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Ekonomi, İşletme, Uluslararası İlişkiler
ve Siyaset Bilimi Dergisi

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An EFQM-Based Self-Assessment Method for Railway Transportation Service Quality: An Application With Intuitionistic Fuzzy AHP

Gözde YANGINLAR[1], Sait GÜL[2]

ABSTRACT

Service quality is one of the most important issues in railway transportation because it is a concept that positively affects customer satisfaction, customer loyalty, corporate image, and intention to repurchase. The European Foundation of Quality Management (EFQM) Excellence Model provides an opportunity to facilitate the service quality-focused self-assessment efforts of the railway companies. This is the first study that integrates intuitionistic fuzzy theory in the application of the EFQM Model of railway industry in Turkey. As the main contribution, it is aimed to find a dedicatedly special weighting schema for the application of EFQM model in railway transportation. For this purpose, Analytic Hierarchy Process (AHP) is utilized with an integration of intuitionistic fuzzy sets that can reveal the decision-makers' opinions, preferences, and expertise more comprehensively than traditional fuzzy sets can do. Consequently, it is found that the original model should be modified for the railway industry since the weights of all the criteria included in the model are found different than the original ones. The study provides new insights into the long-term benefits of applying the EFQM model as a framework in railway transportation and understanding the associations between the EFQM criteria and railway transportation.

Keywords: EFQM excellence model, Analytic Hierarchy Process, Intuitionistic Fuzzy Sets, Self-assessment, Railway Industry.

JEL Classification Codes: M10, L91, C02

INTRODUCTION

Today, considering the developments in international trade and economic stagnations, there is a need for breakthroughs that will provide a competitive advantage in the railway transportation sector. The latest developments, which occurred in various economic, social, and technological aspects with the effect of globalization, bring some deep changes in railway transportation management models and systems. In today's increasingly competitive environment, it is vital to use modern management techniques and tools in the railway transportation sector, which has a significant share in the transportation system. For that reason, the application of the European Foundation for Quality Management (EFQM) Excellence Model in railway transportation can contribute to the development of cooperation, learning, and benchmarking in the transportation sector while systematically improving the advancement of this system.

Each organization needs to measure its performance in the process of achieving its goals and implementing strategies. In the light of this information, the EFQM model, which helps organizations measure how much progress has been made on the path to organizational excellence and helps them grow steadily, was first developed in Europe in 1998. EFQM model is a general tool for quality management, which is used as a multidimensional framework in all types of businesses. One of the most positive aspects of EFQM is the use of self-evaluation (Tutunc and Küçükusta, 2009). This model offers a roadmap by comparing the current positions of businesses with their ideal positions as well as providing solutions to optimize their current positions. On the other hand, many European enterprises used the EFQM model to evaluate their performance, but they have also encountered problems with the accuracy and consistency of data because the scores obtained from this model are not regulated by industries (Calvo-Mora et al., 2005).

The service quality has an abstract and difficult structure due to its unique "intangibility, the inseparability of production and consumption, and heterogeneity" (Parasuraman et al., 1985). The service

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quality rating must respect its specific properties, which are unrepeatability and impalpability, and their usage at the right time they are provided as well as changeability, which is a significant factor in the conditions of railway transport as well. These peculiarities influence the service quality regarding the constantly increasing requirements (Nedeliakova et al., 2014).

In this study, the application of the EFQM Excellence Model in the railway transportation industry is examined. As the main contribution of the study to the literature, the EFQM is specialized for railway transportation. In the original model as detailed in Section 4, the criteria have equal weights representing their importance such as 10% or 15%. But this general weighting concept cannot satisfy the different requirements of various industries. So, it is here aimed to find a special and appropriate weighting schema for the usage of the EFQM model in railway transportation. For this purpose, the Analytic Hierarchy Process (AHP) which is one of the most popular multiple attribute decision-making (MADM) methods is utilized with an integration of intuitionistic fuzzy sets (IFS) that can reveal the decision-makers' opinions, preferences, and expertise more comprehensively. Fuzzy logic that considers just membership degrees, can provide a limited level of opportunity to deal with the uncertainty and vagueness in decision-making processes. IFSs extend this strength by considering both independent membership and non-membership degrees, also the hesitancy within the decision-makers' preferences can be effectively and extensively modeled. In the data collection step, ten managers of the railway enterprise operating in Turkey were interviewed face-to-face to obtain their individualistic expertise. Data provided by the experts are the linguistic judgments consisting of pairwise comparisons of the EFQM model's criteria.

Fig. 1 shows the flowchart of our proposed IF-AHP method and mathematical details are given in Section 4.

The study is structured as follows: Following the introduction, the second section presents the conceptual framework and literature review of rail transportation and the EFQM Excellence Model. IFSs concept is introduced, and a literature review of IFS is also provided in the third section. The details of IF-AHP method are given in the fourth section. In section 5, IF-AHP application which is conducted for the EFQM model's rail transportation system implementation is examined in Turkey. The final section presents the discussion and conclusions drawn from the study with their practical implications and limitations.

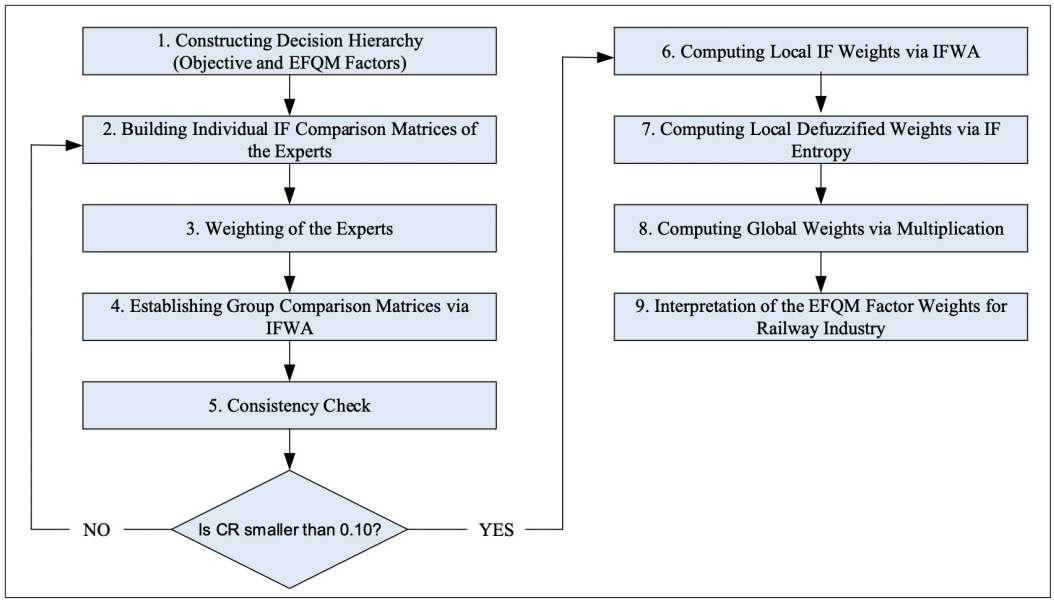

Fig. 1. Flowchart of IF-AHP.

LITERATURE REVIEW: SERVICE QUALITY IN RAILWAY TRANSPORTATION

Railway transportation is a fast-growing sector in developing and developed countries as well as a type of transportation that affects economic and organizational performance. As a result, railway transportation is being given particular attention around the world. Turkey reformed railway transportation policies for the sake of environmental and economic importance. For the liberalization of railway transportation within the scope of improving the service quality and the reconstruction

of TCDD (Türkiye Cumhuriyeti Devlet Demiryolları – the State Railways of the Republic of Turkey), the Law on the Liberalization of Turkish Railway Transportation was published on May 1, 2013. In this context, TCDD was identified under two headings, i.e., infrastructure operator and TCDD freight. After TCDD transportation started its activities in 2017, the process of liberalization and opening up to the competition started. In this process, service quality has become the most important criterion.

Banar and Özdemir (2015) indicated that Turkey's railway transportation achieved significant improvement in recent years. Turkey's railway systems are in an important life cycle and are reported to have an environmental impact that compares with that of other countries. Rail transportation in Turkey has shown significant improvement since 1950. Environmental concerns have also been seen in many European Union countries in recent years. In this context, railway transportation's service quality and quality policies take place as a determining factor in the integration of international transportation networks (Babalik-Sutcliffe, 2007).

The quality of railway passenger transportation is a complicated issue that requires professional skills based on knowledge and practical experience. Hanna and Drea (1998) and Drea and Hanna (2000) analyzed the service quality in railway passenger transportation in the USA by addressing the cost, timing, comfort, location, and productivity during transportation. Driving quality is one of the primary factors. Maskeliūnaite et al. (2009) measured the quality of service in Lithuanian railway transportation via AHP and made some suggestions for improvement. Sivilevičius and Maskeliūnaite (2010) explained that improvement in service quality depends on the performance of railway terminals and the minimization of losses due to train delays. Lithuanian railway service quality was measured using the AHP method. Brons and Rietveld (2009) specified that customer satisfaction is achieved by increasing the importance of scores that indicate high satisfaction in service quality dimensions. In their framework, it is more effective to focus on quality improvements since the railway operator will have less control over the perceived service quality.

Mirandaa et al. (2018) evaluated the impact of service quality dimensions in railway transportation on customer satisfaction by the SERVQUAL model. It is proved that the combination of comfort and connection in terms of service quality dimensions only provides higher customer satisfaction. Gupta and Datta (2012) offered suggestions for improving the quality of service in Indian rail transportation. The results indicate that passengers are generally dissatisfied with the "extent of waiting"; thereafter, there is a claim for further improvement of the "security" system. Travel-associated facilities and passenger amenities such as refreshment rooms and automated teller machines could be required. Ebolia et al. (2016) proposed a multilevel fuzzy synthetic assessment model to evaluate service quality in railways according to attributes such as cleaning, safety, service, information, comfort, and personnel. In addition to ensuring travel safety in railway passenger transportation, the cleaning of the seats on the trains, cleaning of the toilets, the temperature in the vehicle during travel, the comfort of the windows and doors, and density in the vehicle are also considered.

The European Foundation for Quality Management (EFQM) was established in 1988 to help enterprises gain a competitive advantage in Europe. This foundation aims to create the European quality award as in the case of the American Malcolm Baldridge National Quality Awards – MBNQA (Conti, 2007). Since both are based on a total quality management philosophy, the basic pillars of these awards are fairly similar, but there is some divergence between countries. The main reason for these revisions is adaptations to current business situations. MBNQA has evolved from the quality assurance system to the total quality management system (Tan, 2002). The EFQM model has been revised many times over the years. The first revision was carried out in 1999. In the following years, updates continued, and economic and social adaptation was achieved.

The EFQM Excellence Model has a flexible structure; it is applicable in both public and private sectors, small and large organizations, and in-service and industrial enterprises. The main process in implementation is self-assessment, which is based on a series of attributes and performance indicators when measuring the level of quality. Candidates can be nominated for different quality awards after self-assessment. It is important to conduct an external evaluation by independent experts before the self-assessment report is verified (Calvo-Mora et al., 2018).

EFQM is a nonprescription framework that embodies many approaches to achieving sustainable organizational excellence. Fundamental concepts such as customer orientation, process improvement, results in orientation, the involvement of people, and consistency of processes and facts, leadership, and innovation play a

key role in reaching the perfect level of the organization (Rusjan, 2005). New technologies and information systems are vital elements of business strategies. EFQM adapts to information technologies and leads to quality development (Trébucq and Magnaghi, 2017).

EFQM helps businesses adapt quickly to market requirements (Ruiz-Carrillo and Fernández-Ortiz, 2005). It has an integrative feature consisting of operational, strategic, and managerial control processes (Dahlgaard-Park et al., 2001). The strengthening of the relationship between the actors in the supply chain and the increase in quality depend on the generation of synergy and create new opportunities (Daud and Yusoff, 2011). This model offers a perspective-based participatory approach to all actors (suppliers, manufacturers, distributors, customers, etc.) in the supply chain. It acts as a guideline for managers in analyzing the bounds of the company's mission, vision, strategy, and the results it achieves.

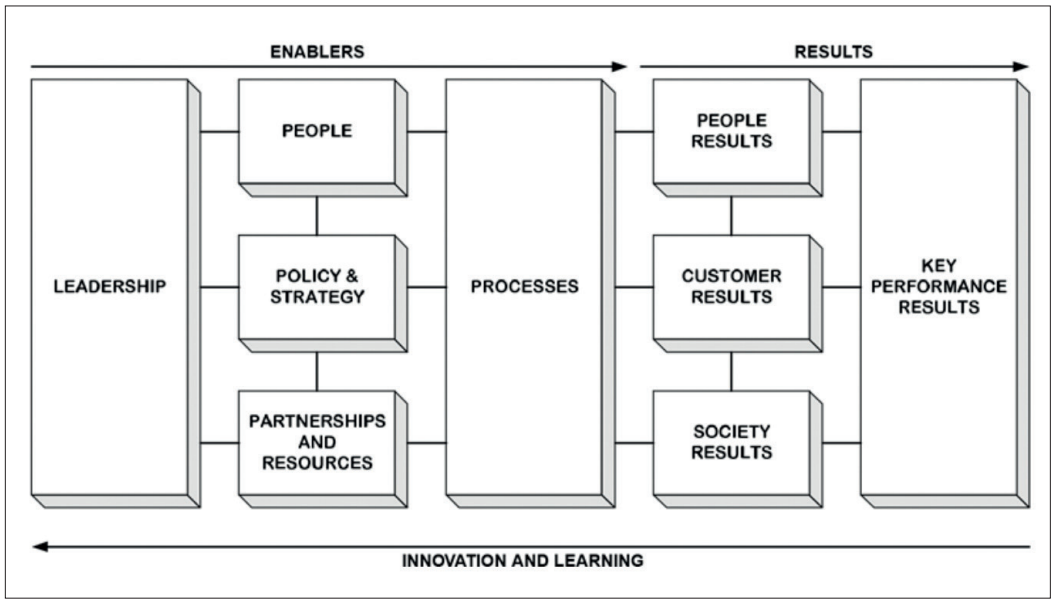

Fig. 2. The EFQM Excellence Model.

Thanks to the scoring procedure, the system assigns specific values and evaluates the current situation of the organization (Madrigal and Lara, 2017). EFQM not only contributes to the development of the enterprises' internal management processes but also provides detailed information about the efficiency of the business (Weske, 2007). Although it defines and evaluates the current situation, it does not provide a specific guide for sectors. It does not classify the areas in which improvement should be primarily made (Rusjan, 2005).

The criteria and sub-criteria of EFQM are classified under nine headings as depicted in Fig. 2 (Moreno-Rodríguez et al., 2013): the first five are defined as "enablers" that are so essential for raising enterprises' performance; the remaining four criteria are classified as "results" which aim to measure the performance of the enterprise (Akyuz, 2015). In this study, Enablers and Results are accepted as the main criteria. So, the general definitions of each sub-criterion are given below, and the sub-sub-criterion is given in Appendix 1.

• **Leadership**: Excellence in leadership means that leaders create values and systems to provide that they efficaciously execute actions and behaviors.

• **Policy and strategy**: To create an excellent organization, it is essential to create mission, vision, and values with stakeholder-focused policies. Strategy development in a multi-partner, collaborative environment entails the solution to the fundamental dilemma of valuing sustainability.

• **People**: An excellent organization performs the best utilization of its human resources and empowers and awards its "people." In a collaborative context, joint management of cross-border, cross-cultural "people" resources at strategic, tactical, and operational levels are required. People become a crucial component in configuring a cooperative relationship among enterprises with different backgrounds and working styles.

• **Partnerships and resources**: Excellent organizations organize partnerships and resources, including information technologies. Hence, all

enterprises' processes and resources assume a vital role in the organization.

• **Processes**: Customer-facing processes add value to the customer in an excellent organization.

• **Customer results**: Excellent organizations realize the best results for their customers and create high levels of customer satisfaction.

• **People results**: Excellent organizations obtain the best results for their people and register high levels of people satisfaction.

• **Society results**: Excellent organizations evaluate the best results for the wider society.

• **Key performance results:** Excellent organizations consistently accomplish the key performance results aligned with their policies and strategies.

Table 1 depicts a picture of EFQM literature. EFQM was integrated with different methods such as fuzzy AHP, fuzzy linguistic modeling, DEMATEL, operations research models, structural equation modeling, hierarchical cluster analysis, maturity models, and canonical correlation analysis. Besides, EFQM has been handled in both production and service industries such as air transportation, thermal power generation, healthcare, electric and electronic, education, tourism, and applications are found in different countries, e.g., India, Greece, Iran, USA, United Kingdom, Spain, Denmark, Portugal, and Netherland.

This study uses a modified version of AHP in implementing the EFQM model in the railway industry. In the literature, few studies are benefitting from MADM approaches. Liu and Ko (2018) utilized fuzzy AHP and found that enablers received 45% while the new results reached 55% importance in the EFQM model applied

Table 1. EFQM Excellence Model's Applications in the Literature

References	Sectors & Organization	Method
Dubey and Lakhanpal (2019)	Indian thermal power generating sector	Structural equation model
Kafetzopoulos et al. (2019).	Greek manufacturing industry	Structural equation model
Paraschi et al. (2019)	Air transportation sectors	Structural equation model
Belvedere et al. (2018)	118 companies	Structural equation model
Calvo-Mora et al. (2018)	116 Spanish companies	Structural equation model
Liu and Ko (2018)	Tourism sectors	Fuzzy analytic hierarchy process
Para-González et al. (2018).	200 medium-sized industrial Spanish firms	Structural equation model
Madrigal and Lara (2017)	Operation of golf courses	Structural equation model
Mesgari et al. (2017)	Healthcare sectors in Iran	Structural equation model
Gómez-López et al. (2016).	168 Spanish private firms	Factor analysis and Kruskal-Wallis Test
Anastasiadou and Zirinogloub (2015)	Greek primary education system	Structural equation model
Ezzabadia et. al. (2015)	Electricity enterprise in Iran	Fuzzy analytic hierarchy process, operations research
Moreno-Rodriguez et al. (2013)	Healthcare sectors	Fuzzy linguistic modeling
Sadeh et al. (2013)	228 Iranian manufacturing firms	Structural equation model
Safari et al. (2012)	Tavanir company in Iran	Canonical correlation analysis
Yousefie et al. (2011)	Iranian companies	Fuzzy analytic hierarchy process, entropy method
Sadeh and Arumugan (2010)	Iranian firms	DEMATEL technique
Sila (2007)	American companies	Structural equation model
Bou-Llusar et al. (2005)	Industrial and services sectors	Structural equation model
Calvo-Mora et al. (2005)	Academic centers in Spain	Partial least squares technique

to the tourism industry. In the original model, the enablers and results have equal weights of 50%. Also, the customer results sub-criterion recorded 23% importance. Ezzabadia et al. (2015) evaluated the EFQM model by integrating fuzzy AHP and operations research in electricity enterprises of Iran. Action plans were prepared with the emphasis on high-priority improvement projects for increasing the quality of business performance evaluation. Yousefie et al. (2011) integrated fuzzy AHP and quality function deployment methodologies for EFQM implementation in the automotive industry and claimed that enterprises can gain market shares and improve operational performance by applying EFQM. By applying DEMATEL in Iranian small-to-medium-sized enterprises, Sadeh and Arumugan (2010) found that leadership has the most efficient criteria having the largest effect on other excellence concepts.

