of the country that credit rating agencies give to the factors that affect the export performance of their companies. Failure by business executives to take the country credit rating given by credit rating agencies into account may result in lower business export performance or less profit.

According to the results of the analysis by which the opinions of the ISO 500 business managers were investigated with the EXPERF scale regarding how the business export performance was affected in 2013, the year when the credit rating score of the country was at investable level, and in 2016, when the country's credit rating was lowered, the export performance of the companies differs significantly. According to this finding, the H₂ hypothesis is supported. In order to examine the source of the difference, the export performance of the firms in 2013 and 2016 was analysed, and it was determined that the difference resulted from the fact that the difference was higher in 2013, when the country's credit rating was increased.

Recommendations to Business Executives or Policy Implication

Business executives should closely follow the country credit rating scores given by the credit rating agencies in directing their export performance, especially in times of crisis when the rating agencies make aggressive decisions. In such cases, they can also consider the country's credit rating score when they make the right decision in their preferences for growth and downsizing while establishing their export strategies considering the fact that their export performance will also go down during the periods rating agencies decrease the country's credit rating score. According to the results of the field research, the increase in the credit rating of the country means an increase in the export performance of companies. Also, a decline in the credit rating of the country will negatively affect the export performance of the enterprises. Business executives should take this into account in their strategic decisions during these periods, and companies should be able to manage their export performance and export strategies according to the credit rating score of their country. The country credit rating scores given by credit rating agencies act as an economic signal for businesses. Therefore, businesses will be able to make effective decisions, especially if they follow these credit rating scores to protect themselves or turn the crisis into an opportunity specifically in times of global crisis.

In this context, it may be recommended that the marketing management or export departments of ISO 500 companies that focus on export activities should establish a separate department that can perform detailed data analysis on the export performance on sector basis, or they should offer support from the financial department or other relevant departments.

Recommendations for Further Studies

In the research, the impact of the country credit rating given by credit rating agencies on the export performance of the enterprises has been tested, and the impact of the export performance of the enterprises on the country credit rating given by the credit rating agencies may be investigated in the future. There are many publications related to export performance of businesses. Therefore, it can be asserted that conducting a meta-analysis study related to the studies conducted in this context may be effective in reaching a more detailed result. In the research model developed for this research, the country's credit rating variable given by credit rating agencies was emphasized in addition to the variables that affect the export performance of companies. A more complex model with a higher number of structures can be developed by adding other variables to this model that are thought to have an impact on performance and the effects of other variables that have an intermediary effect between the country credit rating score and business export performance. In this study, the relation between countries' credit rating scores and the business export performance has been tested, and the impact of a country's credit rating score on the performance of importing enterprises can be investigated in future studies. Finally, as with all empirical studies, repeating the same research in a future period may also be important in supporting the existing results or monitoring a different result.

Limitations of the Study

The research is limited to:

- ✓ 306 business executives selected by intentional (judicial) sampling from ISO 500 companies in 2016,
- ✓ Data on annual export figures of the ISO 500 companies between 1993 and 2016,
- ✓ Credit rating scores Turkey was given by the S&P, Moody's, Fitch ratings agencies between the years 1993-2016.

Peer-review: Externally peer-reviewed.

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RESEARCH ARTICLE

Engaging with Social Media Influencers on Youtube: A Cluster Analysis

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Abstract

Social media platforms have created a new industry where both influencers and consumers are empowered. Consumers do not only consume but also contribute to the content they face on social media. Through their narratives and content, they may even become social media influencers who have the power to shape the attitudes and behavior of fellow consumers. An important social medium, YouTube, allows people to engage with social media influencers by liking, commenting, sharing, etc. However, engagement practices are not similarly shared among every YouTube user, and people have different reaction styles. Thus, measuring success in creating engaging content becomes a controversial issue for brand endorsement. This research aims to uncover consumer typologies in terms of engagement behavior with social media influencers on YouTube. The influential motives of engagement for each typology are also analyzed in order to describe the groups. For this purpose, 341 participants from Amazon's Mechanical Turk (MTurk) platform participated in an online survey, and a two-step cluster analysis was conducted with eleven common social media engagement practices with influencers. The results implied a three-cluster solution, and the clusters were profiled according to several social media engagement motivations. The groups were named as 'positively active followers,' 'passive followers,' and 'analytical followers.' Implications for brand endorsement and content marketing strategies are discussed.