Many studies proposed that industries have characteristics differentiated and they need dedicated EFQM models. In the civil aviation industry, the airport business excellence model version has been implemented at 143 airports worldwide by Paraschi et al. (2019) and the important performance analysis declared that employee results are the most critical success factor for airport excellence, and leadership and operational results are less important than employee results. Madrigal and Lara (2017) suggested that the EFQM operation in the sports industry is effective in improving quality and customer satisfaction. Anastasiadou and Zirinogloub (2015) confirmed that there are relationships among enabler criteria of EFQM with an application in education. As seen from these results, the EFQM applications need industry-specific measures because each industry's service quality evaluation should be based on different priorities of criteria.

The literature review shows there are varying levels of relations among the sub-criteria of EFQM, but these relationships are ignored in the official model. So, these relations are also neglected in this study to build an introductory model of the EFQM application to the railway transportation industry as the first attempt and the main contribution is the determination of the railway-specific importance weights of factors included by the official model. Future research can cope with this assumption of independent criteria.

PRELIMINARIES: INTUITIONISTIC FUZZY SETS

Zadeh (1965) stated that fuzzy numbers are effective tools that can be used in decision-making processes due to the systematic subjectivity in group decision-making problems, uncertainty, and vagueness of human judgments, the necessity of linguistic term usage by decision-makers, etc. Fuzzy set is the general case of set theory and Atanassov's (1986) IFSs provide an extension to the traditional fuzzy sets concept. The basic novelty of IFSs is the consideration of both independent membership and non-membership degrees. This representation style gives an extensive quantification possibility to the decision-makers. Also, the decision-makers' hesitancy levels can be quantified by IFS. The terminology is clarified by the following definitions.

Definition 1. A fuzzy set *A* in the universe of discourse $X = \{x_1, x_2, \ldots, x_n\}$ is defined as

$$\tilde{\mathrm{A}} = \{ < x, \mu_{\tilde{A}}(x) > | x \in X\} \quad (1)$$

where $\mu_{\tilde{A}} : X \to [0,1]$ is the membership function of $\tilde{\mathrm{A}}$. $\mu_{\tilde{A}}(x)$ represents the degree of belongingness of x in $\tilde{\mathrm{A}}$.

Definition 2. An intuitionistic fuzzy set (IFS) *A* which is proposed first by Atanassov (1986) and defined on a universe of discourse *X* is expressed as

$$\tilde{\mathrm{A}} = \{ < x, \mu_{\tilde{A}}(x) > | x \in X\} \quad (2)$$

where $\mu_A : X \to [0,1]$ and $\vartheta_A : X \to [0,1]$ with the condition $0 \le \mu_A(z) + \vartheta_A(z) \le 1$ for all $x \in X$..

The numbers $\mu_A(x)$ and $\vartheta_A(x)$ denote membership and non-membership degrees, respectively. The benefit of the binary representation is its ability to model the decision-makers' uncertainty. From constraint $0 \le \mu_A(x) + \vartheta_A(x) \le 1$, it is understood that the total degree of membership and non-membership can be smaller than 1. The remaining represents the degree of hesitation, intuitionistic index, or non-determinacy of x to A (Gupta et al., 2016):

$$\pi_A(x) = 1 - \mu_A(x) - \vartheta_A(x) \text{ where } 0 \le \pi_A(x) \le 1 \quad (3)$$

Smaller $\pi_A(x)$ represents higher certainty of the knowledge about x, and higher $\pi_A(x)$ shows less certain knowledge about x.

Definition 3. The complementary set A^c of A is defined as

$$A^c = \{ < x, \vartheta_A(x), \mu_A(x) > | x \in X\} \quad (4)$$

The summation and multiplication operations in IFS are given as follows (Atanassov, 1986):

$$A \oplus B = \{< x, \mu_A(x) + \mu_B(x) - \mu_A(x) * \mu_B(x), \vartheta_A(x) * \vartheta_B(x) > | x \in X\}$$

$$A \otimes B = \{< x, \mu_A(x) * \mu_B(x), \vartheta_A(x) + \vartheta_B(x) - \vartheta_A(x) * \vartheta_B(x) > | x \in X\} \quad (6)$$

$$n * A = \{< x, 1 - [1 - \mu_A(x)]^n, [\vartheta_A(x)]^n > | x \in X\} \quad (7)$$

Definition 4. Let a triangular IF number (TIFN) be be $\tilde{a} = < (\underline{a}, a, \overline{a}); \mu_{\tilde{a}}, \vartheta_{\tilde{a}} >$. Its membership and non-membership functions are defined as given in equations (8) and (9), respectively (Wu et al., 2018).

$$\mu_{\tilde{a}}(x) = \begin{cases} \dfrac{(x-\underline{a})}{(a-\underline{a})}\mu_{\tilde{a}} & , \quad \underline{a} \le x < a \\ \mu_{\tilde{a}} & , \quad x = a \\ \dfrac{(\overline{a}-x)}{(\overline{a}-a)}\mu_{\tilde{a}} & , \quad a \le x < \overline{a} \\ 0 & , \quad x < \underline{a} \; or \; x > \overline{a} \end{cases} \quad (8)$$

$$\vartheta_{\tilde{a}}(x) = \begin{cases} \dfrac{(a - x + \vartheta_{\tilde{a}}(x-\underline{a}))}{(a-\underline{a})} & , \quad \underline{a} \le x < a \\ \vartheta_{\tilde{a}} & , \quad x = a \\ \dfrac{(x - a + \vartheta_{\tilde{a}}(\overline{a}-x))}{(\overline{a}-a)} & , \quad a \le x < \overline{a} \\ 0 & , \quad x < \underline{a} \; or \; x > \overline{a} \end{cases} \quad (9)$$

Table 2 shows the results of the literature review of IFS applications in the transportation field. It has been determined that studies were carried out in logistics and supply chain management, supply chain risk management, road transportation, maritime transportation, high-speed railway, humanitarian relief logistics, and green supply chain management. To the best of our knowledge, no study examining the EFQM Excellence Model for railway transportation via the intuitionistic fuzzy MADM methods exists in the literature. Thus, this study aims to contribute to the literature in this manner.

Some examples can be given for clarifying the applicability of IF-based MADM methods in various areas. Ar et al. (2020) revealed that the most important criteria are security, visibility, and audit in blockchain technology selection for the logistics industry via incorporating AHP and VIKOR. According to Tavana et al. (2016), the most important criterion that should be considered by the companies making reverse logistics outsourcing decisions is the focus on the core business. Karasan et al. (2018) integrated AHP and TOPSIS approaches under IFS environment to prioritize ten production strategies such as innovation-focused, technology-based, marketing-intensive, customization-based strategies, etc. Şahin and Soylu (2020) proposed a conceptual framework of process management for maritime transportation with IF-AHP. Büyüközkan et al. (2020) showed that digital trust is the most significant dimension in the Turkish airline industry by applying IF-AHP method. Kahraman et al. (2020) prioritize outsource manufacturers by combining IF-AHP and IF-TOPSIS and showed the method's applicability for a global textile firm. Yu et al. (2020) established a computing model combining IF-AHP with a cloud model to evaluate the risk levels of the Chinese electricity retailers. Demir and Koca (2021) used IF-AHP and IF-TOPSIS combined model in selecting the best green supplier for the paper mills in Turkey.

PROPOSED METHODOLOGY

In this study, IF numbers are used to extend AHP (Saaty, 1980) for handling vagueness and ambiguity in the decision processes of experts. IF-AHP can obtain the relative importance of criteria more comprehensively and effectively. When decision-makers make comparisons in a pairwise manner, they may not specify their evaluation with crisp numerical values because of uncertain information. IF-AHP can better work with all aspects of information covered by the expert since it is capable to utilize membership, non-membership, and hesitancy information. The steps of IF-AHP are detailed as follows.

Step 1: Modeling of the decision problem consists of definitions of objective, criteria, and sub-criteria if any exist. The problem hierarchy is constructed here. The objective of the current study is the determination of the EFQM's criteria weights that are specific for railway companies. EFQM's criteria, sub-criteria, and sub-sub-criteria are the elements of the hierarchy which is depicted in Fig. 3. The number of factors is used as the indices. The details of the sub-sub-criteria are given in Appendix 1. The criterion is represented by C_i where *i* will take a value according to the number of considered criteria, e.g., Enablers is the first main criterion and it is represented by *CI*; Leadership as the first sub-criterion of Enablers is represented by *CI1*; *CI1a* shows the first question of Enabler's Leadership.

Step 2: IF-AHP uses pairwise comparisons in evaluations. Decision-makers are asked to respond to a questionnaire for comparing factors with regard to their industry knowledge and expertise. Each expresses his/her judgment on each factor as a linguistic term. AHP's 9-point evaluation scale is transformed into a 9-point linguistic term set by Abdullah and Najib (2016). The overall scale and their reciprocals for inverse comparisons are shown in Table 3.

Step 3: In group decision making, the group of decision-makers usually have different levels of experience, knowledge, and preferences. This variation among them and their uniqueness is represented by weights that reflect their contribution or reliability in

Table 2. IF-based MADM Methods

Authors	Application area	Techniques used	Aim of the study
Ar et al. (2020)	Logistics management	IF-AHP and VIKOR	Feasibility of blockchain technology in the logistics industry
Büyüközkan et al. (2020)	Air transportation	IVIF-AHP	A new digital service quality model.
Budak et al. (2020)	Humanitarian relief logistics	IVIF-DEMATEL, ANP, and TOPSIS	Real-time location systems technology selection
Niroomand et al. (2020)	Supply chain network design	IF constraint programming	A hybrid approach considering the IF fuzzy objective function
Şahin and Soylu (2020)	Maritime transportation	Triangular IF based Chang's extension method and Gaussian approximation	Conceptual structure of process management for maritime supply chain
Deveci et al. (2019)	Road transportation	Interval-valued IF Quality Function Deployment	Quantitative assessment framework for public bus operators
Memari et al. (2019)	Sustainable supply chain management	IF-TOPSIS	Sustainable supplier selection
Büyüközkan and Göçer (2018)	Logistics and supply chain management	IF-ARAS and AHP	Supplier selection
Büyüközkan et al. (2018)	Sustainable urban transportation	IF Choquet integral	Sustainable urban transportation alternatives selection
Tavana et al. (2018)	Third-party providers	IF-TOPSIS and ANP	Third-party reverse logistics provider selection
Zhang et al. (2018)	Supply chain management	IF entropy weight method	Manufacturing service supply chain optimization problem
Govindan et al. (2016)	Supply chain risk management	Trapezoidal IF ELECTRE TRI-C	Supplier risk assessment
Tavana et al. (2016)	Third-party providers	IF-AHP and SWOT	New method to reverse logistics outsourcing decision making
Wan et al. (2016)	Many companies in various areas	IF preference relations model	RFID technology selection
Govindan et al. (2015)	Green supply chain management	IF-DEMATEL	A method for GSCM practices and performances
Liu et al. (2015)	High-speed railway	Ranking of trapezoidal IF numbers	Investigate high-speed railway accidents.

Table 3. Linguistic term set for the importance of criteria

	TIFNs		Reciprocal TIFNs		
Linguistic Terms	μ			μ	
Equally Important	0.02	0.18	1	0.18	0.02
Intermediate	0.06	0.23	1/2	0.23	0.06
Moderately More Important	0.13	0.27	1/3	0.27	0.13
Intermediate	0.22	0.28	1/4	0.28	0.22
Strongly More Important	0.33	0.27	1/5	0.27	0.33
Intermediate	0.47	0.23	1/6	0.23	0.47
Very Strong Importance	0.62	0.18	1/7	0.18	0.62
Intermediate	0.80	0.10	1/8	0.10	0.80
Extremely More Important	1.00	0.00	1/9	0.00	1.00

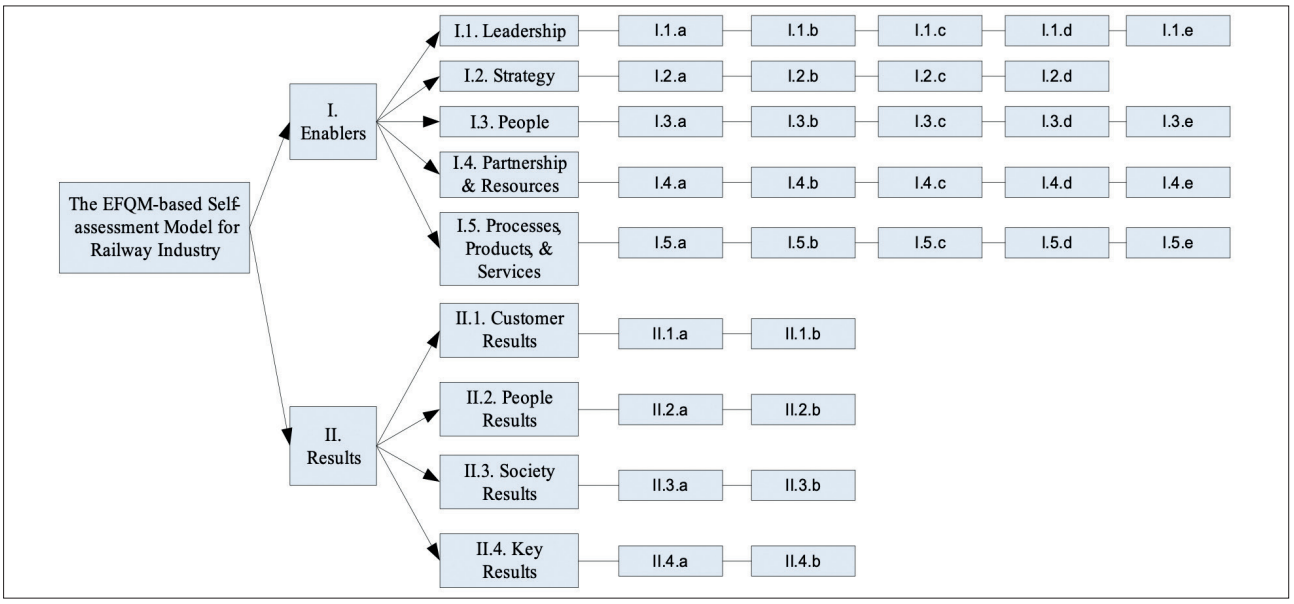

Fig. 3. The hierarchy of EFQM-based self-assessment.

solving the problem (Koksalmis and Kabak, 2019). By denoting D_k as the group of decision-makers and λ_k as the weights of each D_k, the group aggregation process is executed by utilizing the methodology developed by Boran et al. (2009). They proposed a linguistic evaluation scale for decision-makers' importance levels represented by triangular IF numbers $D_k = (\mu_k, \vartheta_k)$ where $\pi_k = 1 - \mu_k - \vartheta_k$. The scale is given in Table 4. Accordingly, λ_k can be computed with Eq. (10) where $\sum_k \lambda_k = 1$.

$$\lambda_k = \frac{\mu_k + \pi_k(\mu_k/(\mu_k + \vartheta_k))}{\sum_k(\mu_k + \pi_k(\mu_k/(\mu_k + \vartheta_k)))} \quad (10)$$

Table 4. Linguistic scale for the importance of DMs

Linguistic Scale	*TIFN*
Very Important (VI)	(0.90, 0.05)
Important (I)	(0.75, 0.20)
Medium (M)	(0.50, 0.40)
Unimportant (UNIMP)	(0.25, 0.60)
Very Unimportant (VUNIMP)	(0.10, 0.80)

Step 4: After the construction of IF comparison matrices, preference values in the matrix will be calculated. To do this, it is required to use an aggregation operator because each decision-maker holds his/her specific weight λ_k. Xu (2007) introduced IF weighted averaging (IFWA) operator. As Büyüközkan et al. (2019) stated, IFWA is the most used and practical aggregation operator in literature.

Let $R^{(k)} = \left(r_{ij}^{(k)}\right) = (\mu_{ij}^{(k)}, \vartheta_{ij}^{(k)})$ be IF comparison matrix of the k^{th} decision-maker and λ_k be the weight. The individualistic preference values $\left(r_i^{(k)}\right)$ can be calculated by Eq. (11).

$$r_i^{(k)} = IFWA_k\left(r_{ij}^{(k)}\right) = (1 - \prod_j(1 - \mu_{ij}^{(k)})^{\lambda_k}, \prod_j(\vartheta_{ij}^{(k)})^{\lambda_k}) \quad (11)$$

Step 5: The comparisons are based on the individual preferences of decision-makers. The inconsistency level in a comparison matrix should be checked to make a more representative and consistent decision. Saaty (1980) proposed an eigenvector-based consistency measurement which is called CR (consistency ratio). Abdullah and Najib (2016) stated that π hesitancy value of the aggregated IF comparisons can be used while calculating the inconsistency degree of each individualistic comparison matrix. Eq. (12) gives the proposed CR. *n* is the size of the matrix. RI is taken from Saaty (1980)'s Random Index table.

$$CR = \frac{(\lambda_{max} - n)/(n-1)}{RI} = \frac{(\frac{\pi_{ij}^k}{n})/(n-1)}{RI} \quad (12)$$

Step 6: Deciding in a group environment requires the fusion of individualistic preference values so that the importance degrees of each criterion or sub-criterion can be determined. IFWA operator can be used again to make this integration.

Let w_i be IF representation of the local weight of factor i, λ_k be k^{th} decision maker's weight and $r_i^{(k)} = (\mu_i^{(k)}, \vartheta_i^{(k)})$ be his/her preference value for each element. Eq. (13) is used for determining the local weights (Xu, 2007).

$$w_i = IFWA_{\lambda_k}\left(r_i^{(1)}, r_i^{(2)}, \ldots, r_i^{(k)}\right) = \lambda_1 r_i^{(1)} + \lambda_2 r_i^{(2)} + \cdots + \lambda_k r_i^{(k)} = \left(1 - \prod_k (1 - \mu_i^{(k)})^{\lambda_k}, \prod_k (\vartheta_i^{(k)})^{\lambda_k}\right) \quad (13)$$

Step 7: By performing Eq. (13), the aggregated pairwise comparison matrix is formed for each criteria group. To find their local defuzzified weights, Abdullah and Najib (2016) proposed the usage of IF entropy. In this study, the entropy calculation presented by Burillo and Bustince (1996) is used as given in Eq. (14) and (15).

$$\bar{\bar{w}}_i = \pi_i \cdot e^{\pi_i} \quad (14)$$

$$\bar{w}_i = \frac{1 - \bar{\bar{w}}_i}{n - \sum_i \bar{\bar{w}}_i} \quad (15)$$

Step 8: After constructing local weight sets of main criteria and their sub-criteria, the global weights should be determined. They are the distributed weights of main criteria into associated sub-criteria one by one. For example, the weight of Enablers' main criterion will be allocated into its 5 sub-criteria (Leadership, People, etc.) and then, i.e., the weight of Leadership sub-criterion will be allocated into its 5 sub-sub-criteria. The resulting weights of sub-sub-criteria will be called global weights. The local weight of the main criterion and the local weight of its one sub-criterion will be multiplied to reveal the global weight of the interested sub-criterion and so on.

Step 9: Since the aim is to find the specific criteria weights of a new EFQM-based self-assessment model for railway companies to allow them to monitor their service quality level and compare their position within the logistics industry, the global weights that are calculated by IF-AHP approach, should be interpreted and then, are utilized to update the associated weight set of EFQM criteria. As the ultimate result, the EFQM-based self-assessment methodology will be based on the mentioned weights.

A CASE STUDY FROM TURKEY

After introducing the steps of the proposed IF-AHP methodology, the application and results are discussed in this section. A railway company from Turkey is selected to perform the case study. The company focuses on both passenger and cargo transportation. Due to an actual requirement of the company, it was decided to use the proposed method. To deal with the self-assessment problem being discussed within the company, 10 experts were selected for data collection. They were asked to fill out a survey including pairwise comparisons. The survey has 12 main parts. In the first 9 parts, the questions (that are accepted as sub-sub-criteria) of sub-criteria from Leadership to Key Results are evaluated. The survey has 2 parts for the comparison of sub-criteria of Enablers and Results criteria sets, respectively. The last part is about the comparison of Enablers and Results.

As mentioned above, 10 experts were selected from the industry by considering their expertise and knowledge about the management of railway operations. Some of these experts work in the quality management directorate, while others work as directors or deputy directors in the departments of "purchasing, strategy development, information technologies, passenger transportation, freight transportation, personnel and administrative affairs, railway maintenance, and repair". Each has worked for 20 years or more. They are effective in analyzing how railway transportation service quality has changed from the past to the present and evaluating it within the framework of EFQM.

Step 1: The general definition and scope of the interested problem are represented in Fig. 3. Criteria are shown with C_i (i = I and II for Enablers and Results; I1, I2, …, I5, II1, II2, …, II4 for sub-criteria and I1a, I1b, …, II4a, II4b for sub-sub-criteria).

Step 2: All the decision-makers are asked to fulfill the survey which is developed dedicatedly for this specific study. In this step, the opinions of decision-makers are collected by the survey and converted to IF numbers by using the linguistic terms that are depicted in Table 3. Table 5 shows the IF number conversions of comparisons of the first decision-maker (k=1). The other 9 experts' evaluations are not given due to space limitations.

Step 3: Decision-makers are weighted concerning their expertise in railway transportation. These expertise levels will be assessed by using the linguistic term scale and associated conversions of them to IF numbers which are given in Table 4. IF numbers are used in Eq. (10) for computing the decision-makers' weights. Table 6 shows the associated linguistic terms, their IF numbers correspondences, and the weights.

Table 5. Converted TIFNs of evaluations of Expert 1

	I1a		I1b		I1c		I1d		I1e	
I1a	0.02	0.18	0.62	0.18	0.8	0.1	0.8	0.1	0.8	0.1
I1b	0.18	0.62	0.18	0.02	0.33	0.27	0.33	0.27	0.33	0.27
I1c	0.1	0.8	0.27	0.33	0.02	0.18	0.27	0.33	0.27	0.33
I1d	0.1	0.8	0.27	0.33	0.33	0.27	0.02	0.18	0.33	0.27
I1e	0.1	0.8	0.27	0.33	0.33	0.27	0.27	0.33	0.02	0.18

	I2a		I2b		I2c		I2d	
I2a	0.02	0.18	0.33	0.27	0.27	0.33	0.33	0.27
I2b	0.27	0.33	0.02	0.18	0.33	0.27	0.22	0.28
I2c	0.33	0.27	0.27	0.33	0.02	0.18	0.22	0.28
I2d	0.27	0.33	0.28	0.22	0.28	0.22	0.02	0.18

	I3a		I3b		I3c		I3d		I3e	
I3a	0.02	0.18	0.33	0.27	0.27	0.33	0.27	0.33	0.27	0.33
I3b	0.27	0.33	0.02	0.18	0.33	0.27	0.27	0.33	0.33	0.27
I3c	0.33	0.27	0.27	0.33	0.02	0.18	0.33	0.27	0.33	0.27
I3d	0.33	0.27	0.27	0.33	0.27	0.33	0.02	0.18	0.33	0.27
I3e	0.33	0.27	0.27	0.33	0.27	0.33	0.27	0.33	0.02	0.18

	I4a		I4b		I4c		I4d		I4e	
I4a	0.02	0.18	0.27	0.33	0.33	0.27	0.27	0.33	0.27	0.33
I4b	0.33	0.27	0.02	0.18	0.33	0.27	0.02	0.18	0.02	0.18
I4c	0.27	0.33	0.27	0.33	0.02	0.18	0.27	0.33	0.27	0.33
I4d	0.33	0.27	0.02	0.18	0.33	0.27	0.02	0.18	0.27	0.33
I4e	0.33	0.27	0.02	0.18	0.33	0.27	0.33	0.27	0.02	0.18

	I5a		I5b		I5c		I5d		I5e	
I5a	0.02	0.18	0.02	0.18	0.33	0.27	0.33	0.27	0.02	0.18
I5b	0.02	0.18	0.02	0.18	0.33	0.27	0.33	0.27	0.27	0.33
I5c	0.27	0.33	0.27	0.33	0.02	0.18	0.33	0.27	0.27	0.33
I5d	0.27	0.33	0.27	0.33	0.27	0.33	0.02	0.18	0.27	0.33
I5e	0.02	0.18	0.33	0.27	0.33	0.27	0.33	0.27	0.02	0.18

	II1a		II1b	
II1a	0.02	0.18	0.33	0.27
II1b	0.27	0.33	0.02	0.18

	II2a		II2b	
II2a	0.02	0.18	0.33	0.27
II2b	0.27	0.33	0.02	0.18

	II3a		II3b	
II3a	0.02	0.18	0.33	0.27
II3b	0.27	0.33	0.02	0.18

	II4a		II4b	
II4a	0.02	0.18	0.33	0.27
II4b	0.27	0.33	0.02	0.18

	I1		I2		I3		I4		I5	
I1	0.02	0.18	0.33	0.27	0.33	0.27	0.33	0.27	0.33	0.27
I2	0.27	0.33	0.02	0.18	0.27	0.33	0.33	0.27	0.33	0.27
I3	0.27	0.33	0.33	0.27	0.02	0.18	0.33	0.27	0.33	0.27
I4	0.27	0.33	0.27	0.33	0.27	0.33	0.02	0.18	0.27	0.33
I5	0.27	0.33	0.27	0.33	0.27	0.33	0.33	0.27	0.02	0.18

	II1		II2		II3		II4	
II1	0.02	0.18	0.33	0.27	0.02	0.18	0.02	0.18
II2	0.27	0.33	0.02	0.18	0.02	0.18	0.02	0.18
II3	0.02	0.18	0.02	0.18	0.02	0.18	0.02	0.18
II4	0.02	0.18	0.02	0.18	0.02	0.18	0.02	0.18

	I		II	
I	0.02	0.18	0.27	0.33
II	0.33	0.27	0.02	0.18

Table 6. Weights of DMs

k	*Linguistic Term*	*TIFNs*		λ_k
1	VI	0.9	0.05	0.1101
2	VI	0.9	0.05	0.1101
3	I	0.75	0.2	0.0917
4	I	0.75	0.2	0.0917
5	I	0.75	0.2	0.0917
6	VI	0.9	0.05	0.1101
7	VI	0.9	0.05	0.1101
8	M	0.5	0.4	0.0645
9	VI	0.9	0.05	0.1101
10	VI	0.9	0.05	0.1101

Step 4: IFWA operator (Eq. 11) is used for obtaining the preference values of the criteria. For each comparison matrix, IFWA operator will be performed. Table 7 shows the preference values determined for the first decision-maker. For all the others, preference values are calculated in the same fashion.

Step 5: All the consistencies of decision-makers are checked via Eq. (12). A comparison matrix is consistent when its CR value is smaller than 10%. At the end of the consistency analysis, all the matrices are found ready for further steps.

Step 6: Group decision as the integration of different decision-makers' comparison matrices is realized by using Eq. (13) which is an application of IFWA. For illustration purposes, Table 8 shows the preference values for the sub-sub-criteria of Strategy. By combining these values, their local weights can be calculated as given below.

$$\mu_{I2a} = 1 - \prod_k \left(1 - \mu_{I2a}^{(k)}\right)^{\lambda_k} = 1 - [(1-0.1175)^{0.1101} * (1-0.0584)^{0.1101} * (1-0.1041)^{0.0917} * (1-0.0547)^{0.0917} * (1-0.1145)^{0.0917} * (1-0.0798)^{0.1101} * (1-0.823)^{0.1101} * (1-0.0052)^{0.0645} * (1-0.0218)^{0.1101} * (1-0.0405)^{0.1101} = 0.0701$$

$$\vartheta_{I2a} = \prod_k \left(\vartheta_{I2a}^{(k)}\right)^{\lambda_k} = (0.5494)^{0.1101} * (0.5389)^{0.1101} * (0.7008)^{0.0917} * (0.6197)^{0.0917} * (0.5254)^{0.1101} * (0.5691)^{0.1101} * (0.6423)^{0.0645} * (0.4915)^{0.1101} * (0.4535)^{0.1101} = 0.5584$$

Similarly, weights of remaining 3 factors are (0.0753, 0.5291) for *wl2b*, (0.0775, 0.5301) for *wl2c*, and (1, 0) for *wl2d*. All IF number representations of local weights are depicted in Table 9.

Step 7: Entropies of all criterion sets are computed and then, these entropies are processed to find the crisp local weights. As an illustration, the entropies and crisp weights related to the factors under Strategy are given below. For entropies, Eq. (14) is performed.

Table 7. Preference values of Expert 1

	μ	ν
I1a	0.4728	0.3206
I1b	0.1613	0.4003
I1c	0.1111	0.5603
I1d	0.1277	0.5361
I1e	0.1194	0.5480

	μ	ν
I2a	0.1175	0.5494
I2b	0.1026	0.5516
I2c	0.1026	0.5516
I2d	0.1034	0.5252

	μ	ν
I3a	0.1395	0.4972
I3b	0.1476	0.4863
I3c	0.1556	0.4757
I3d	0.1476	0.4863
I3e	0.1395	0.4972

	μ	ν
I4a	0.1395	0.4972
I4b	0.0905	0.4256
I4c	0.1313	0.5083
I4d	0.1195	0.4549
I4e	0.1277	0.4450

	μ	ν
I5a	0.0905	0.4256
I5b	0.1195	0.4549
I5c	0.1395	0.4972
I5d	0.1313	0.5083
I5e	0.1277	0.4450

	μ	ν
II1a	0.0452	0.7169
II1b	0.0362	0.7329

	μ	ν
II2a	0.0452	0.7169
II2b	0.0362	0.7329

	μ	ν
II3a	0.0452	0.7169
II3b	0.0362	0.7329

	μ	ν
II4a	0.0452	0.7169
II4b	0.0362	0.7329

	μ	ν
I1	0.1635	0.4653
I2	0.1476	0.4863
I3	0.1556	0.4757
I4	0.1313	0.5083
I5	0.1395	0.4972

	μ	ν
II1	0.0495	0.4915
II2	0.0405	0.5025
II3	0.0089	0.4701
II4	0.0089	0.4701

	μ	ν
I	0.0362	0.7329
II	0.0452	0.7169

$$\bar{\bar{w}}_{I2a} = \pi_{I2a} * e^{\pi_{I2a}} = 0.3715 * e^{0.3715} = 0.5387$$

$$\bar{\bar{w}}_{I2b} = \pi_{I2b} * e^{\pi_{I2b}} = 0.3956 * e^{0.3956} = 0.5875$$

$$\bar{\bar{w}}_{I2c} = \pi_{I2c} * e^{\pi_{I2c}} = 0.3924 * e^{0.3924} = 0.5809$$

$$\bar{\bar{w}}_{I2d} = \pi_{I2d} * e^{\pi_{I2d}} = 0 * e^{0} = 0$$

To find final weights, Eq. (15) is used.

Table 8. Preference values of Experts for sub-sub-criteria of Strategy

	λ_1 =	0.1101	λ_2 =	0.1101	λ_3 =	0.0917	λ_4 =	0.0917	λ_5 =	0.0917
	μ	ν	μ	ν	μ	ν	μ	ν	μ	ν
I2a	0.1175	0.5494	0.0584	0.5396	0.1041	0.7008	0.0547	0.6071	0.1145	0.6197
I2b	0.1026	0.5516	0.1007	0.4222	0.0386	0.7850	0.0846	0.4874	0.0748	0.5625
I2c	0.1026	0.5516	0.0832	0.4575	0.2641	0.5488	0.0518	0.5742	0.1096	0.5742
I2d	0.1034	0.5252	0.0667	0.5254	0.3590	0.4535	0.0443	0.5370	0.0698	0.5212

	λ_6 =	0.1101	λ_7 =	0.1101	λ_8 =	0.0645	λ_9 =	0.1101	λ_{10} =	0.1101
	μ	ν	μ	ν	μ	ν	μ	ν	μ	ν
I2a	0.0798	0.5254	0.0823	0.5691	0.0052	0.6423	0.0218	0.4915	0.0405	0.4535
I2b	0.0653	0.5494	0.0601	0.5806	0.0052	0.6423	0.1007	0.4222	0.0832	0.4575
I2c	0.0798	0.4742	0.0066	0.5677	0.0052	0.6423	0.0218	0.4915	0.0262	0.5050
I2d	0.0405	0.4535	1.0000	0.0000	0.0052	0.6423	0.0218	0.4915	0.0474	0.4355

Table 9. Aggregated local weights of all factors

	μ	ν
I1a	1.0000	0.0000
I1b	1.0000	0.0000
I1c	1.0000	0.0000
I1d	1.0000	0.0000
I1e	1.0000	0.0000

	μ	ν
I2a	0.0701	0.5584
I2b	0.0753	0.5291
I2c	0.0775	0.5301
I2d	1.0000	0.0000

	μ	ν
I3a	0.0881	0.4579
I3b	0.1029	0.4403
I3c	1.0000	0.0000
I3d	0.0917	0.4590
I3e	0.0914	0.4556

	μ	ν
I4a	0.1114	0.4682
I4b	0.0778	0.4649
I4c	0.1038	0.4369
I4d	0.1233	0.4324
I4e	0.1267	0.4409

	μ	ν
I5a	0.1011	0.4638
I5b	0.1052	0.5034
I5c	0.1007	0.4491
I5d	0.1354	0.4320
I5e	0.1089	0.4417

	μ	ν
II1a	0.0341	0.7234
II1b	0.0243	0.7365

	μ	ν
II2a	0.0262	0.7269
II2b	0.0346	0.7170

	μ	ν
II3a	0.0237	0.7186
II3b	0.0223	0.7197

	μ	ν
II4a	0.0265	0.7198
II4b	0.0208	0.7229

	μ	ν
I1	0.0950	0.4634
I2	0.0956	0.4879
I3	0.0987	0.4688
I4	0.1470	0.4255
I5	1.0000	0.0000

	μ	ν
II1	0.0285	0.7277
II2	0.0278	0.7237
II3	0.0522	0.7183
II4	0.0403	0.7420

	μ	ν
I	0.0429	0.4100
II	0.0673	0.3814

$$\overline{w}_{I2a} = \frac{1-\overline{w}_{I2a}}{n-\sum_i \overline{w}_i} = \frac{1-0.5387}{4-(0.5387+0.5875+0.5809+0)} = \frac{0.4613}{2.2930} = 0.2012$$

$$\overline{w}_{I2b} = \frac{1-0.5875}{2.2930} = 0.1799 \; ; \; \overline{w}_{I2c} = \frac{1-0.5809}{2.2930} = 0.1828; \; \overline{w}_{I2d} = \frac{1-0}{2.2930} = 0.4361$$

The resulting weights are introduced in Table 10.

Step 8: In this step, the local weights of each criterion (Table 10) are multiplied by their parent sub-criteria weights and criteria weights to extract global weights. For example, the calculation regarding the global weights of sub-sub-criteria of Strategy is given below.

Local weight of Enablers (C_I): $\overline{w}_I = 0.5574$

Local weight of Strategy (C_{I2}): $\overline{w}_{I2} = 0.1561$

Global weight of Strategy: $w_{I2} = \overline{w}_{I2} * \overline{w}_I = 0.1561 * 0.5574 = 0.0870$

Global weight of C_{I2a}: $w_{I2a} = \overline{w}_{I2a} * \overline{w}_{I2} * \overline{w}_I = 0.2012 * 0.0870 = 0.0175$

Global weight of C_{I2b}: $w_{I2b} = \overline{w}_{I2b} * \overline{w}_{I2} * \overline{w}_I = 0.1799 * 0.0870 = 0.0157$

Global weight of C_{I2c}: $w_{I2c} = \overline{w}_{I2c} * \overline{w}_{I2} * \overline{w}_I = 0.1828 * 0.0870 = 0.0159$

Global weight of C_{I2d}: $w_{I2d} = \overline{w}_{I2d} * \overline{w}_{I2} * \overline{w}_I = 0.4361 * 0.0870 = 0.0380$

Step 9: Based on all experts' evaluations, the final weights are calculated as a group decision. According to the results of integrated preferences, the proposed EFQM-based self-assessment model's criteria weights may now be interpreted. Table 11 summarizes the main criteria and sub-criteria weights of the official EFQM and proposed model.

In the proposed model, Enablers representing the management aspects of the railway transportation company get higher importance in general, since its weight increased from 50% to 55.74%. Therefore, Results as the performance measure of the company's business

Table 10. Global weights of all factors

Main Criteria	Local Weights	Sub-Criteria	Local Weights	Global Weights	Sub-Sub-Criteria	Local Weights	Global Weights
Enablers	0.5574	Leadership	0.1328	0.0740	I1a	0.2000	0.0148
					I1b	0.2000	0.0148
					I1c	0.2000	0.0148
					I1d	0.2000	0.0148
					I1e	0.2000	0.0148
		People	0.1561	0.0870	I2a	0.2012	0.0175
					I2b	0.1799	0.0157
					I2c	0.1828	0.0159
					I2d	0.4361	0.0380
		Strategy	0.1413	0.0788	I3a	0.1329	0.0105
					I3b	0.1298	0.0102
					I3c	0.4657	0.0367
					I3d	0.1378	0.0109
					I3e	0.1338	0.0105
		Partnership and Res.	0.1460	0.0814	I4a	0.2320	0.0189
					I4b	0.1788	0.0146
					I4c	0.1761	0.0143
					I4d	0.1980	0.0161
					I4e	0.2151	0.0175
		Proc., Prod., & Services	0.4238	0.2362	I5a	0.1961	0.0463
					I5b	0.2519	0.0595
					I5c	0.1759	0.0415
					I5d	0.1993	0.0471
					I5e	0.1768	0.0418
Results	0.4426	Customer	0.2450	0.1084	II1a	0.4981	0.0540
					II1b	0.5019	0.0544
		People	0.2424	0.1073	II2a	0.5009	0.0537
					II2b	0.4991	0.0536
		Society	0.2530	0.1120	II3a	0.5002	0.0560
					II3b	0.4998	0.0560
		Key	0.2595	0.1149	II4a	0.5016	0.0576
					II4b	0.4984	0.0572

activities lost some importance. At first sight, it seems that the management activities are accepted as more important than the outputs of their results. But the consideration of the weights of sub-criteria may give a different and more realistic view. In fact, sub-criteria of Leadership, Strategy, People, and Partnership and Resources lost weights ranged between 1% and 3% and it seems all the lost slides to the sub-criterion of Products, Processes, and Services. Railway transportation experts gave more importance to services provided by the companies than other aspects of management. Actually, since railway transportation is a service itself, this finding points out an inevitable phenomenon of it. The general EFQM model is designed to be used in any industry. So, there are no industry-specific implications of it until now. Transporting goods and/or people requires an emphasis on processes and services. Otherwise, the customers can be lost to the competitor(s) as companies and other transportation modes like maritime, truck, or airway. To keep the goods and people safe and delivering

Table 11. Comparison of original and proposed models' weight sets

Main Criteria	Original Weights	Proposed Weights	Difference	Sub-Criteria	Original Weights	Proposed Weights	Difference	Rank
Enablers	0.50	0.5574	0.0574	Leadership	0.10	0.0740	-0.0260	9
				People	0.10	0.0870	-0.0130	6
				Strategy	0.10	0.0788	-0.0212	8
				Partnership and Res.	0.10	0.0814	-0.0186	7
				Proc., Prod., & Services	0.10	0.2362	0.1362	1
Results	0.50	0.4426	-0.0574	Customer	0.10	0.1084	0.0084	4
				People	0.15	0.1073	-0.0427	5
				Society	0.10	0.1120	0.0120	3
				Key	0.15	0.1149	-0.0351	2

the service with a top-quality involving timely delivery are among the basic expectations and requirements of customers.