Keywords

Social Media, Social Media Influencers, Influencer Marketing, Consumer Engagement, Social Media Engagement, Uses and Gratifications Theory

Introduction

The social media environment has created its own dynamics by changing the relationship between firms and consumers as well as among consumers themselves. One of these changes pertains to the development of influencers, who can be described as social media celebrities, whose influence and followers are limited but whose content and personal narratives have the power to shape the attitudes of others (Wiedmann & von Mettenheim, 2020; Hearn & Schoenhoff, 2016). Since they have influential power upon other people's opinions, social media influencers have become natural mediums to promote or transfer messages about brands and sought-after brand endorsers in social media, for which they are rewarded economically by

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brands (Childers et al., 2019; Raun, 2018; Hearn & Schoenhoff, 2016). Research shows that 72 % of Generation Z and Millennials follow at least one influencer on social media, and YouTube influencers are as popular as major celebrities for Generation Z. 50% of Millennials also trust the influencers they follow on product and brand recommendations (Morning Consult, 2019). The influencer marketing industry was set to grow to approximately \$9.7B in 2020, and the average earned media value per \$1 spent has increased to \$5.78 in years (Influencer Marketing Hub, 2020). Thus, advertisers and marketers believe in the effectiveness of influencer marketing and wish to collaborate with these newly empowered influencers to introduce their brands and communicate with their target audiences. Therefore, brand managers need to assess the requirements of a successful endorser in their brand endorsement decisions (Wiedmann & von Mettenheim, 2020; Arora et al., 2019; Valsesia et al., 2020; Hearn & Schoenhoff, 2016). Selecting the “right” influencer is recognized by practitioners as the biggest challenge in working with influencers online (Simpson 2016).

What drives the success of an influencer is mostly focused on his/her engagement score, such as likes, comments, shares, and retweets (Arora et al., 2019; Wiedmann & von Mettenheim, 2020). The engagement statistics are an important criterion to show the popularity of an influencer on social media (Van Der Heide and Lim, 2016; Valsesia et al., 2020) and his/her ability to obtain reactions from followers (Arora et al., 2019; Freberg et al., 2011). Through engagement, an influencer can connect the endorsed brands to consumers (Childers et al., 2019; De Vries et al., 2012) and influence the attitudes and purchase intentions of followers towards the endorsed brand (Jiménez-Castillo and Sánchez-Fernández, 2019). Against this backdrop, it is important for brand managers to understand the nature of engagement and what motives drive this engagement. In line with this need, the aim of this research is: (1) to develop consumer typologies with regard to how consumers behaviorally engage and interact with influencers on social media (YouTube in this particular case) and (2) to explore which motivations are influential for engaging with YouTubers for different typologies of consumers. The results of this research are believed to add to the influencer marketing literature by understanding different levels of engagement with influencers and offering the consequent consumer typologies. The study also aims to contribute to the practice by suggesting content marketing strategies. Knowing what motivates different consumer groups will help influencers design and deliver the right content to their followers and increase chances of engagement and, hence, brand endorsement offers.

YouTube is an important medium for social media influencers to build up their brands, collaborate with and promote branded products on their channels, and influence consumers in the buying decision process (O’Connor, 2016; Holland, 2016). Research has shown that influencers who are present on YouTube have become popular among firms because their content often seems more realistic or organic than traditional advertising and they have a strong influence on others (Rasmussen, 2018). Further, YouTube, as a platform that converges traditional

entertainment choices of television, music, and film (Shao, 2009), provides opportunities for social interaction by allowing its users to seek and provide information through commenting as well, which makes the platform interesting for engagement research. Therefore, the context of this research is limited to consumer engagement with social media influencers on YouTube. Other social media channels were excluded from the research since means of engagement and consumer motivations are known to change from one channel to another.

Engagement Concept and Consumer Classifications Based on Engagement on Social Media

The engagement concept has drawn a lot of attention among marketers and practitioners because it is associated with positive consumer behavior and brand performance (Brodie et al., 2011; Bowden, 2009; Hollebeek et al., 2014) and is positioned as a pivotal concept of 21st Century marketing (Kumar and Pansari, 2016). One of the commonly accepted definitions of the concept is that it is a “psychological state that occurs by virtue of interactive, co-creative experiences with a focal agent/object in a focal service relationship” (Brodie et al., 2011, p. 262). The extant research treats engagement either as a multidimensional or a behavioral construct. The multidimensional definitions consist of three sub-dimensions of engagement: (1) cognitive engagement- a consumer’s level of brand-related thought processing and elaboration, (2) emotional or affective engagement- a consumer’s level of positive brand-related affect, and (3) behavioral/conative engagement- a consumer’s level of energy, effort, and time spent on using a brand (Brodie et al., 2011; Hollebeek et al., 2014). Behavioral definitions, on the other hand, consider engagement primarily as specific customer activity types or patterns (Van Doorn et al., 2010; Pham and Avnet, 2009).

Engagement consists of both online and offline activities. The focus of this study is on engagement with influencers over YouTube; therefore, it is digital engagement on social media. The literature provides many examples of digital engagement practices, including reading and writing customer reviews; liking, following, sharing, commenting, creating consumer-generated videos or advertisements; and playing advergames, to name a few (Eigenraam et al., 2018). However, digital engagement practices vary from one medium to another and from one classification to another. Therefore, one must study engagement in the context of each medium separately. Khan (2017), for example, posited that consumer engagement with YouTube is expressed through activities such as liking, disliking, commenting, sharing, and uploading videos. His approach in measuring engagement is behavioral.

Engagement practices have been used to classify consumers based on their level of engagement (Li and Bernoff, 2008; Shao, 2009; Muntinga et al., 2011). A behavioral approach is followed in these studies. Li and Bernoff (2008) distinguished six types of social media users based on their engagement level as inactives, spectators, joiners, collectors, critics, and

creators. Inactives are not active on social media at all. Spectators lightly participate in social media and mostly consume content delivered there. Joiners, on the other hand, participate a little more by maintaining their profile and uploading pictures. Collectors, on the other hand, collect and categorize content and leave it for others to enjoy. Critics love to rate products and write reviews and respond to posts and videos. Finally, creators make videos, blog, and write reviews for others to consume. Shao (2009) categorized different types of engagement activities consumers conduct online. He made a distinction between content consumption and participation. Content consumption is defined in terms of situations in which users watch videos, read comments, and view likes/dislikes but choose not to respond. Participation, instead, involves user-to-user and user-to-content interaction (commenting, sharing, liking, and disliking) in addition to watching videos. Finally, similar to Shao (2009), Muntinga et al. (2011) created a typology based on brand-related social media use and identified three different levels from passive to active as (1) consuming- viewing, listening, following, watching, reading, downloading, etc., (2) contributing- rating, joining a brand community, engaging in conversation, commenting, etc., and (3) creating- publishing, uploading videos, writing articles, etc.

Consumer Motivations for Engagement in Social Media

In the context of media use, motivations can be understood as the incentives that drive people's selection and use of media and media content (Rubin, 2002). They also influence media effectiveness, consumer attitudes and purchase intention towards brands and advertisements (Rodgers, 2002; Ko et al. 2005). Hence, extant literature has recognized the importance of consumer motivations in many studies. Uses and gratifications (U&G) theory (Katz et al., 1973) is a widely used framework that helps understand why and for what purposes people use media. The theory has been widely applied in social media studies to understand consumer motivations to engage in social media. Some of these motivations were found to be specific to the kind of social media, even to some of their particular features of those media such as music applications on Facebook (Krause et al., 2014). However, common themes could be recognized among the numerous studies on motivations, uses, and gratifications satisfied by engaging with social media. These themes include social interaction (socializing with people), information seeking (self-educating), exploration (exploring new, relevant topics), passing the time (staving off boredom), entertainment (pleasure, fun), relaxation (relieving stress, escaping from reality), escape (getting away from daily routine, work, etc.), self-status seeking (portraying a self-image to get acceptance of others), companionship (sweeping away loneliness), relational (facilitating interpersonal expression, gossip), convenience utility (accessible anytime, anywhere), and incentives (rewards, sweepstakes, presents etc.) (Smock, 2011; Sundar 2013; Whiting and Williams, 2013; Gao and Feng, 2016; Krause et al., 2014; Dolan et al., 2015; Haridakis and Hanson, 2009; Khan, 2017).