From Table 11, it is observed that weights of many sub-criteria (6 out of 9; 4 out of 5 Enablers criteria, and 2 out of 4 Results criteria) were diminished for an EFQM application in the railway industry. The only weight increment in Enablers criteria was observed in Processes, Products, and Services by 13.62%. Customer and Society sub-criteria of Results also increased their weights by only 0.84% and 1.20%. It is obvious that the total lost weights were shifted to the three aforementioned sub-criteria and Services earned the biggest part of the pie with an increase of 13.62%. It can be interpreted that the railway experts gave due credit to Services sub-criteria.

According to these findings, it is evident that the weights of the official EFQM are not completely appropriate for the railway industry. Industries have different features, paradigms, expectations, and characteristics. The original model's equal weighting methodology should be updated by considering the distinctive requirements of the industry. As a quality self-assessment tool, the EFQM model should be modified according to the specific requirements of railway transportation service. Adjustment of the weighting schema can be a good starting point. Then, if required, definitions, concepts, or questions in EFQM can be updated according to the specifications of railway transportation.

CONCLUSIONS

In today's intensely competitive environment, EFQM has become a strategic issue, as it is an effective concept in choosing the best management tool for a business. EFQM is a concept that develops strategic capabilities and plays a key role in achieving sustainable competitive advantage.

Service quality is one of the most important issues in railway transportation because it is a concept that positively affects customer satisfaction, customer loyalty, corporate image, intention to repurchase, and operational efficiency. The quality of railway transport directly affects whether passengers travel by train and how often they travel by train. Therefore, it is important to take steps to improve the service quality of railway operators. EFQM model also provided an opportunity to consider the justification of the existing solutions of local authority activity in railway transportation. EFQM may authorize railway transportation managers to determine how local authority processes influenced the achievement of positive results and outcomes for passengers.

The purpose of this study is to build a modified EFQM-based self-assessment model for allowing railway companies to evaluate their service quality levels, provide relevant data on the continuous improvement process, and lead the way to higher levels of quality. This is the first attempt to conduct a case study in the Turkish railway industry using the IF-AHP method for EFQM model implementation. This study pointed out interesting results related to the gaps identified during the railway transportation and EFQM literature review and contributed toward improving railway service quality, thus encouraging the identification of solutions that lead to continuous improvement.

In this study, IF-AHP method which provided the relative importance of criteria was used to analyze the problem more comprehensively and effectively. We preferred to employ an intuitionistic version of AHP because this version is more inclusive than traditional fuzzy sets. In the original fuzzy definition, an expert can just provide a positive idea represented by a membership function. But intuitionistic fuzzy sets consider both positive and negative evaluations of the expert and represent these ideas with membership and non-membership degrees, respectively. AHP is a very famous and highly cited MADM method, and its power comes from its practicality and usability in any decision problem requiring subjective judgments of the experts. To increase its ability regarding the human judgment evaluations, we conducted an AHP analysis under IFS environment. Another power of AHP is its ability to assess the consistencies of the experts.

We developed a dedicated questionnaire for this study and took the EFQM model's elements as attributes. Then, the questionnaire was fulfilled by eleven railway experts in a face-to-face meeting. The collected data were analyzed by IF-AHP and the attribute weights were revealed. As can be seen in Table 11, all the weights we found are different than the original EFQM model's weight set. As a result, it has been determined that the importance of the Enablers has increased by 5.74% in total. It means the management aspects in the railway transportation companies should be improved as a quality dimension. It is observed that the results of management activities are admitted as more important than their outputs. Also, the highest change (its weight is increased from 10% to 23.62%) occurred in the Process, Production, and Services attribute. In contrast, the sub-criteria of Leadership, Strategy, People, and Partnership, Resources lost weight and it is obvious that all these losses have shifted to the sub-criterion of Products, Processes, and Services. This finding is very important because transportation activity is a service and management efforts should always be focused on service quality. So, the proposed EFQM model for the railway industry is reflecting this idea: processes and services will take the first position in any improvement plan because the customer's focus will be on service quality.

A country's development depends on the importance given to relations with transportation infrastructure so that the railway transportation service quality is expected to further improve by increasing the resources allocated to the railway infrastructure in Turkey. Turkey is located at the junction where international trade and logistic activities function among Europe, the Balkans, the Black Sea, the Caucasus, Central Asia, North Africa, and the Middle East. With the acceleration of economic growth and international trade, located in the Silk Road and the Spice Road route in the historical process, the importance of Turkey in the railway transportation undertaking act as a bridge between the East and West is further increased. Despite Turkey owned to having a huge advantage in strategic and geopolitical position, it is not a sufficient factor to be an international logistics center. Rail transportation is so critical regarding Turkey's transformation into an international logistics center. First of all, railway transportation should be provided as integration by sea, road, and air transportation for being an international logistics center. Railway transportation is one of the most important modes of transportation to realize intermodal transportation effectively and efficiently. In this context, a consideration that should be given to improving the quality of railway transportation services and infrastructure will strengthen the potential of becoming an international logistics center. These developments will provide an opportunity for Turkey about being a center country in the world and not a transit country.

The options for future research are wide. Firstly, a comprehensive analysis of air, sea, road, and railway transportation could be included to find the importance of general service quality measures for the logistics industry of a country. Secondly, the question that needs to be addressed is which transportation mode is more important regarding quality for being an international logistics center. This study has three basic limitations, one is related to the fact that the railway experts invited stay in Turkey; the judgment and thinking of these experts can contradict those of railway transportation experts in other countries. The second one is the assumption of the non-existence of influences/relations among criteria. Rather than using a version of the AHP, Analytic Network Process (ANP) can be performed.

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Appendix 1. The sub-sub-criteria included by the hierarchy of the EFQM Model.

(I1) Leadership

(I1a) Leaders develop the mission, vision, values and ethics and act as role models.

(I1b) Leaders define, monitor, review and drive the improvement of the organization's management system and performance.

(I1c) Leaders engage with external stakeholders.

(I1d) Leaders reinforce a culture of excellence with the organization's People.

(I1e) Leaders ensure that the organization is flexible and manages change effectively.

(I2) Strategy

(I2a) Strategy is based on understanding the needs and expectations of both stakeholders and the external environment.

(I2b) Strategy is based on understanding internal performance and capabilities.

(I2c) Strategy and supporting policies are developed, reviewed and updated to ensure economic, societal and ecological sustainability.

(I2d) Strategy and supporting policies are communicated and deployed through plans, processes and objectives.

(I3) People

(I3a) People plans support the organization's strategy.

(I3b) People's knowledge and capabilities are developed.

(I3c) People are aligned, involved and empowered.

(I3d) People communicate effectively throughout the organization.

(I3e) People are rewarded, recognized and cared for.

(I4) Partnership and resources

(I4a) Partners and suppliers are managed for sustainable benefit.

(I4b) Finances are managed to secure sustained success.

(I4c) Buildings, equipment, materials and natural resources are managed in a sustainable way.

(I4d) Technology is managed to support the delivery of strategy.

(I4e) Information and knowledge are managed to support effective decision making and to build the organizational capability.

(I5) Processes, products and services

(I5a) Processes are designed and managed to optimize stakeholder value.

(I5b) Products and Services are developed to create optimum value for customers.

(I5c) Products and services are effectively promoted and marketed.

(I5d) Products and services are produced, delivered and managed.

(I5e) Customer relationships are managed and enhanced.

(II1) Customer results

(II1a) Perception.

(II1b) Performance indicators.

(II2) People results

(II2a) Perception.

(II2b) Performance indicators.

(II3) Society results

(II3a) Perceptions.

(II3b) Performance indicators.

(II4) Key results

(II4a) Key outcomes.

(II4b) Key indicators.

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A Study on the Investigation of Sustainability Practices of Global Brands in the Fashion Market

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ABSTRACT

Due to the careless use of natural resources, developments in technology, industrialization and population growth, environmental pollution and resource depletion are experienced in the world. The garment clothing and fashion industry has a significant impact on the rapid depletion of natural resources. The rapid change in fashion, especially in the garment clothing industry, negatively affects sustainability in the use of resources. Besides these; the careless use of large amounts of water and chemicals in production, and the release of waste to nature also harm the sustainability of life. These negative factors have started to increase consumption with environmental awareness, especially among consumers who care about nature. Conscious consumers' interest in nature has led to an increasing emphasis on sustainability in production and consumption by brands in ready-to-wear and other sectors. Especially in the Industry 4.0 process, the concept of sustainability has become one of the most important issues for global brands. The production of garment clothing products with natural fibres and materials is of great importance in terms of sustainability. These materials are compatible with nature and can be recycled. In apparel, due to long supply chains, energy and labour intensive production, ecological, economic and social sustainability studies are of high importance in the production and process management process.

In the research, application examples of global brands in the ready-to-wear and fashion sector, based on sustainability studies, were examined. For example; Stella McCartney, one of the luxury fashion brands; uses organic cotton, eco-friendly fibre and recyclable polyester and cashmere for sustainability. While Mara Hoffman uses tencel fabric and organic cotton, Gucci has banned PVC in its products since 2015 and prefers to use a carbon zero footprint in its work. While DeFacto, one of the global ready-to-wear brands, implements many environmental projects related to PET bottles, water use and textile waste, global brands such as Nike, GAP, Levi's, C&A, Inditex group, Nude Jeans also carry out exemplary studies on sustainability. As can be seen from the global brand examples, brands, on sustainability; develop applicable strategies in the fields of development goals, management of production and operation processes, supply policies, waste management.

Keywords: Sustainability, Sustainable Fashion, Sustainable Market, Sustainability Production Management, Sustainability Studies, Document Analysis.

JEL Classification Codes: M14, M31, M37, L11, L23

INTRODUCTION

Clothing is as old as human history. It is an indispensable need that arises with the existence of human beings. It was born out of the need to be protected from natural conditions and then developed according to the needs of people. The need for clothing is one of the necessary factors for a person to live. Dressing style becomes demand through socialization and psychological satisfaction. The concept of fashion and clothing style emerges according to climate, religion, language, class differences, social life, economy, technological developments and regions. The fashion industry, which has gone through many stages since it entered the society, is now approaching the 4.0 period with many lessons learned and the potential to transform into a more sustainable and predominantly customer-oriented industry (Bertola and Teunissen, 2018). The term Industry 4.0 is used to describe a series of technology transformations and productive process organizations based on communication technologies and devices in a system and product design, production and distribution (Kabukcu, 2018). The concept of Industry 4.0 is also the expression of a multidimensional system consisting of smart product development, increased productivity, high and continuous customers, and a logistics network as a result of the integration of the production process into the digital industry (Özcan et al., 2018). The desire to use a garment or item for a certain period of time instead of not using the same one and to replace it with a different one has created fashion. In today's societies that have

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adopted a fast lifestyle, the need for changes to come together has created the concept of 'fast fashion', which accelerates consumption and production. Fast fashion is not sustainability. It is helps to satisfy the craving of consumers for luxury fashion (Joy et al. 2012).

In today's world where resources are limited, it is becoming more and more difficult for all companies to reduce their costs, reduce their environmental impact and survive in a competitive market environment. Sustainability of companies in the market depends on the degree to which they meet customer expectations in the competitive global market. Sustainability has become a keyword in the fashion industry due to its wide supply chain, intense labour and energy needs. In these conditions, businesses today can continue their existence with the "sustainability" strategy (Thomas, 2019).

The concept of sustainability was used for the first time in the "Our Common Future" report of the United Nations Environment&Development Commission in 1987. For the first time, "The Concept of Sustainability" was included in this report with concrete data (WCED, 1987). Sustainability is the primary concern of the 21th century and is often associated with corporate social responsibility (Aguilera et al., 2007). Development goals have become more and more important all over the world in terms of sustainability in the market. Countries have set targets in terms of sustainability. In order to achieve the Sustainable Development Goals, businesses and society have important duties. The Sustainable Development Goal has emerged as a result of the processes in which governments evaluate businesses, non-governmental organizations and citizens together (UNDP Turkey, 2020).

Sustainability is a broad term. While ensuring the continuity of productivity and diversity, it aims to preserve its ability to be permanent. Sustainability, in the simplest terms, can be defined as developing without harming resources in order to transfer them to future generations while using today's resources. As a basic principle, sustainability focuses on the fact that the resources in the environment and nature are exhaustible, and therefore, it focuses on using these resources with rational approaches.

The fashion and ready-to-wear sector, which is among the sectors where sustainability is important, is a labour-intensive and low-wage sector that focuses on market demands. The purpose of companies operating in the fashion sector; is to develop designs with high competitive advantage for consumer demands and preferences and to produce them by meeting efficiency criteria. Thus, brands can optimize product costs in accordance with their target audience. In this process, sustainability in the garment clothing and fashion industry is only possible by ensuring sustainability at all stages of the industry's supply chain.

Brands based on sustainability also attach importance to employing workers in better conditions and maximizing social contribution, while making environmentally friendly production with less energy and less water consumption. However, in this way, it can be mentioned that all components of sustainability in ecological, economic and social dimensions are provided. Sustainability in the ready-to-wear and fashion industry is only possible by ensuring sustainability at all stages of the industry's supply chain. Today, global garment clothing brands attach great importance to sustainability studies on issues such as water use, carbon footprint, PVC use, recycling, reuse and energy use. There are many garment clothing brands that attach importance to sustainability, organize their sustainability activities according to international sustainability standards, and take part in international sustainability organizations. Among these global brands, brands such as The DeFacto, Nike, GAP, Levi's, C&A, Inditex group, Nudie Jeans draw attention with their sustainability studies, projects and campaigns.

In this research, the concept of sustainable fashion in the fashion and ready-to-wear sector, sustainable development goals, sustainable fashion market and competition, sustainability studies of global brands in the ready-to-wear and fashion sectors are emphasized. While performing document analysis in the research, in the selection of global garment clothing brands to be analysed; their work on sustainability, the projects and campaigns they carry out, the organizations they are members of and the international standards they apply are taken into account.

SUSTAINABILITY DEVELOPMENT TARGETS OF THE FASHION AND APPAREL INDUSTRY

The Fashion and Ready-to-Wear Sector is an industry branch that has an important place in the economic growth process of countries and is one of the sectors in which the industrialization process first starts in developing countries. The global apparel market is worth $3 trillion, $3,000 billion and accounts for 2% of the world's Gross Domestic Product (GDP) (Fashion United, 2022). Although it has such an important place in the economic system, the damage it causes to the environment and humanity in the fashion and garment

clothing sector is quite high (Taşkın and Güney, 2014). For example; In 2015, out of 400 billion m2 of fabric produced in the garment clothing industry, 15%, or 60 billion m2 of garbage, was generated (Rissanen and Mcquillan, 2016).

20% of the global wastewater production is made by the garment and textile industry. According to the world average, each consumer throws away 32 kg of shoes and clothes annually (IHKIB, 2022). Although many sectors in the world negatively affect the environment and human health, the fashion and garment clothing industry is similar to the chemical industry, which is one of the most polluting sectors worldwide (Yücel and Tiber, 2018). A 2021 World Economic Forum report identified fashion and the supply chain as the planet's third largest polluter, after the construction and food industries. The fashion industry contributes to approximately 10% of global greenhouse gas emissions. This beause is long supply chains and energy-intensive production (Fashion Industry Environmental, Waste, and Recycle Statistics) (Edgexpo, 2021).

The largest environmental impact of the clothing and fashion industry comes from the discharge of high chemical wastewater. Other important factors include energy consumption, solid waste, odour generation and air pollution. Environmental problems related to the fashion and apparel industry continue at all stages including the production and process management process, starting with the emissions from the production of synthetic fibre and drugs used in the cultivation of fibres for raw materials, from the production of the garment garment to its delivery to the consumer. When it comes to obtaining the final garment clothing product, a series of processes and many different chemicals have been used until this stage. Environmental issues related to the fashion and apparel industry are mostly related to water pollution from the discharge of untreated liquid waste. Liquid waste from washing operations contains significant amounts of organic and suspended impurities such as fibres and grease. Liquid wastes often generate heat, are alkaline and odorous, and are dyed with chemicals used in dyeing processes. Some of the discarded chemicals are toxic and can reduce the amount of dissolved oxygen in waters, threaten aquatic life and directly reduce overall water quality. In addition, other equally important and relevant issues in the industry include workplace safety such as emissions, volatile organic compounds, noise and odour (Taşkın and Güney, 2014).

Industry 4.0 stands out in terms of sustainability and competition in the fashion industry. In Industry 4.0, there are three basic elements that transform high technology into a competitive advantage:

a. Getting the product to market very quickly

b. Making custom production

c. Increasing productivity (Kılıç&Alkan, 2018).

When the use of the technological components of Industry 4.0 in the garment and fashion industry supply chain is examined, smart factory approaches come to the fore. In the fashion industry, a collection is first prepared during the production stages, and then the prototypes are presented to the customer. In this process, clothing models designed with three-dimensional virtual dressing programs using virtual reality technologies, one of the technological components of Industry 4.0, within the framework of the smart factory concept, can be dressed digitally in a way that carries the visual characteristics of the desired fabric and accessories (Şen, Şen Kılıç, Öndoğan, 2020). Clothing patterns created in computer-aided pattern design systems can be made three-dimensional with the help of these systems. Thus, clothing companies can save time, labor and fabric by preparing a virtual prototype of the product (Kılıç, 2011).

Sustainability has three dimensions: ecological dimension, economic dimension, social/ethical dimension. Realizing for sustainability all of them must be provided.

SUSTAINABILITY IN APPAREL BRANDS

The ready-to-wear industry is a market-oriented, low-wage, labour-intensive, dynamic and innovative industry. While mass production is carried out by preparing commercial collections in the sector, personalized designs also have an important place. While the industry is increasingly digitized, the use of modern technology is now dominating the industry. The most important factor for the sector to follow technology and developments closely is to provide competitive advantage in the market in an intensely competitive environment, to continuously meet the changing demands of consumers and to ensure continuity by using resources in the most effective way. Thus, while reducing their costs with their sustainability activities, they also provide social prestige. The competitive advantage of companies in the sector is to produce designs that can respond to consumer demands and preferences. Globalization in the apparel industry means that the apparel is designed in New York, manufactured in

China using a fabric produced in Korea and cut in Hong Kong, and distributed in the UK. A single country border is no longer effective in determining the strategies of manufacturers and distributors (Erarslan, Minister, Kuyucu, 2008). Sustainability provides many benefits to businesses. These are: Gaining global competitive advantage, Reducing production costs, Improving strategic decision making, Increasing (improving) firm value, Identifying new business opportunities, Gaining advantage as a supplier, Developing relations with regulators, Developing responsibility management, Increasing cooperation, Training employees, Meeting customer needs definition, improvement of product and service differentiation, improvement of relations with society (UIB, 2017). Ready-to-wear brands aim to produce commercial collections with designs that will create demand according to consumer demands and preferences in order to gain competitive advantage in an intense market environment. While maintaining their existence in a competitive environment, brands have begun to give importance to sustainability studies in order to use resources in the best way, reduce environmental impacts, reduce costs, and maintain their presence in the market while meeting consumer expectations in an environment where resources are gradually decreasing (UIB, 2017).

In terms of sustainability, the "cradle-cradle2cradle" principle, which was put forward by Stahel in the 1970s, came to the fore at the beginning of the 21st century. According to this principle; a product should be designed to have many life cycles and the product at the end of its life should be able to participate in a new life cycle through recycling (Niinimäki, 2013). Sustainable development refers to providing the needs of the present, the ability of future generations to meet their own needs without compromise (WCED, 1987).

Sustainability Studies of Global Fashion and Apparel Brands

Since sustainable development began to be used and discussed as a concept, it has three dimensions: ecological dimension, economic dimension, social dimension (Harris, 2000).

A. Ecological dimension; the aim of ecological sustainability is to protect nature and the environment for future generations, and to use non-toxic and recyclable resources that do not harm the physical environment. ecological dimension; Ecological sustainability is the ability to preserve valuable things or qualities in the physical environment (Sutton, 2004). In the ecology dimension, sustainability is examined in two stages:

Production ecology: Selecting textile raw materials, chemicals and processes with an environmentally friendly approach, using treatment methods at every necessary stage,

Waste ecology: It is the conversion or recovery of wastes such as water, textile products, which occur after production, into products that are harmless to the environment (http://www.oeko-tex.com)

B. Economic dimension; protection of capital and prevention of corruption (Goodland, 2002). Sustainability has become the main subject of renewable natural resources economy due to the depletion of resources day by day (Vivien, 2008). It is the prevention of excess consumption of economic resources such as raw materials, energy and manpower, which is desired to be achieved with economic sustainability (http://www.innovationintextiles.com). Sustainability in the economic dimension is related to ensuring economic growth along with improving the quality of life and the environment. Excessive consumption of resources also hinders the achievement of economic sustainability.

C. Social sustainability; encompasses human rights, labour rights and corporate governance. In the social dimension; A society must have the flexibility and ability to conserve and develop its own resources, and to prevent and solve potential future problems. Social sustainability refers to the process of creating sustainable places that increase well-being, taking into account where people live and work. In addition, in this process, what people need in a working environment needs to be synthesized appropriately (Woodcraft, et al., 2012). Social sustainability can be achieved by meeting the basic needs of the individual (Sahni, 2010).

As Sustainable Development Goals; In September 2015, 193 states of the United Nations adopted a plan called the "2030 Agenda" to achieve a better future (Piñeiro-Otero, Martínez-Rolán, 2016). Emphasizing the importance of taking responsible consumption and production as a basis in order to ensure sustainability in the garment clothing and fashion sector as in other sectors, the steps to be taken to ensure responsible consumption and production have been brought together under the following headings (UNDP Turkey, 2020);

– Ensuring sustainable management and effective use of natural resources until 2030,

– By 2030, significantly reduce the generation of solid waste through prevention, reduction, recycling and reuse,

– Ensuring environmental management of chemicals and wastes throughout their life cycles in order to reduce adverse effects on human health and the environment, within the framework of international agreements, and substantially reducing their contamination into air, water and soil by 2020,

– Encouraging especially large and global brands to adopt sustainable practices and preparing sustainability reports,

– By 2030, it is to ensure that everyone reaches a certain knowledge and awareness about sustainability.

The social dimension of sustainability consists of three phases: "development sustainable development", "bridge sustainability" and "maintaining sustainability". Sustainability of development is the provision of basic needs such as social capital, justice and equality. Bridge sustainability is making behavioural changes to achieve environmental goals. Sustainability refers to the preservation of socio-cultural characteristics in the face of change (Vallance, Perkins, Dixon, 2011). Sustainability is an increasingly important concept for consumers. For this reason, businesses attach more and more importance to sustainability studies. Here, the circular fashion industry is starting to come to the fore. In a cyclical process, products are needed and designed and developed according to the next step. Therefore, fashion products should be designed with organic, atoxic, reclability and high resource efficiency. Also, recyclable resources and ethical practices should be prioritized in the producing and designing.

Fashion products must be suitable for recycling. Raw materials must be biodegradable. For sustainability in circular model, products are designed and developed with re-use in mind. While designing fashion products, resources should be used efficiently, should not contain toxic substances, should be recyclable, and ethical rules should be observed in design and production (Motif, 2020). The circular model, which is of vital importance in terms of sustainability for the garment clothing industry, is given in Figure 1.

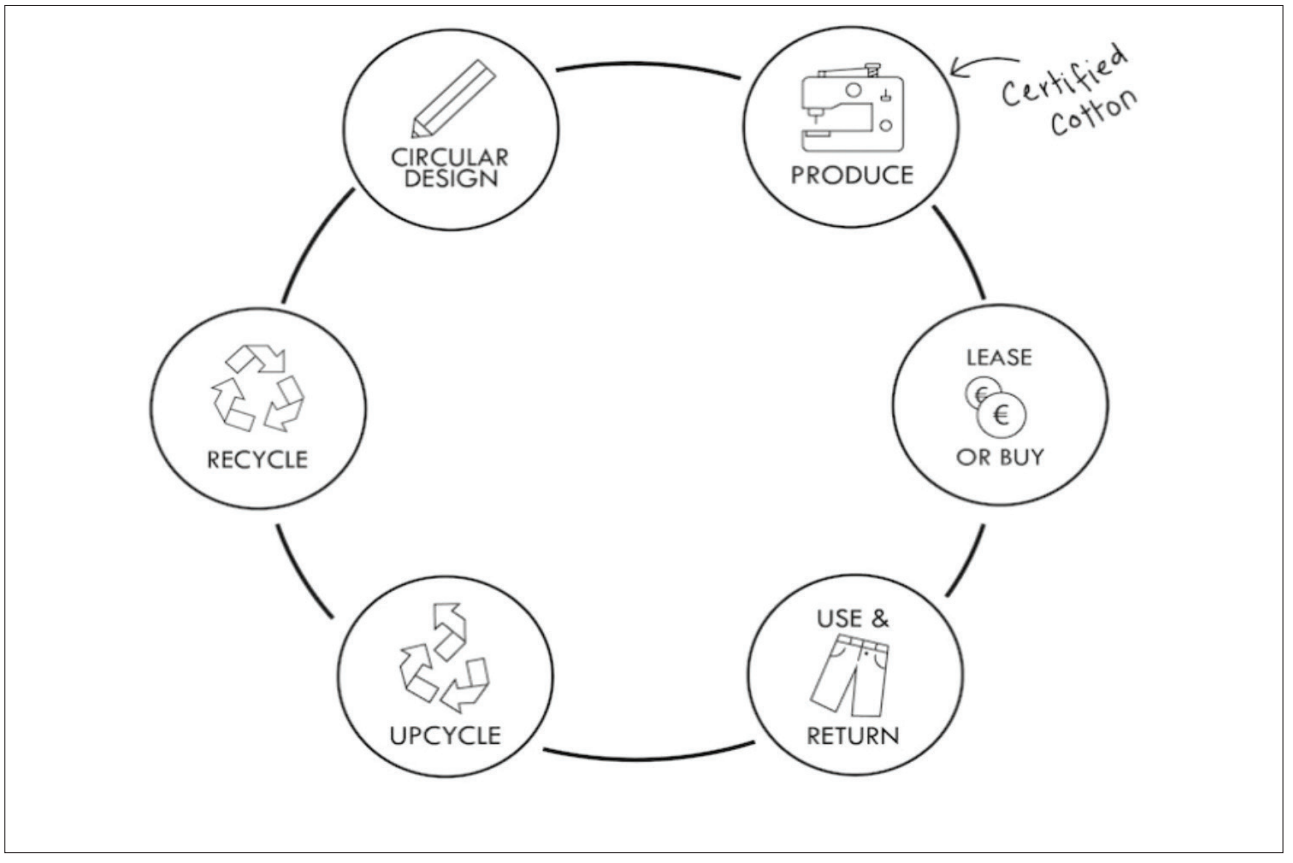


Figure 1. Circular Fashion Economy Wheel

https://cf.motif.org/wp-content/uploads/2019/03/29150110/circular-4.jpg

MATERIAL METHOD

Today, the concept of sustainability has gained importance in the world where resources are increasingly depleted. Brands attach importance to sustainability

studies in order to reduce costs, reduce environmental impacts and compete in the market. The basis of sustainability is that brands make environmentally friendly production with low energy and water consumption. It is also important for brands to improve working conditions. Sustainability in the ready-to-wear and fashion industry is possible by ensuring sustainability at all stages of the industry's supply chain.

In this study; In order to examine the sustainability studies applied in the fashion and garment clothing sector, document analysis, which is a qualitative research method, was conducted. For the document analysis, global brands that attach importance to sustainability studies in the sector were examined. World-famous brands were chosen as examples for the review. The aim of the research is to examine the sustainability studies of global brands and to make suggestions on the subject. To this end, an attempt was made to find out how the marketing strategies of the garment clothing companies have changed over time. For this purpose, the method of document analysis was used, which belongs to the qualitative research methods. The reason why qualitative research is preferred is to study corporate behaviour in relation to sustainability, because qualitative research examines attitudes, behaviours, opinions and experiences in detail. It interprets and explains the findings. It offers the opportunity to go into depth. Qualitative research seeks answers to questions such as "why, how, why" to understand the issue, rather than measurable values. As a result, suggestions are made to increase the quality. The data desired to be obtained in qualitative research is collected through observation, interviews and documents (Berg&Lune, 2019). Then the obtained data is interpreted and evaluated.

Document analysis is a qualitative research method used to analyze the contents of written documents meticulously and systematically (Wach, 2013). Document analysis systematically analyses written documents. Document analysis is used to examine and evaluate all printed and electronic documents related to the subject to be researched. The chosen research problem determines which documents can be used as data sources. Data increases when document analysis is used together with other qualitative methods such as observation and interview. This contributes to research validity.

Document analysis whis is using is a form of qualitative research to give voice and meaning to assessment topic (Bowen, 2009). Document review is used together with methods such as survey, interview and observation in the research methods of social sciences. It is also used alone in qualitative analysis. In social sciences research methods, document analysis is used together with visual films, videos and photographs. It is important that the documents are original, competent, accurate, reliable and up-to-date. Data selection is essential in document analysis. The success of document analysis depends on the researcher's ability to understand and interpret documents correctly. Like other qualitative research methods, document analysis gives meaning to an event or situation and creates an idea about the subject. Examines and interprets data to develop visual and experimental information.

In the research; As material, sustainability reports, activities, fashion shows and websites prepared by global garment clothing brands within the scope of sustainability practices were discussed. Thus, the data were collected. In the research, sustainability studies of global garment clothing brands in the media were also observed. The reason for using document analysis in the research is stated below;

- It takes less time than other research methods,
- It is more efficient and
- It costs less.

As the sample size, a selection was made among the global garment clothing brands to be examined in the research. When selecting brands: criteria such as membership of the United Nations Global Compact (UNGC), use of Global Reporting Initiative standards, production of environmentally friendly clothing, recycling, production of reusable products, production of sustainability reports and work on issues such as zero waste and zero carbon footprint. It is discussed. In this context, seven global brands were selected as part of the research. Document analysis was used as a qualitative analysis in the research. Documents related to sustainability reports and sustainability activities of garment clothing brands were selected. In the research, open access documents of brands on the internet and documents of international organizations on sustainability were used. Since the documents on the websites of organizations or businesses have open access, digital documents can be used as open source. Open access documents can be used without permission of the authors or publishers. This situation brings document analysis to the fore in qualitative research. The fact that the documents used in the research can be reviewed repeatedly also makes document analysis

preferable in qualitative research. The purpose of using the qualitative method in the research is to examine the sustainability-related behaviours and attitudes of garment clothing brands. In qualitative research, in addition to observation, previously prepared printed and electronic documents were examined and observations were objectively supported. By comparing the data obtained in the research, an approach on the subject was tried to be obtained. Care was taken to protect the documents shared with the public in order to protect copyrights. Certain steps have been taken in the document review;

- A research plan has been established.
- Necessary data for the research have been determined.
- Data were collected by accessing open access documents determined in data collection.
- The authenticity, accuracy and reliability of the documents obtained from the websites of brands and organizations were checked.
- After the data were analysed, data analysis was performed.
- The findings obtained as a result of the analysis were interpreted.

In order to carry out the research, the data obtained by examining the global brands were interpreted as a whole. As a result of the research, it was seen that global brands attach importance to sustainability studies. Finally, the results obtained by observation and document review were interpreted.

FINDINGS

Qualitative analysis approach was preferred in the research. From the qualitative analysis approach, document analysis was carried out to determine and analyse the sustainability studies, projects and campaigns of the brands. Open access sustainability reports, projects and campaigns published on the websites of the selected brands by document analysis were examined. In addition to the websites of the brands, open access data of global organizations on sustainability and international standards organizations were examined. Among the many ready-to-wear and fashion brands that work on sustainability strategies in the selection of the brands to be the subject of the research, brands that prioritize sustainability in common areas and are members of relevant organizations were preferred (Edgexpo, 2021). In the selection of brands;

– *United Nations Global Compact (UNGC) (The world's largest corporate sustainability initiative):* UNGC aims mobilise a global movement of sustainable businesses and stakeholders to create the world that is want. UNGC supports companies to: act responsibly by aligning their policies and operations about human rights, ecology, anti-corruption and human rights with ten principles; take strategic action to advance broader societal goals (UNGC, 2021).

– *Global Reporting Initiative (GRI):* The GRI (Global Reporting Initiative) is an independent organization. It helps companies and other organizations take responsibility for their impacts by providing them with a global common language. GRI standards provide the most widely used sustainability reporting standards in the world. (GRI, 2021).

- Based on environmentally friendly clothing production (Commitment to eliminate or reduce hazardous chemicals, etc.)
- Based on recycling (such as using PES and organic cotton)
- Reuse applications
- Publishing sustainability reports (sustainability reports)
- Having studies on zero carbon footprint
- Giving importance to zero waste management
- High brand value in the global market
- Factors such as their consideration of the Paris agreement were taken into account (Table 1).

Among these brands, GAP, Nike, Zara brands carry out studies in 3 priority areas (Figure 2.).

DeFacto Brand

The DeFacto brand has implemented many environmental projects to protect natural resources and contribute to sustainability activities (Brandage, 2019). For example, they focused on a special technology by evaluating PET bottle and textile waste together, by reducing the average monthly electricity consumption per square meter in stores in Turkey; they succeeded in obtaining 500 tons of waterless trousers in at least four thousand years. water saving, zero discharge using organic and recycled cotton, chemical fertilizers and pesticides, recycling of 1,688 tons of cardboard and 338 tons of packaging waste (CNNTurk, 2018) (Photo 1).

Table 1. Common features that stand out in the selection of fashion and ready-to-wear brands

Company	UNGC Membership	GRI Standars	Sustainability Report	Re-Cycle	Re-Use	Zero Carbon Footprint	Zero Waste	Paris Agreement
DeFacto	♻	♻	♻	♻	♻	♻	♻	♻
GAP	♻	♻	♻	♻	♻	♻	♻	♻
Levi's	♻	♻	♻	♻	♻	♻	♻	♻
Nike	♻	♻	♻	♻	♻	♻	♻	♻
Zara	♻	♻	♻	♻	♻	♻	♻	♻
C&A	♻	♻	♻	♻	♻	♻	♻	♻
Nudie	♻	♻	♻	♻	♻	♻	♻	♻

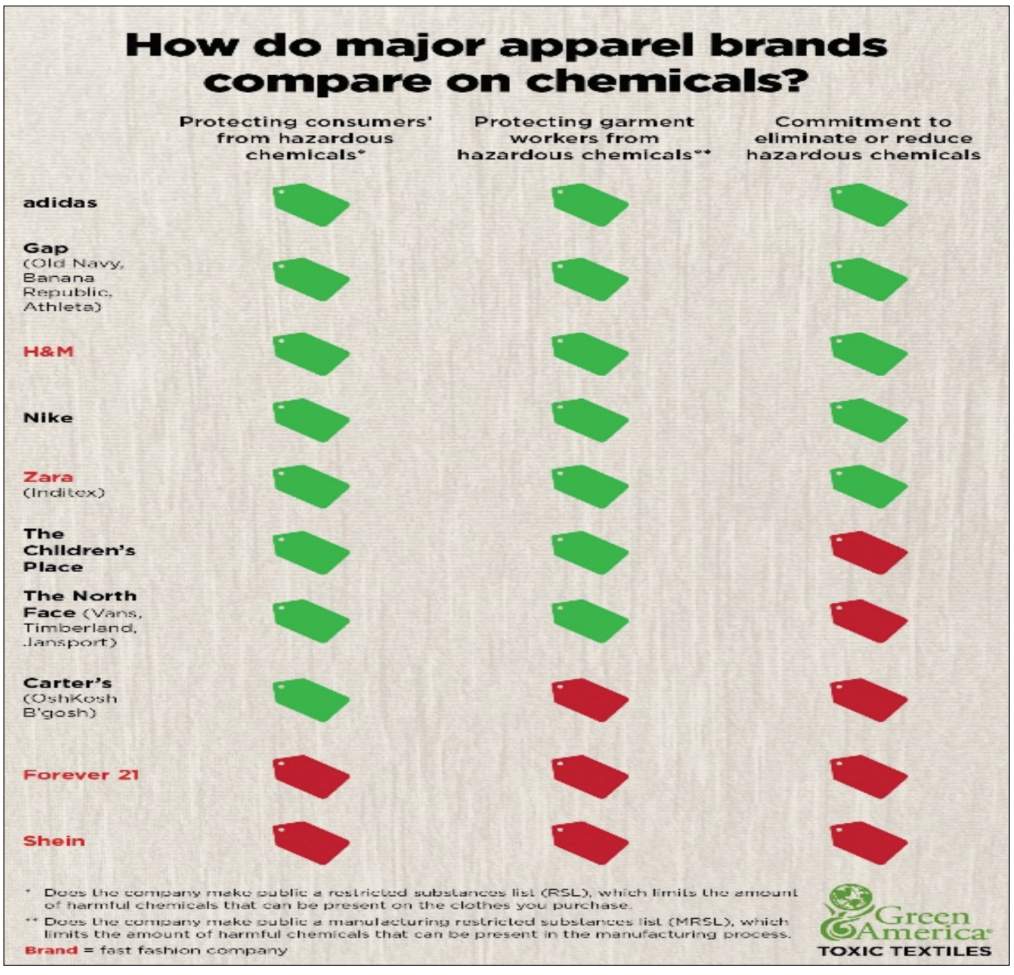
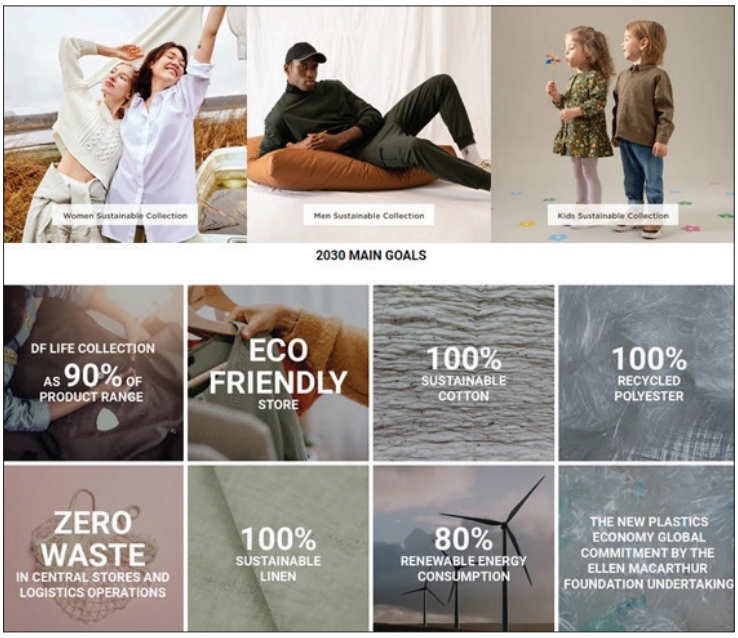


Figure 2. Brands working in three priority areas in the field of sustainability

https://edgexpo.com/fashion-industry-waste-statistics/



Photograph 1. Defacto Sustainability Products Policy https://eu.defacto.com/pages/sustainability

Photograph 2. GAP Sustainability Policy, https://gap.com.tr/surdurulebilirlik-gap-for-good/ (1, 2, 3) https://www.gap.ae/gap-for-good/ (4)

GAP Brand

The GAP brand uses recycled polyester and nylon as a resource conserving non-renewable resources that balance water effects and waste streams associated with pure material inputs. In 2016, the brand removed 7 million plastic water bottles from landfills. Thus, the brand got recycled polyester. GAP uses recycled materials as part of Generation Good. This global icon means that all products manufactured under the "GenerationGood" Program use at least 50% recycled materials or organically grown cotton (GAP, 2022).