Studies on YouTube, on the other hand, include Haridakis and Hanson (2009)'s and Khan (2017)'s studies. The results of Haridakis and Hanson (2009) revealed that while people watched videos to seek information and for entertainment, they shared them as a means of interpersonal expression (to express themselves and have a voice in the information marketplace). A study by Khan (2017) demonstrated that seeking and providing information was related to all participatory acts on YouTube, including liking, disliking, and commenting, as well as sharing and uploading videos.

Methodology

An online survey was carried out to collect data in this study. The survey included engagement items, motivation items, and demographic questions. A behavioral approach was preferred to define engagement with influencers and classify consumers. Thus, engagement with influencers on social media was defined as “consumer’s manifestations, interactions, and co-creative experiences with influencers on social media” on YouTube in this study. Engagement was measured with eleven YouTube activities rated on a seven-point Likert scale. Engagement motives were measured with a total of 62 items representing 12 distinct constructs (Appendix 1), aiming to uncover consumer motivations to engage with social media influencers on YouTube. The motivational items were to reflect YouTube’s dynamics. Lastly, demographic information, including age, gender, and marital status, were collected.

The sampling frame was determined as individuals who follow at least one social media influencer on YouTube. Following one social media influencer served as a filter for ensuring the representativeness of the sample of interest and making the respondents eligible to answer engagement-related questions. The respondents were recruited from Amazon’s Mechanical Turk (MTurk) platform, on which participants opt-in to research studies in return for nominal compensation. Since accessing the questionnaire required MTurk access, respondents were among those who were already registered to the platform, making the sampling method a non-probability sampling. However, several benefits of utilizing MTurk made the platform suitable for the research. Firstly, participants’ anonymity and confidentiality could be ensured. Further, the platform provides an affordable way to reach participants outside the university community and student samples. The access to non-student samples along with student samples enhances representativeness. Another hallmark of the MTurk platform is that the recruitment pool closely reflects the diversity of the US population since respondents are dispersed across a wide geographical area. Though, as a drawback, the MTurk participants were found to be younger and more educated and have more familiarity with online questionnaires on average (Landers and Behrend, 2015; Smith et al., 2015). However, reaching younger generations did not conflict with the research’s purpose. Half of the respondents were aged between 25 and 35. After omitting outliers and missing data (due to filter question), 341 of

the participants were deemed appropriate for further analysis. Men accounted for 58% of the participants and 54% of the respondents were single.

In order to develop consumer typologies based on engagement and interaction behaviors, a two-step cluster analysis, using hierarchical and non-hierarchical methods, was conducted. Row-centering standardization was applied to the data in order to remove response style effects (Hair et.al.,2010). That is, each engagement activity was standardized to the respondent's average score so that individual response patterns were controlled, and the data can truly reflect the differences in activities conducted on YouTube rather than a differential style that occurs when people face a spectrum of responses. Eleven engagement activities (presented in Table 1) were used to form the clusters.

The first step in the process was to determine the number of clusters within the sample by using the hierarchical clustering method. For this purpose, Squared Euclidean Distance was selected as a proximity measure, and Ward's method of clustering was used to establish clusters. The high heterogeneity increase observed in the agglomeration schedule suggested a three-cluster solution over the alternatives. As a second step, non-hierarchical clustering was applied. K-means clustering algorithm was used in SPSS.22, and each respondent was assigned to one of the three clusters determined by the algorithm. Finally, the clusters were profiled according to twelve engagement motives (entertainment, exploration, information seeking, self-status seeking, social interaction, passing the time, escape, relaxation, convenience, companionship, relational and incentives) that were mentioned in the social media engagement literature.

Results

The clusters were named as 1) 'positively active followers' (those who avoid engaging in negative activities), 2) 'passive followers' (those who watch videos and subscribe to the channels but don't engage in any other activities), and 3) 'analytical followers' (those who read comments, check likes/dislikes). The number of cases in each cluster was 167 (49% of the sample), 61 (18% of the sample), and 113 (33% of the sample), respectively. The final cluster centers with row-centering standardization are presented in Table 1.

Table 1
Cluster Centers

		Positively Active Followers (1 st cluster)	Passive Followers (2 nd cluster)	Analytical Followers (3 rd cluster)
ACT1	I watch videos on Youtube.	1,20	2,02	1,22
ACT2	I click on the like button after watching videos on Youtube.	1,15	,89	1,01

		Positively Active Followers (1 st cluster)	Passive Followers (2 nd cluster)	Analytical Followers (3 rd cluster)
ACT3	I click on the dislike button after watching videos on Youtube.	,69	,58	,78
ACT4	I check the number of likes.	1,03	,66	1,34
ACT5	I check the number of dislikes.	,76	,55	1,26
		Positively Active Followers (1 st cluster)	Passive Followers (2 nd cluster)	Analytical Followers (3 rd cluster)
ACT6	I read the comments below Youtube videos.	1,12	1,16	1,14
ACT7	I comment on Youtube videos.	1,00	,54	,56
ACT8	I share Youtube videos.	1,09	,85	,78
ACT9	I subscribe to the channels of the YouTubers I like.	1,04	1,60	1,06
ACT10	I unsubscribe when I dislike a Youtuber.	,83	1,29	1,06
ACT11	I follow YouTubers from other social media platforms, as well (e.g., Instagram, Facebook, Twitter, Snapchat)	1,09	,87	,79

Table 2 demonstrates the ANOVA statistics of the clusters, indicating differences among clusters based on activities performed. It is seen that the clusters significantly differ from each other with an exception for the 6th activity ‘reading comments below YouTube videos.’ The groups resemble each other in terms of participating in this activity. Despite its lack of differential effect, the item was not removed since it is a theoretically appropriate and reasonable activity to be considered in engagement studies.

Table 2
ANOVA Results

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
ACT1	16,674	2	,197	338	84,627	,000
ACT2	1,728	2	,132	338	13,101	,000
ACT3	,854	2	,121	338	7,069	,001
ACT4	9,402	2	,113	338	83,411	,000
ACT5	12,492	2	,102	338	121,962	,000
ACT6	,031	2	,165	338	,184	,832
ACT7	8,438	2	,074	338	114,296	,000
ACT8	3,526	2	,138	338	25,583	,000
ACT9	7,526	2	,151	338	49,796	,000
ACT10	5,015	2	,183	338	27,420	,000
ACT11	3,347	2	,145	338	23,018	,000

Further, cluster stability was assessed by sorting the data in different ways and comparing the cluster memberships (Hair et.al., 2010). The cross-tabulation of two different K-Means groupings indicated that 79% of the cases remained in the same clusters.

As a final step, the clusters were profiled according to twelve engagement motives which were categorized as entertainment, exploration, information seeking, self-status seeking, social interaction, passing the time, escape, relaxation, convenience, companionship, relational, and incentives. The CFA of these motivational constructs suggested the significance of parameter estimates. Besides, all of the standardized loading estimates were over 0.5, showing that the items were strongly related to their associated factors. Convergent validity was assessed by evaluating the factor loadings, average variance extracted (AVE), and composite reliability values. All the factor loadings were significant, and the standardized loading estimates were over 0.5. The AVE values of the constructs were over 0.5, and all the composite reliability values were over 0.7, indicating the presence of convergent validity. The square roots of the AVE of the constructs were greater than the correlation values of the other constructs, assessing the discriminant validity (Fornell and Larcker, 1981). Both the maximum shared squared variance (MSV) values were lower than the average variance extracted (AVE) values, which also points out the existence of discriminant validity. Detailed cluster profiles are presented in Table 3.

Table 3
Cluster Profiles

	Entertainment	Relaxation	Escape	Passing the time	Companionship	Information Seeking	Exploration	Social Interaction	Incentives	Self-status seeking	Convenience	Relational
Positively Active Followers	5,68	5,53	4,71	4,03	4,53	5,26	5,36	4,94	4,05	3,79	5,32	4,90
Passive Followers	5,24	5,39	4,02	3,57	2,55	4,01	4,22	2,58	1,48	1,52	4,73	2,41
Analytical Followers	5,35	5,22	4,37	3,67	3,06	4,59	4,75	3,17	1,93	2,00	4,91	3,02
<i>Mean</i>	5,49	5,40	4,47	3,83	3,69	4,82	4,95	3,93	2,89	2,79	5,08	3,83

It is seen that the highest means are observed in more hedonic motives such as entertainment (M=5,49), relaxation (M=5,40), convenience (M=5,08), and exploration (M=4,95). These motives score high in each cluster. On the other hand, self-status seeking (M=2,79) and incentives (M=2,89) appear to be the least motivating factors in engaging with Youtubers.

Positively active followers have higher scores in every motive compared to other groups. They are also motivated by incentives (M=4,05), unlike the other groups. The most important motive for this group is entertainment. They do not dislike YouTube videos and do not check the dislike figures. Further, they are less prone to unsubscribing a YouTube channel, but they comment and share more than the other groups.