The GAP brand has set a goal of obtaining 100% of its cotton from sustainable sources such as organic, recycled and US-grown cotton by 2021. The GAP brand has also developed consumer communication on the concept of sustainability (GAP, 2019) (Photo 2.).

Levi's Brand

Levi's has developed a comprehensive "Life Cycle Assessment" on one of its jeans that allows it to look at the entire production cycle from start to finish to find out where they can change their behaviour, interact with consumers and save money. Levi's has also launched a "Care for Our Planet Label" under the Goodwill brand, which provides brief instructions on all products so that consumers can learn about sustainable ways to wash and care for their clothes (Levi Strauss, 2010). Levi's and Goodwill brands jointly launched the "Care Label for Our Planet" application in order to extend the product life cycle in the fashion and apparel industry. In the application, customers who donated clothes to Goodwill were given a 30% discount coupon for their shopping at Levi's stores. This application is the first application that extends the product life cycle and reduces the environmental impact in the fashion and apparel industry (Levi Strauss, 2016). In addition, Levi's launched its denim clothing collection, consisting of organic and recycled cotton, under the brand Levi's Eco®. Denim pants contain 29% recycled PET bottles from Levi's Waste-LessTM collection. A Levi's 501 jeans are made from recycled PET bottle. Through its consumer-focused education programs, the company established a deeper connection with customers and encouraged them to change their behaviour in sustainable ways (Photo 3).

Nike Brand

Focusing on sustainability, the Nike brand has developed the "Design with Consideration" series, which aims to minimize designer clothes and uses environmentally friendly materials (e.g. knit shoe design) in design. Nike has implemented the "Go to Zero" sustainability policy to combat climate change. The Move To Zero campaign is a new step in Nike's sustainability journey for zero carbon and zero waste (Kavas, 2019). The slogan of the Nike brand is "Go to Zero" in its sustainability campaign. The aim of the Nike brand, which aims at zero carbon and zero waste with the campaign, is to help protect the future of sports (Nike, 2019) (Photo 4).

Photography 3. Levi's Sustainability Policy

https://adage.com/creativity/work/care-tag-our-planet-2/17672,
https://tiagrazette.com/copy-of-the-quartyly

Photograph 4. Nike Sustainability Policy

https://www.businessinsider.com/nike-announces-climate-change-sustainability-campaign-move-to-zero-2019-9
https://news.nike.com/news/nike-s-sustainability-report-shows-company-reducing-environmental-impact-while-continuing-to-grow
https://news.nike.com/sustainability
https://www.nike.com/tr/surdurulebilirlik

Nike has pioneered industry transformation in sustainable materials. They have expanded the EPM options available for all footwear by converting major large-volume shoe components into 100 percent sustainable materials. In addition, in 2019, more than 28,000 metric tons of carbon emissions were prevented by using recycled polyester instead of traditional in Nike brand shoes. Nike has also made progress in using sustainable materials in textiles and apparel (Nike, 2020).

In 2020, Olympic athletes wearing jerseys made by Nike brand from recycled shoe parts took place (Thomas, 2020a). Nike brand announced in September 2019 that they are working to reduce carbon emissions and waste as part of social responsibility projects. The brand

has stated that it will operate its businesses with 100% renewable energy until 2025, within the scope of the 2015 Paris Agreement. In addition, the brand has stated that they will reduce carbon emissions in the global supply chain by 30% by 2030.

The Nike brand today manufactures 78% of its products with some recycled material. In order to increase this rate, they are developing production methods. Since nearly 70% of the total carbon footprint consists of the materials it uses, the brand carries out serious studies and campaigns in this regard as a factor that will reduce its negative impact on the environment. One of the campaigns it has run is the "Move to Zero Community Competition", which is open to all members between 10-27 April 2022, representing the zero carbon and zero waste journey they have started to help protect the future of sports, with the slogan "You run, we plant trees". For this competition, the brand has committed to planting a tree for everyone who moves at least 1 km with its partners, WeForest. The brand also buys shoes for reuse, like new, and shoes with minor imperfections, is eaten by hand and offers them to its customers in select Nike stores (Nike, 2022). The brand also uses recycled polyester in its sportswear collections. It obtains high quality new yarns from recycled plastic bottles. These high-performance yarns reduce carbon emissions up to 30% compared to normal polyester. It produces Tempo shorts; one of the most popular product lines, by using at least 75% recycled polyester with these yarns. Most of the brand's design options are made from 100% recycled polyester. The Tempo shorts product alone has managed to collect 112 million plastic bottles from trash and drains to date (Nike, 2021).

Global brands such as Adidas, Puma, GAP, Athleta and Patagonia also attach importance to sustainability, just like the Nike brand. For example; while the Adidas brand produces approximately 20 million pairs of shoes by recycling the plastic accumulated in the oceans, the GAP brand uses recycled organic cotton in its production. In addition, the GAP brand has stated that it will increase the use of recycled cotton to 100% by 2025. Athleta aims to source 80 percent of its materials for clothing and accessories it sells from sustainable fibres such as recycled cotton by the end of 2020. It also produces recycled clothing from nylon and polyester waste (Thomas, 2020b).

C&A Brand

C&A brand became the first retailer to introduce Gold Level Cradle to Cradle (C2C) Certified™ t-shirts for sustainable fashion and apparel to the global market in 2017. Launching Gold Level C2C Certified™ Jeans in 2018, the brand added new products with Gold, Silver and Bronze C2C certificates to its fashion collections for its target audience. C2C Certified™ "Cradle to Cradle" is a very prestigious product quality standard. C2C Certified™ sets out five different quality criteria: material reuse, water management, material health, social equity, renewable energy and carbon management.

The C2C Certified™ Program has five certification levels; platinum, gold, silver, bronze and basic level. The C&A brand has also partnered with Fashion for Good, a platform for sustainable fashion (Houge, 2018) (Photo 5).

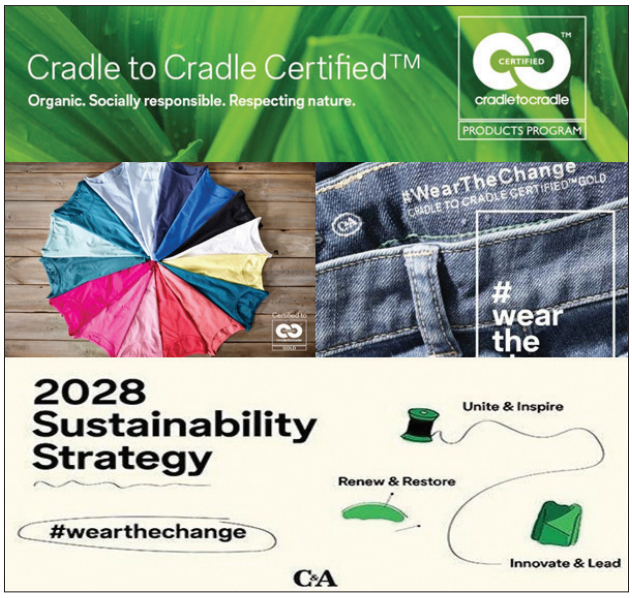
Nudie Jeans Brand

Scandinavian denim brand Nudie Jeans is one of the leading brands in ethical wear with its comfortable and traveller style. The brand, which makes all its production with 100% organic cotton and uses 91% less water than traditional methods, is very sensitive about its supply chain. While making unannounced visits to the factories it is a partner of, ensuring that the production conditions are always at high standards, it publishes these reports on its website and shares it with everyone (Berksü, 2019). In 2019, Nudie jeans repaired 63,281 pairs of jeans. In other words, they extended the life of 50,000 kg of clothing. Thus, a 15 percent increase compared to 2018 (Nudie Jeans, 2019) (Photo 6.).

Inditex Group Brands

The Inditex group is among the companies that attach the greatest importance to sustainability studies in the world. While all world-famous brands supported the sustainable development goals plan, Inditex started to implement a project called Join-Life. Recognized as a pioneer in the apparel industry, it covers the highest sustainability standards and strictest codes of conduct. Inditex is one of the world's leading fashion groups. Inditex's policy is to respond to customers' needs at the right time and present the latest trends to meet their demands (Pereira, 2020). Inditex group, want develop a complete and efficient cycle of life for their products by closing the loop. By 2023, one of Inditex aims is Zero Waste. It means send notthing to landfills from their headquarters, logistics centres, stores and factories (Inditex, 2022).

Join-Life is a production project developed by the Inditex Group to offer its customers products that are produced with materials obtained from sustainable natural resources and that have the least harm to the environment. Join-Life is an application created by



Photograph 5. C&A Sustainability Policy

https://www.c-and-a.com/uk/en/corporate/company/sustainability/c2c/ https://www.c-and-a.com/at/de/corporate/company/nachhaltigkeit/c2c/

https://www.just-style.com/news/ca-rejects-allegations-of-supply-chain-labour-rights-violations/

https://www.c-and-a.com/uk/en/corporate/company/sustainability/

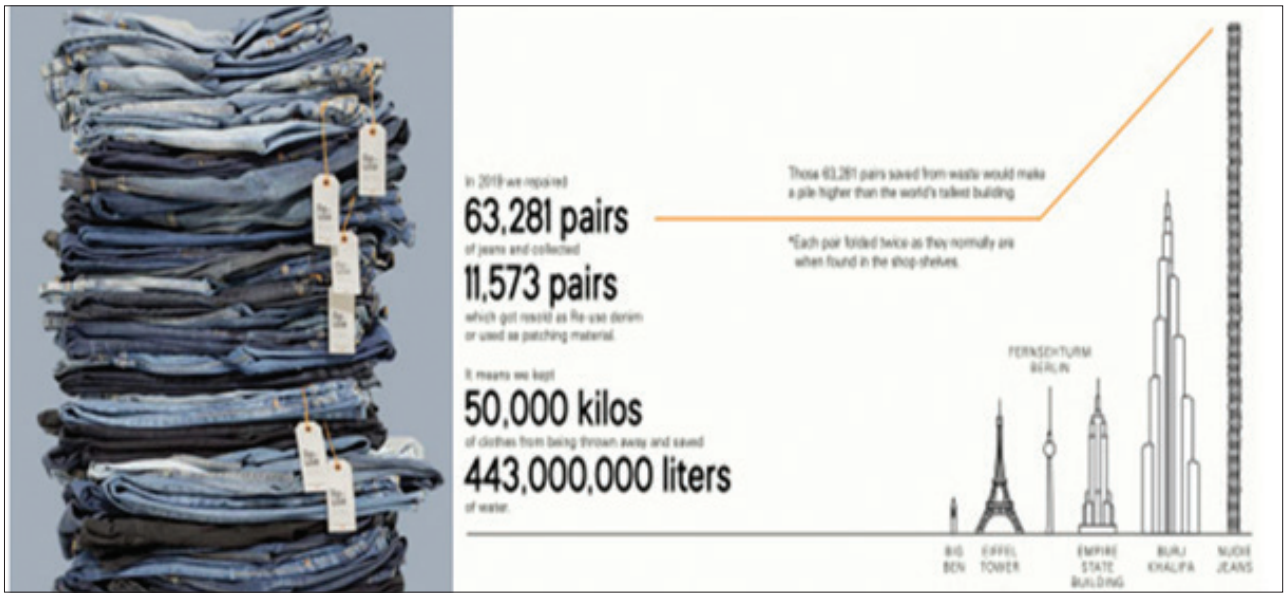
the Inditex group with the slogan "Our Goal Is Always To Make Our Products More Sustainable". Join Life sustainable collections are essential for validating sustainability plans. Join Life label refers to products with the "best" processes and raw materials. This label shows Inditex's holistic approach to the Circular Economy (Figure 3.) (Pereira, 2020).

The Join Life program aims to create beautiful, ethical, quality products that are right not only for customers but also for Inditex employees, society and the environment. This can be achieved with all-round traceability of the Join Life event and means thinking and acting in a transparent way. Inditex increased the Join Life collection, which includes the sustainable collections of the Zara brand, in 2017 and expanded this initiative with Massimo Dutti and Oysho (Photo 7, 8, 9).

Consumer preferences and expectations play a major role in sustainability goals (Yücel and Tiber, 2018). Brands have good reasons to set such goals: Generation Z consumers, born between 1995 and 2012, display environmentalist attitudes when shopping. According to a survey of more than 1,000 people conducted by First Insight in December, 62% of Gen Z consumers prefer to shop from sustainable brands. Also, 73% of Gen Z are accepting to pay more for sustainable products (Thomas, 2020).

SUSTAINABLE FASHION MARKET

Sustainable fashion marketing has become increasingly important in the marketing of apparel products. Intense competition in the market has forced brands to produce and collect more and more. Naturally, the fashion industry has also been greatly affected by this rapid consumption and production. While affordable products increase the consumption frenzy in the fashion market, consumers buy products they do not need. While wastes increase as a result of



Photograph 6. Nudie Jeans Sustainability Policy

https://www.nudiejeans.com/sustainability/sustainable-products/

https://www.seanfleming.com/what-is-circular-denim-and-why-are-top-brands-redesigning-jeans/

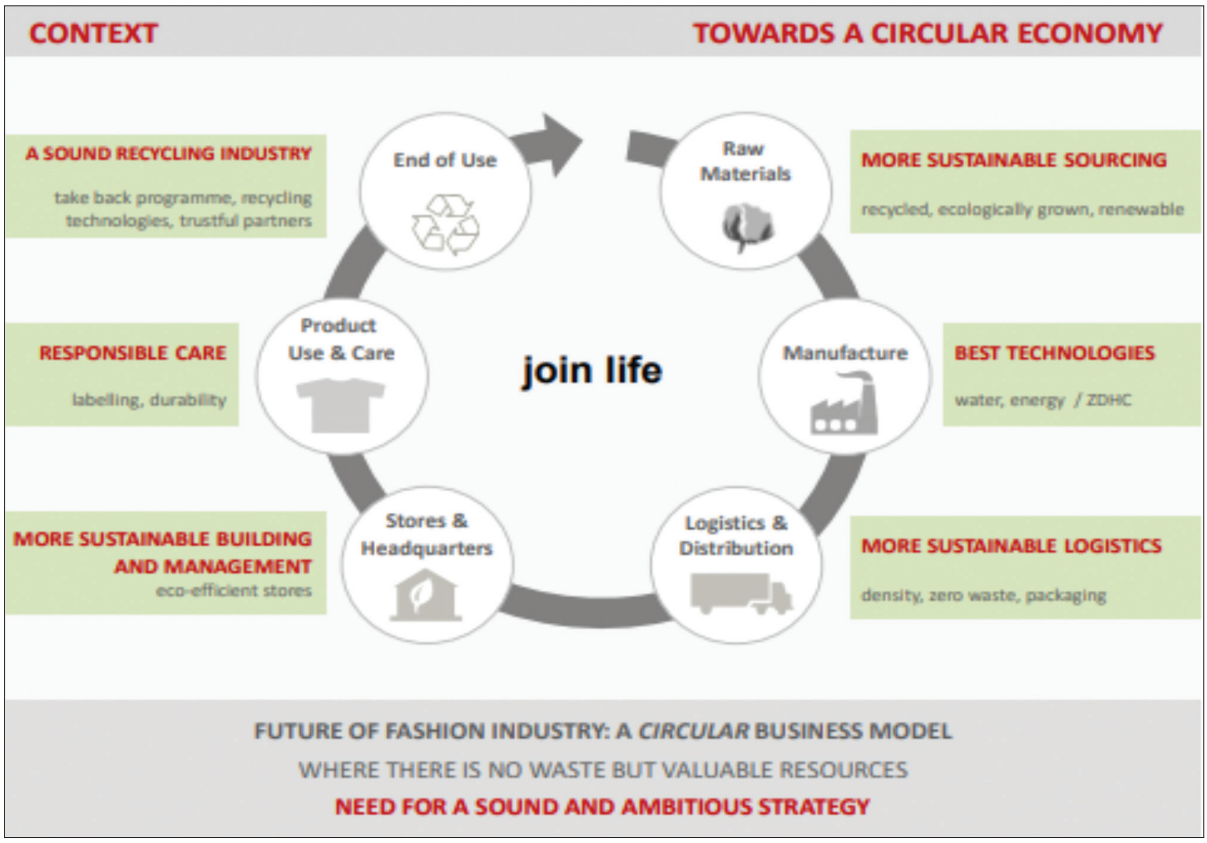


Figure 3. Inditex Circular Economy Overview
http://www.r2piproject.eu/wp-content/uploads/2019/05/Inditex-Case-Study_1.pdf

Photography 7. Zara Sustainability Policy (Join,Life)

https://www.zara.com/mc/en/zw-rhinestone-the-mid-waist-skinny-jeans-p07513048.html?v1=164670068&v2=2025818

https://www.zara.com/mc/en/contrast-printed-sweatshirt-p00495420.html?v1=183767833&v2=2032279

https://www.zara.com/mc/en/snoopy--peanuts-t-shirt-p05643635.html?v1=184980417&v2=2047413

https://www.zara.com/mc/en/z-join-life-mkt1399.html?v1=1464710

Photography 8. Massimo Dutti Join-Life Sustainability Collection

https://www.massimodutti.com/tr/en/women/join-life/commitments-n1679#/productos

https://www.massimodutti.com/tr/en/women/join-life/commitments-n1679#/recogida-ropa

Photography 9. Osyho Join-Life Sustainability Collection

https://www.oysho.com/tr/join-life-c1010281508.html

https://www.oysho.com/tr/join-life/join-life-koleksiyonut%C3%BCm%C3%BCn%C3%BC-g%C3%B6ster-c1010281510.html

over consumption, natural resources are consumed rapidly. As a result of these developments, the concept of sustainable fashion has emerged (Necef et al., 2020). Sustainable use of raw materials, design, production and distribution processes based on sustainability, traceability of the supply chain, protection and respect for human and worker rights, good health and safety conditions, keeping the consumption of resources at the optimum level controlled and minimally environmentally friendly. The implementation of the applications is of vital importance (Kılıç, 2017). Competition in the fashion market is intense. Businesses attach more importance to sustainability in order to gain competitive advantage. Brands should pay attention to consumers' right to wear in order to gain competitive advantage in the market. The right to wear is the basic philosophy of sustainability activities. All activities in fashion creation, customer satisfaction and product production are carried out by taking responsibility towards the environment, suppliers, employees and customers (Inditex 2020).

Competition in the Sustainable Fashion Market

The concept of sustainability generally refers to the capacity to sustain a situation or process for an indefinite period (WordNet, 2020). The prices of environmentally friendly products produced by sustainability-based companies are higher than non-sustainable products in the market. This is because the costs of sustainable products are higher than normal products. The reasons for the high costs are largely the use of high-tech devices and machines, training to raise awareness of employees, the use of more expensive environmentally friendly energy sources and other environmentally friendly systems for production. In addition, it is less harmful to the environment due to high dye and chemical costs and substances. Apart from these, the processes of the fabric made from recyclable materials, which are considered as the main item, are also very costly. Recyclable labels and packaging are also more costly, so the overall cost is higher than for a non-sustainable product.

Sustainability-based companies are joining forces with trade unions, nongovernmental organizations, governments, workers' associations and global customers. As a result, companies that make sustainable production; it receives the support of the state, many associations and organizations. This indirectly contributes to the promotion of the brand in the market. The projects carried out are very important in terms of raising awareness of the society. Managers should follow the right strategy in the face of intense competition in the market. Competition in the industry includes four other competitive forces: potential competitors, suppliers, customers and substitute products. Competition that arises from the combination of these elements defines the structure of the industry and shapes the nature of competition in the industry (Figure 4.) (Porter, 2008).

In recent years, the relationship between innovation and competitive advantage has been emphasized in the literature. Businesses that have shaped international markets use different strategies in every aspect. However, while every successful business adopts a unique strategy, the basic operating style (features and trajectory) is basically the same. Businesses gain sustainable competitive advantage in the market thanks to their innovation activities (Doğan, 2017). Businesses attract the attention of consumers and create business reputation by producing clothes with high symbolic value based on sustainability. Sustainable apparel and fashion products are a trend or a means to attract customers' attention. Consumers attach importance to the image of the company with the sustainability label in products that are produced as a result of ethical production and pay more for products produced on the basis of sustainability. The fact that consumers do not avoid paying more for more

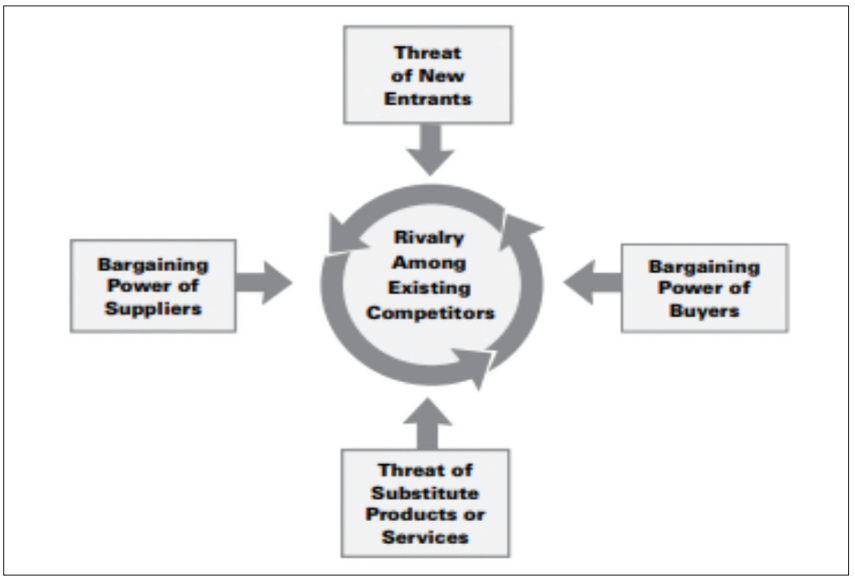


Figure 4. Porter Five Forces Shaping Industrial Competition (Porter, 2008)

ethically produced products is an important factor in the sustainability efforts of the sector and increasing these efforts.

Today's consumption-based economies have also created consumption societies. As this structure continues and welfare levels rise, societies will demand increasing amounts of products. Of course, this will cause environmental problems related to production (Yavuz, 2010). The factors that gain importance in environmentally friendly production are listed as follows: Environmental problems that will arise with the demand; The number of consumers will not decrease, consumption habits will not change suddenly; Mass production is standard in modern society; Products are designed, designs are produced. Correct design is important; Every product design and manufacturing process has an environmental impact; The designer should consider the possible environmental impacts of the design phases; If nature is not treated fairly, the consequences must be endured (Jeswiet, 2007).

Today, although many garment clothing and fashion companies produce products based on sustainability, not all products produced by international companies are sustainable. The reasons for this are as follows: The lack of a waste management strategy in many countries, the ignorance of local governments about initiating and using waste, and the lack of awareness and sensitivity of the society to the issue. European countries, which have recently adapted to the sustainability trend are cautious about the trend and continue their current studies in order to maintain their competitive power in the market. Despite these, it is inevitable that all garment clothing companies will turn to products based on sustainability in the short term and consumers will buy them. The reason for this is the rapidly depleting resources and the damage it causes to the world. It has ceased to be an option and has become a necessity. The faster brands switch to sustainable production, the more permanent and successful they will be in the market. However, despite these reasons, all garment clothing companies will tend to produce sustainable products in the short term. Thus, it will become inevitable for consumers to purchase these products. Sustainable production and consumption will become inevitable because with the rapidly depleting resources and the damage it has caused to the world, it has become a necessity rather than an option. The faster the brands switch to sustainability-based production, the more permanent and robust they will be in the market if they establish this system and make it routine.

DISCUSSION AND CONCLUSION

One of the biggest problems of the 21st century is undoubtedly the rapid depletion of natural resources. One of the most critical sectors affected by this problem due to rapid production and consumption is the garment clothing and fashion sectors.

The global garment clothing market, which is one of the first sectors in which the industrialization process started in developing countries and has an important place in the economic growth process of the countries, is worth 3 trillion dollars, 3.000 billion dollars and constitutes 2% of the world's Gross Domestic Product (GDP) (Fashion United, 2022).

The concept of fashion has accelerated in recent years. Speed emerges in the transition period of the product between designer, producer and consumer. With the acceleration of this process in the fashion and garment clothing sector, the price and quality of the product decrease, while the damage it causes to consumption and the environment increases.

According to the World Economic Forum report of 2021, the fashion industry is the third most polluting sector after the construction and food sectors. Fashion industry contributes to around 10% of global greenhouse gas emissions. This because is long supply chains and energy-intensive production (Edgexpo, 2021). The biggest environmental impact of the clothing and fashion industry is due to the use of high chemical wastewater in the production processes and their discharge into nature. Other important factors include energy consumption, solid waste, odour generation and air pollution.

As consumers buy more fashion and ready-to-wear products, the product becomes obsolete after being worn a few times. For all these reasons, sustainability has come to the fore and sustainable fashion has started to gain importance as a solution. The sustainable clothing and fashion industry makes production waste sustainable, including post-production and post-use sustainable approaches, and supports the product formation process from raw material to product.

The fashion and garment clothing industry aims to reduce the consumption of natural resources through sustainable production. Here, the most important responsibility falls on global brands. Because these brands continue their design and production processes in different geographical regions, especially in developing countries. Global brands, as well as being role models with the regulations they have prepared and implemented on sustainable production and process management, also impose the obligation to comply with the production and supply rules according to the regulations they have prepared for the institutions and countries in different regions that supply them.

Companies and other stakeholders such as the public, civil society and academia examine the changes and risks brought about by the concept of sustainability from their own perspectives. They change their business models and strategies and align their products and production methods with sustainability components. Although this change is a change that develops not with brands' own will but with social pressures, it offers companies important competitive opportunities in the market.

Some of the main areas where sustainable technology is applied are listed below (Sahni, 2010);

- Technology Related to the Material Used: Thread and printing, weaving, finishing and dyeing technology
- Design Related Technology: Computer-aided clothing design
- Technologies Related to Processes / Software Modules: Enterprise Resource Planning
- Manufacturing Related Technology: Landfill gas, wind, solar, low-impact hydroelectric facilities, etc. operating facilities with alternative or renewable energy sources, such as
- Technology Related to Distribution, Transportation and Retailing of Fashion Products: Using RFID to ensure effective tracking and security of fashion products and to create a green supply chain.
- Consumer Use Technology: Smart textiles, smart clothing
- Post-Consumer Technology for Disposal, Recycling and Reuse: Zero waste by applying "Closed Loop" waste management techniques.

In conclusion, as seen above, all phases of design, production, marketing, distribution and consumption should be taken into account when talking about "sustainable clothing and fashion". Because real sustainability can only be discussed if a product is fully sustainable with all its processes. This is possible not only with the global and regional brands taking responsibility, but with the awareness and awareness of sustainability of the society that makes the final purchasing and usage preferences of the products.

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Digital Public Relations Practices in Ecological Municipalism: Lahti Municipality Sample

Simge ÜNLÜ[1], Lütfiye YAŞAR[2], Erdal BİLİCİ[3]

ABSTRACT

In this study, the use of Twitter for public relations purposes of the Lahti municipality was analysed. The study aims to reveal the public relations focus of the ecological municipality approach. In this context, Tweets shared on the Twitter account of the municipality between November 1 and November 30, 2021, were analysed by discourse and content analysis method in the 2020.2.2 version of the Maxqda program. The findings obtained from the analysis are: In the process that Lahti was elected as an ecological municipality, it shared the most on municipal services and ecological city. The main topics shared by the municipality were identified as Covid-19, Lahti activism, ecological city, and municipal services. The main headings of the macro discourse of this process, which covers municipal services; Lahti City is urban transportation, openings, tender announcements, meetings, cooperation, and events. When these discourse titles are analysed at the micro-level, it is seen that a simple, active, and everyday language is used. When the shares are examined in rhetoric, reference representation is quite intense in persuasiveness. As a result; It is seen that the municipality of Lahti fulfills the principles of corporate citizenship on Twitter, which it uses for recognition and promotion purposes.

Keywords: Ecological Municipalism, Public Relations, Ecological Capital, Lahti, Twitter.

JEL Classification Codes: M31, I38, H54

INTRODUCTION

Since the 1980s, urbanization began to gain momentum. The environmental problems that arise with this process lead to new management approaches. Therefore, the sustainability discussions, which came to the fore with environmental problems, paved the way for ecological municipalism as an incentive to management that can integrate ecological and economic order (Author, 2020). This municipal approach, which was first seen in Scandinavian countries, became widespread in European countries over time and was given the title of ecological municipal capital (Langlais, 2009). The city that received the title of the first ecological capital was Stockholm in 2010. (BBC, 2021). Cities that were named ecological capitals, respectively, are; Hamburg in 2011, Vitoria-Gasteiz in 2012, Nantes in 2013, Copenhagen in 2014, Bristol in 2015, Ljubljana in 2016, Essen in 2017, Nijmegen in 2018, Oslo in 2019, and Lisbon in 2020 (Irmak and Avcı, 2019). The ecological capital of 2021 is Lahti. Using renewable energy sources, recycling systems, and environmentalist investments effectively select these cities as the European Ecological Capital. Currently, there are 111 municipalities in Sweden, 28 in the United States, 15 in France, and some parts of Ethiopia and Kenya (SSA, 2021). In Türkiye, there are municipal ecological applications in Gaziantep, Bursa, and Muğla.

The ecological city infrastructure in Türkiye started in 2013 with the eco-city trainings in Gaziantep. These trainings include ecological city, building criteria and financial support. Bursa and Antakya municipalities also participated in this event organized by Gaziantep Metropolitan Municipality (Gaziantep Municipality, 2013). In addition, it has been suggested to plan the Bursa-Nilüfer Eco-City project within the scope of ecological municipal activities (Nilüfer Municipality, 2016). In this context, the ecological municipal approach requires the adoption of a sustainable environmental policy.

The ecological municipalism approach is managed with sustainability principles; Although it includes a managerial process achieved with the participation of stakeholders, it is seen as the integration of urban,

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environmental, and social sustainability. In this context, the prerequisites of the ecological municipality model developed within the framework of sustainability principles can be listed as follows: Providing sensitivity in the continuity of sustainability. To support local ones in the production of goods and services. It is conserving biodiversity and carrying the initiated change to a global scale. Finally, it supports democratic participation (Roseland, 2000; Fernández & Angel, 2020). Depending on these principles, the development course of the ecological municipality is observed as follows: Being interested in change, identifying problems, collecting information, implementing determined practices, ensuring systemic continuity, and sharing data experience with other societies (Högström, 2021). In short, it can be said that ecological municipality is to create a systemic school, such as raising awareness of the society and encouraging participation within the framework of the sustainability approach.

Eco-cities are seen as balanced places that are in harmony with nature and increase the quality of life of the local people. In this context, the principles of the ecological city: It is a dynamic living space; eco-cities constitute the urban ecosystem and should provide adaptation to nature. Urban approaches created in line with ecological city principles are zero waste policy and carbon footprint, use of renewable energy, recycling, and green city practices (Çetinkaya, 2013:14). Ecological urban planning is carried out in line with the determined urban approaches. Eco-urban planning focuses on ensuring economic, socio-cultural, environmental, and ecological sustainability in this context. In this context, the eco-city criteria created to ensure sustainability in ecological cities can be listed: Location, urban structure, material and energy cycle, socio-economic criteria, planning, and transportation (Tosun, 2017: 180). These eco-city criteria formed the basis of more environmentally friendly city management.

Since ecological cities are based on respecting nature in their essence, it suggests integrating plans and programs created in line with the effect of nature, humans, and the city on each other (Xun, 2014). Ecological municipality principles created with the perspective of Local Agenda 21: Sustainable planning and transportation, participation, combating climate change, use of renewable energy resources, recycling/ waste management, and finally to provide green building standards (Bostancı, 2014). In this context, the field of activity of ecological municipality; developing biodiversity and climate change projects, solidarity-oriented urbanism, and developing a democratic, participatory city understanding. Therefore, in line with the principles and fields of activity of ecological municipalities, the characteristics of this municipal approach are; are cities that actively use natural resources, are guiding, anti-monopoly, evaluate the expectations of NGOs and the public from an ecological perspective, support institutions and organizations that will support ecological city branding, can take zoning decisions with transparency, accountability, and public benefit, and create recycling awareness. In addition to these features, they are environmentalist local governments that can design a city with a culture of democratic and social solidarity (Bostancı, 2012). As a result, the ecological municipality is the municipality that is referenced to NGOs and other institutions in line with the sustainability principles in the implementation of the decision taken by the legislators.

It is seen that more environmentalist approaches are adopted in issues such as environmental cleaning, recycling, and solid waste management within the framework of the ecological municipality and ecological city understanding, which can be examined in metropolitan and local governments. Therefore, in the axis of these developments, it is imperative to evaluate the actions taken in ecological municipalities in terms of public relations. In this context, the official Twitter account of the municipality of Lahti, chosen as the ecological municipal capital in 2021 within the scope of the research, will be analyzed in terms of the recognition and promotion function of public relations. Since the ecological municipality literature has developed to focus on municipal planning and entrepreneurship, this study reveals the public relations focus of ecological municipality principles. The study is essential because it is the first study to evaluate the ecological municipality approach from public relations.

The tweets shared by the municipality of Lahti, which was declared the ecological capital at the Ecocity Forum on November 1, 2021, between November 1 and November 30, 2021, will be analyzed in the 2020.2.2 version of the Maxqda program with the method of content and discourse analysis.

ONLINE PUBLIC RELATIONS ACTIVITIES IN ECOLOGICAL MUNICIPALISM AS A LOCAL GOVERNMENT APPROACH

As a local government, it is imperative to get the support of the people in the municipality. All financial support is approved by the public to ensure the continuity of actions aimed at zoning, infrastructure services, fire

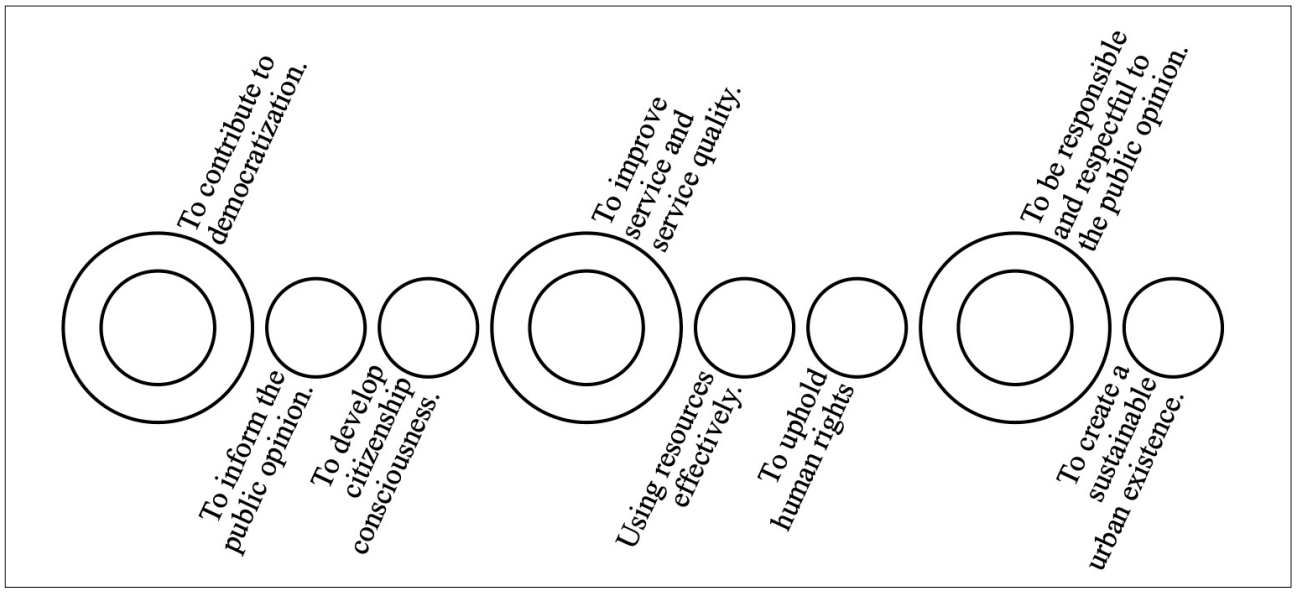

Figure 1: Purposes of Public Relations Activities in Municipalism

Source: Özüpek, 2013

brigade, cleaning, and protecting public health, which is seen as the duty area of the municipality (Can, 2021). Municipalities, which are brought to the administration in line with the votes of the city residents and whose activities are constantly under surveillance, must be sensitive to the wishes/complaints of the people in order to maintain their sustainability in the administration (Lee et al., 2011; Lee, 2012). Therefore, municipalities must implement an effective public relations practice in all their administration actions. The axis of these public relations activities to be carried out is to influence the shaping of management principles and to guide the implementation of these principles (Zavattaro, 2010). While planning and implementing these principles, public relations consider the administration's needs, the residents' tendencies, and thoughts (Wondımu, 2018). In this context, the position of public relations in local governments is both a communicator and a feedback evaluator with the public. As a result, public relations in local governments are a tool that determines the public's wishes, creates a management map in this direction, and reveals the harmony between the administration and the people.