Passive followers are driven by relaxation and entertainment. They care less about companionship, social interaction, and the relational benefits of engagement. Their video watching and

subscription scores are higher. Nevertheless, they are also the ones who unsubscribe the most when they don't like a Youtuber. However, they do not contribute by disliking or commenting.

Analytical followers have similar motives compared to passive followers, yet they score slightly higher in every motive. They are influenced by entertainment and relaxation but also seek information and exploration.

Discussion

The results of this study show that consumers can be classified into three groups based on their level of engagement with influencers. One of these groups, the positively active followers, is actively engaging with the influencers. They follow influencers on different platforms and like, comment on, or share the posts created by influencers. As Shao (2009) put in his study, this group acts participatory and contributes to the engagement score of the influencers with their activities. They are also similar to contributors, described in Muntinga et al. (2011)'s study. The positively active group is the group that is highly responsible for the engagement scores influencers receive. Therefore, their motivations are important to acknowledge and work upon. The other two groups, the passive followers and analytical followers, on the other hand, are content consumers with slight differences between them. Shao (2009) and Muntinga et al. (2011) also mentioned in their studies about the content-consuming individuals who are reading, analyzing, and viewing but not reacting much. The major difference between the passive followers and analytical followers in this study is that analytical followers check the like and dislike figures of the influencers more than the other group.

When the motivating factors in different groups are investigated, it is seen that entertainment, relaxation, and convenience of the medium are commonly motivating all the followers. Exploration and information-seeking are also strong motivators for all the groups. When we compare the results of this study to previous studies on identifying motivations to use different types of social media (e.g.; Haridakis, 2009; Leung, 2009; Logan, 2017), it is seen that they correspond to each other; entertainment, exploration, and information-seeking are evident as strong motivators to engage with influencers in all types of social media.

When the motivations are investigated for each group, it is seen that the positively active group is also motivated by social interaction among followers and relational and companionship provided by the influencers. Thus, this group is highly socially motivated when compared with the other two groups. Social motives of relational bond-building with friends and relatives, decreasing of loneliness, and socialization over the medium are actively affecting engagement with influencers. This is not surprising since the interaction and engagement with influencers include socialization even if it is over the medium and sometimes one-sided from the followers. The literature has recognized the importance of such interaction as parasocial

interaction, an individual's '*illusion of a face-to-face relationship with a media personality*' (Horton & Wohl, 1956, p. 188), and it has been a growing topic of interest in influencer marketing research (e.g.; Daniel Jr. et al., 2018; Rasmussen, 2018; Yuan and Lou, 2020). The involvement of the followers with the personal narratives of influencers may lead them to build parasocial relationships that would ease their loneliness. The narratives may also produce cognitive and emotional responses and create topics of discussion to be shared with the followers' social circle of friends and relatives as well as other followers on YouTube, and help with social interaction over the medium and bond-building in personal circles (Brechman & Purvis, 2015). Therefore, the strategies built around personal narratives and story-telling need to be carefully designed. The positively active group is also the only group that is influenced by remuneration or incentives. Remuneration and incentives are frequently used tools on social media; they tend to draw interest on brands if used honestly and openly disclose the promotion-related purpose (Abendroth and Heyman, 2013). They are also known to create high acceptance and interaction with the influencers (Silva et al., 2019). Finally, the positively active group is motivated by a self-status-seeking drive. In other words, they follow social media influencers to increase their status in life, to impress others, and to appear cool. Self-status seeking was also identified as a factor to join online groups (Park et al., 2009) and consume YouTube videos (Khan, 2017). In a similar sense, people may have felt peer-pressured to follow social media influencers, who are the new cool activity to do on social media.

Implications for Theory and Practice

The results of the study have implications for theory and practice. First, the results of this study extended the research on social media engagement practices and U&G theory with a cluster analysis approach. The previous studies focused on explaining the motivations for social media engagement with U&G theory by treating the study samples as a homogenous group with similar customer engagement characteristics (e.g.; Haridakis and Hanson, 2009; Khan, 2017; Sundar 2013). The approach in this study, on the other hand, recognizes that distinct customer engagement subgroups potentially exist within the sample and different U&G may apply for each subgroup. Thus, this research compares and contrasts the U&G for different types of followers. Identification of the U&G for the subgroups showed that social motivations are more evident in the group with the highest engagement when compared to the other groups. This was not surprising given that engagement with social media influencers is essentially an engagement with an individual rather than engagement with a medium; therefore, it is understandable that social motives are more influential in this case. Furthermore, the results of the study extended the scope of studies on social media engagement and U&G by incorporating engagement with social media influencers on YouTube, which was not previously studied as far as the authors acknowledge.

The results of the study also posit implications for practice. Engagement is an important metric for marketers to select the right social media influencer for brand endorsement. The results of this study may provide clues to social media influencers to apply the right content marketing strategies and ensure the likelihood of brand endorsement. The results show that for any type of group, the content of the influencer should provide a nice balance of information and entertainment, and his/her attitude to followers should be towards relaxing them from daily stress. The motivating factors of positively active followers, who score high on engagement behavior, on the other hand, show that they are socially encouraged; thus, in order to procure more engagement, situations and contents to socialize should be fomented. For example, personal narratives to relate with, interactive questions and answers may draw on social interaction. Uniqueness in ideas, behavior, or speech that is entertaining and thought-provoking may also work well to differentiate the influencer and secure word-of-mouth popularity among the social circles of followers. Furthermore, remuneration motives such as drawings and sweepstakes may also attract followers and create engagement activities. Sweepstakes and drawings may induce excitement and immediate response to influencers' posts (Silva et al., 2019). Indirectly, remuneration may also encourage social interaction in the personal circles of the followers through word-of-mouth. Furthermore, brand managers may create entertaining and informative brand narratives and content and apply remuneration tactics to obtain positive results in their influencer-induced brand endorsements.

This research is a preliminary step to understand U&G among different customer engagement subgroups. Further research can be carried on uncovering consumer engagement profiles related to different social media channels or social media influencers on different channels (such as Instagram) or across channels. This research focused on the antecedents of engagement. Other research may focus on consumer behavior outcomes such as attitude towards the endorsed brand or purchase intention towards the endorsed brand and try to understand the outcomes among the customer engagement subgroups. Furthermore, cross-cultural, comparative studies may be carried on to understand the differences in U&G to engage with influencers across cultures.

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APPENDIX

TABLE A: Sources of the Motivational Construct Items

Construct	Number of Items	Sources
Entertainment	7	Haridakis and Hanson (2009), Khan, (2017), Leung (2009), Lim and Kumar (2017), Park et.al. (2009), Smock (2011)
Exploration	7	Krause et al. (2014), Leung (2009), Logan (2017), Sundar (2013)
Information seeking	8	Haridakis and Hanson (2009), Hanson and Haridakis(2008), Khan (2017), Logan (2017)
Self-status seeking	6	Khan (2017), Krause et al. (2014), Leung (2009)
Social interaction	8	Haridakis and Hanson (2009), Khan, (2017), Logan (2017), Park et.al. (2009), Sundar (2013)
Passing the time	6	Khan (2017), Krause et al. (2014), Logan (2017), Lim and Kumar (2017), Smock (2011)
Escape	5	Haridakis and Hanson (2009), Krause et al. (2014), Logan (2017)
Relaxation	3	Khan (2017), Smock (2011)
Convenience	3	Liu et al. (2010)
Companionship	3	Smock (2011)
Relational	3	Haridakis and Hanson (2009), Logan (2017)
Incentives	3	Dolan et al. (2015), Lim and Kumar (2017)

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Basic Reference Types

Book

a) Books

Kamien R., & Kamien A. (2014). *Music: An appreciation*. New York, NY: McGraw-Hill Education.

b) Edited Book

Ören, T., Üney, T., & Çölkesen, R. (Eds.). (2006). *Türkiye bilişim ansiklopedisi* [Turkish Encyclopedia of Informatics]. İstanbul, Turkey: Papatya Yayıncılık.

c) Chapter in an Edited Book

Bassett, C. (2006). Cultural studies and new media. In G. Hall & C. Birchall (Eds.), *New cultural studies: Adventures in theory* (pp. 220–237). Edinburgh, UK: Edinburgh University Press.

d) Book with the same organization as author and publisher

American Psychological Association. (2009). *Publication manual of the American psychological association* (6th ed.). Washington, DC: Author.

Article

a) Journal article with DOI

de Cillia, R., Reisigl, M., & Wodak, R. (1999). The discursive construction of national identity. *Discourse and Society*, 10(2), 149–173. <http://dx.doi.org/10.1177/0957926599010002002>

b) Journal Article with DOI and More Than Seven Authors

Lal, H., Cunningham, A. L., Godeaux, O., Chlibek, R., Diez-Domingo, J., Hwang, S.-J. ... Heineman, T. C. (2015). Efficacy of an adjuvanted herpes zoster subunit vaccine in older adults. *New England Journal of Medicine*, 372, 2087–2096. <http://dx.doi.org/10.1056/NEJMoa1501184>

c) Journal Article from Web, without DOI

Sidani, S. (2003). Enhancing the evaluation of nursing care effectiveness. *Canadian Journal of Nursing Research*, 35(3), 26–38. Retrieved from <http://cjr.mcgill.ca>

d) Journal Article with DOI

Turner, S. J. (2010). Website statistics 2.0: Using Google Analytics to measure library website effectiveness. *Technical Services Quarterly*, 27, 261–278. <http://dx.doi.org/10.1080/07317131003765910>

e) Advance Online Publication

Smith, J. A. (2010). Citing advance online publication: A review. *Journal of Psychology: Advance online publication*. <http://dx.doi.org/10.1037/a45d7867>

f) Article in a Magazine

Henry, W. A., III. (1990, April 9). Making the grade in today's schools. *Time*, 135, 28–31.

Doctoral Dissertation, Master's Thesis, Presentation, Proceeding

a) Dissertation/Thesis from a Commercial Database

Van Brunt, D. (1997). *Networked consumer health information systems* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 9943436)

b) Dissertation/Thesis from an Institutional Database

Yaylalı-Yıldız, B. (2014). *University campuses as places of potential publicness: Exploring the politicals, social and cultural practices in Ege University* (Doctoral dissertation). Retrieved from Retrieved from: <http://library.iyte.edu.tr/tr/hizli-erisim/iyte-tez-portali>

c) Dissertation/Thesis from Web

Tonta, Y. A. (1992). *An analysis of search failures in online library catalogs* (Doctoral dissertation, University of California, Berkeley). Retrieved from <http://yunus.hacettepe.edu.tr/~tonta/yayinlar/phd/ickapak.html>

d) Dissertation/Thesis abstracted in Dissertations Abstracts International

Appelbaum, L. G. (2005). Three studies of human information processing: Texture amplification, motion representation, and figure-ground segregation. *Dissertation Abstracts International: Section B. Sciences and Engineering*, 65(10), 5428.

e) Symposium Contribution

Krinsky-McHale, S. J., Zigman, W. B., & Silverman, W. (2012, August). Are neuropsychiatric symptoms markers of prodromal Alzheimer's disease in adults with Down syndrome? In W. B. Zigman (Chair), *Predictors of mild cognitive impairment, dementia, and mortality in adults with Down syndrome*. Symposium conducted at the meeting of the American Psychological Association, Orlando, FL.

f) Conference Paper Abstract Retrieved Online

Liu, S. (2005, May). *Defending against business crises with the help of intelligent agent based early warning solutions*. Paper presented at the Seventh International Conference on Enterprise Information Systems, Miami, FL. Abstract retrieved from http://www.iceis.org/iceis2005/abstracts_2005.htm

g) Conference Paper - In Regularly Published Proceedings and Retrieved Online

Herculano-Houzel, S., Collins, C. E., Wong, P., Kaas, J. H., & Lent, R. (2008). The basic nonuniformity of the cerebral cortex. *Proceedings of the National Academy of Sciences*, 105, 12593–12598. <http://dx.doi.org/10.1073/pnas.0805417105>

h) Proceeding in Book Form

Parsons, O. A., Pryzwansky, W. B., Weinstein, D. J., & Wiens, A. N. (1995). Taxonomy for psychology. In J. N. Reich, H. Sands, & A. N. Wiens (Eds.), *Education and training beyond the doctoral degree: Proceedings of the American Psychological Association National Conference on Postdoctoral Education and Training in Psychology* (pp. 45–50). Washington, DC: American Psychological Association.

i) Paper Presentation

Nguyen, C. A. (2012, August). *Humor and deception in advertising: When laughter may not be the best medicine*. Paper presented at the meeting of the American Psychological Association, Orlando, FL.

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