Municipalities use public relations activities to get the support of local people or to create or develop a positive image against municipal activities (Cassel, 2008). For these public relations activities to reach their goal, it is crucial to learn the public's expectations, that is, to know the target audience. As a result, as a result of recognition and promotion actions, municipalities determine their service policies and successfully adopt them in the local people (Can, 2021). In other words, if the municipality can correctly analyze the feelings and thoughts that make up the people's perspective on life, and if it can adopt a service policy in this direction, it can gain the title of the people's municipality. In this direction, the aims of public relations activities in the municipality are:

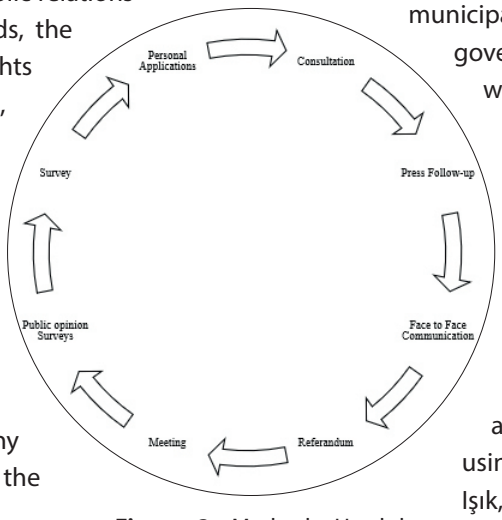

Figure 2: Methods Used by Municipalities to Know the Public in the Decision-Making Process

Source: Özüpek, 2013; Kocaoglu and Fural, 2018

Public relations activities that enable municipalities carrying out local government activities to integrate with the local people are based on recognition and consultation. As an administrative unit, the municipality should consult the public from time to time to make decisions. The primary purpose of this decision-making process is to be helpful to the public, establish close relations, and gain the necessary support by using public relations (Hamel, 2002; Işık, 2017; Weise & Chiasson, 2020). Methods used by municipalities to get to know the public in the decision-making process:

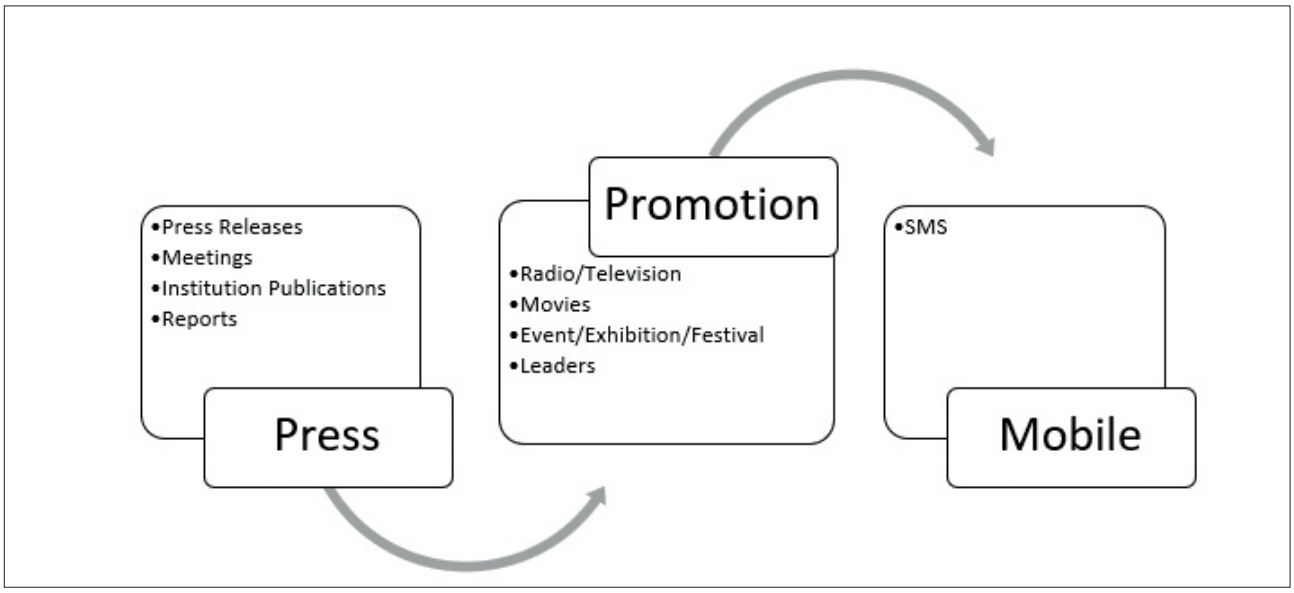

Figure 3: Tools and Methods Used by Municipalities for Publicity Formation

Source: Karkin and Janssen, 2014; Bayraktar, 2020

While making decisions, municipalities use various methods such as personal application, face-to-face communication, surveys, and public opinion surveys to get to know the public. Therefore, the decisions are taken by the municipalities, which learn about the expectations, requests, and complaints of the public, create satisfaction in the public so that the action policies are supported and adopted by the public.

Municipalities, which carry out various practices to inform the governed about the decisions taken and the operation of the process, have to use clear and concise language in these actions. In this context, the tools and methods used by municipalities for publicity purposes:

In local governments, public relations activities are used to announce the decisions taken while fulfilling the administrative duty to the local people and introducing the local people's expectations in learning. At this point, the tools used by the municipality to establish asymmetrical communication can be discussed under two headings as meetings and online studies. Under the title of meetings, there are meetings held with the local people and organized (interest/pressure) groups of the municipality and meetings held at the municipal council. In online studies, another tool used by the municipality for recognition and promotion while communicating symmetrically, there are mobile applications and the corporate website and social media accounts (Tarhan and Minister, 2013; Şenyurt, 2016). The corporate website, social media accounts, and mobile applications used by municipalities to communicate symmetrically create awareness in recognition and promotion. Thus, in line with the principle of transparency, since it positively affects the public relations policy and activities, it also makes the municipality successful in the political arena from an administrative point of view. In this context, online public relations practices are also crucial in including a multi-faceted approach.

In the municipality, corporate websites provide various advantages because they confortable to serve without time constraints. These advantages are; facilitating the dissemination of institutional information, providing trust, providing efficiency, and resource planning (Karkin & Janssen, 2014). Since corporate websites provide feedback on the service policies of the municipality, image development, information collection, and classification, social responsibility practices are also effective in increasing participation (Bayraktar, 2020: 26). Therefore, the municipalities' websites inform the public during the recognition and promotion.

One of the areas where municipalities implement online public relations is social media. Municipalities should interact with the public by creating approved accounts on their behalf and creating an open space for discussion where complaints/wishes will be processed. Considering this aspect, social media is used as a recognition/promotion tool for municipalities (Tarhan and Minister, 2013: 79). According to Jarvis, the effectiveness of municipalities in social media environments does not emerge with the majority of social media followers. However, they establish the duality of the communication and the proper target audience follow-up (2012:165). In these networks, where

instant communication is established, municipalities convey information about their activities via Twitter and Facebook and receive the views of local people through corporate blogs (Güçdemir, 2012: 28). In this context, it is also essential for the sustainability of public relations activities and the harmony between the municipality and the public that the public is in contact with the municipal authorities through blogs/microblogs, regardless of time and place.

Mobile applications belonging to municipalities are essential in facilitating access to corporate data. Monitoring the municipality's activities or services makes municipalities more accessible in e-service evaluations. Therefore, since anyone with a smartphone can express suggestions, wishes/complaints about municipal services, it falls within the scope of the target audience for the recognition or promotion activities of the municipality (Şenyurt, 2016:55-56). As a result, online public relations activities, which are actively used by public relations in municipalities for recognition and promotion, can be discussed under seven headings. According to Bayraktar (2020:30), the first of these titles is the announcement of sponsorship activities. Websites, social media, and mobile applications connect with the target audience by announcing sponsored films, books, or symposiums. The second activity is tax payment, service information, public opinion polls, and finally, online surveys made with e-applications. While corporate link sharing constitutes the third application area, the fourth topic is mutual communication. In addition to the corporate identity studies, revising the personnel's pages constitutes the internal communication step. In the sixth step, in connection with presenting information, providing data such as reports, brochures, and bulletins, the last step is research.

PUBLIC RELATIONS SERVICES AND PRINCIPLES IN ECOLOGICAL MUNICIPALISM

Public relations policies and practices are essential in promoting municipal ecological activities to the public. In this context, the first of the principles used within the scope of public relations practices in local governments is the principle of integrity. The principle of integrity is primarily concerned with the compatibility of public relations policies with the policies of the collaborating institution. In this context, the public relations planning adopted by the second anecdotal municipality should be coordinated with the service planning of the municipality. The third rule is that all municipality staff must comply with the public relations policy. Fourth, a public relations policy compatible with internal and external stakeholders it should be implemented (Özüpek, 2013: 33). As a result, within the scope of the principle of integrity, a public relations policy should be established that is compatible with all the institutions in cooperation with the municipality, adopted by the municipal employees, and able to serve all stakeholders.

It is essential to have individuals interested in urban problems adapt to the decisions taken by the lawmakers and have a developed sense of responsibility. In this respect, mutual communication and interaction should be implemented through public relations studies in order to develop citizenship or citizenship awareness in local governments (Tau, 2013). In this context, the participation of the people in local elections and the adoption of legal regulations or the lack of resistance to these regulations show the importance of mutual communication within the framework of the principle of participation.

Since the inability to provide effective/efficient service in public or private institutions will create a negative image, there will be a perception that the municipality administration will not be able to meet the needs of the people, use the resources effectively and provide quality service. For this reason, local governments benefit from public relations while creating their service policy (Matějová, 2014). Two principles are considered while creating an effective/efficient service policy focused on public relations in municipalities. The first of these principles is to show successful performance, while the other is to produce and distribute administratively effective and efficient services (Özüpek, 2013). Therefore, it shows that it accepts self-explanation, improvement, and regulation to inform public relations.

Consistency of public relations principles can be seen in three ways in municipal practices. The consistency principle is discursive, the determination of its goals and policies, and the consistency in practice is the harmony in the tool/method used (Sezgin, 2011:100; Özüpek, 2013: 36). The principle of consistency should be handled in the context of temporality and continuity in the discourses and shares of the municipality. Therefore, success in public relations can be mentioned if the messages created are designed to support each other within the principle of consistency and continuity.

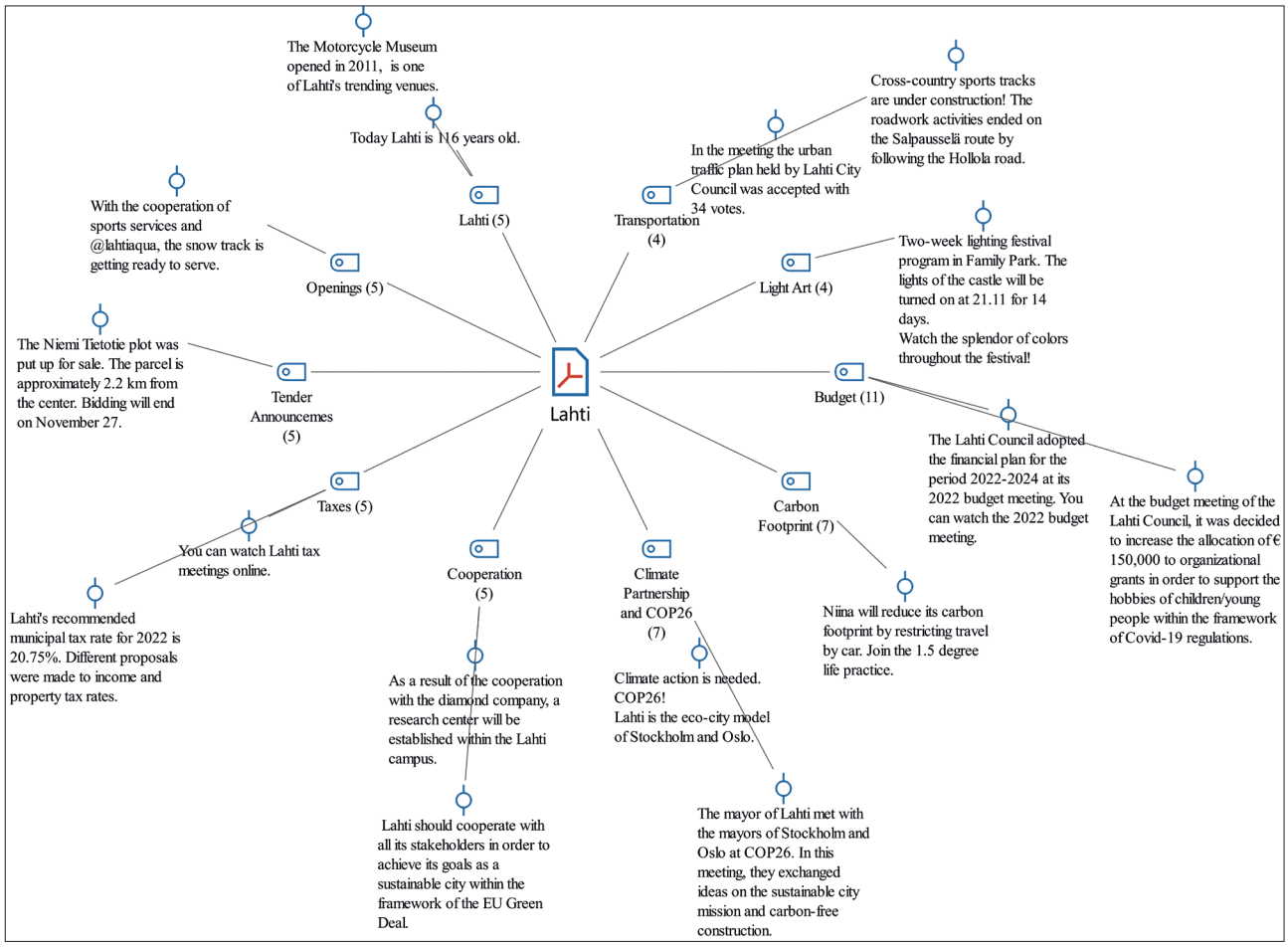

Figure 4: Lahti Municipality Macro Discourse Analysis Topics

RELATED STUDIES

When the literature is scanned, it is seen that ecological municipality and ecological city-oriented studies are carried out. Some of these studies are as follows: Studies focused on the ecological city and the sustainability of municipalism; Song, (2011); Dou et al., (2013); Pickett et al., (2013); Cetinkaya, (2013); Cetinkaya and Ciravoglu, (2016); Akıncı et al., (2019). Studies focusing on the ecological city or municipal activities planning: Koskiaho, (1999); White, (2002); Hagan, (2014); Çiğdem and Akyol, (2016); Akyol and Sonmez, (2018); Archibugi, (2019); Kaya and Susan, (2020); Koçan and Alp, (2021). While Yıldız (2018) researched the ecological city and entrepreneurship, Jepson Jr and Edwards (2010) focused on the perception of the ecological city in their study.

The literature shows that sustainability, municipal planning, entrepreneurship, and city perception focus on the ecological municipality. Since this study will focus on online public relations activities regarding the ecological municipality approach, it will contribute to the literature.

RESEARCH METHOD

The content and discourse analysis method will be used in this research. The content analysis method is based on the objective, quantitative, and systematic descriptions (Gökçe, 1995:16). In this method, after the data set is denoted descriptively, the content should be objective. Finally, there is the formulation of the systems infrastructure of the research. At this stage, assumptions, universe/sample determination, describing the analysis scale and criteria, checking reliability and validity, etc. There are determinations on the subject of the study on the subjects (Taylan, 2011: 66). Considering this whole process, the purpose of content analysis is to classify the analyzed content according to specific features and determine the frequency range of these features. Therefore, the reason for using content analysis in this research is to classify the posts of Lahti Municipality.

Another method to be used within the scope of the research is discourse analysis. The discourse analysis method; focuses on how discourse is constructed by considering the text as a whole. According to Van

Dijk (2006), this analysis consists of macro (thematic) and micro (synaptic) analysis. Within the scope of this research, the discourse of the municipality selected as a sample will be revealed using the discourse analysis method. In this context, the research questions are:

1) What topics were shared during the ecological municipal capital selection process?

2) Which discourse comes to the fore in the ecological municipal capital selection process?

RESULTS

Lahti is located in Finland's Päijät-Häme region. And Lahti received the title of European Green Capital in 2021 (Lahti.fi, 2022). The municipality of Lahti, which was declared an ecological capital at the Ecocity Forum in 2021, shared 89 Tweets between November 1 and November 30, 2021. Shared tweet topics are Covid-19 (f=2), Lahti activism (f=2), ecological city (f=24) and municipal services (f=61). Sub-themes depending on the tweet topics; Covid-19: Outbreak notification (f=2); Lahti activism: Health activism (f=1), cultural activism (f=1); Ecological city: Quiet city (f=1), eco-city selection (f=4). Another sub-theme related to the ecological city affiliation is the green Lahti. Green Lahti: E-invoice (f=1), environmental solutions (f=4), carbon footprint (f=7). The last sub-theme of the ecological city title is climate partnership and COP26 (f=7). Municipal services: Security measures (f=1), personnel recruitment/appointments (f=3), transportation (f=4), cooperation (f=5), tender announcements (f=5), Lahti (f=5)' Truck. Another sub-theme of the municipal services theme is the meeting title. Sub-themes depending on the meeting title: Tax (f=5), budget (f=11). The last theme related to municipal services is events. Sub-themes of the event theme: Ecocity Forum (f=1), competition (f=1), Lahti vision (f=1), exhibition (f=1), Christmas (f=2), festival (f=2), To the President Ask (f=2), celebration/commemoration (f=3), Art of Light (f=4), opening (f=5).

LAHTI MUNICIPALITY TWITTER POSTS MACRO DISCOURSE ANALYSIS

As a result of the content analysis, the macro discourse titles of the municipality were determined. In this context, macro discourse titles: As municipal services; Lahti is transportation, openings, tender announcements, tax and budget meetings, cooperation, and the Art of Light. In the context of the Ecological City, there are climate partnerships and the subtitle of COP26 and carbon footprint.

In the posts made between November 1 and November 30, 2021, reference to when the city was founded in the discourses about the City of Lahti "Today, Lahti is 116 years old." Emphasis is placed on the history and rootedness of the city. Along with this emphasis, he also added to the city's famous places, "The Motorcycle Museum, which was opened in 2011, is one of the populer places of Lahti." reference is made. The activities in the trendy places of the city are also included in these discourses. "A two-week lighting festival program in the Family Park. The castle lights will be turned on at 21.11 for 14 days. Watch the splendor of colors throughout the festival!" It encourages you to participate by clearly explaining that the event is open to the public and the start and end dates. With these discourses, the crucial elements of the city are brought to the fore with references to the historical and popular centers of the city and the events to be held in these places.

You can watch Lahti tax meetings online, where the meetings can be followed live within the scope of the transparency principle on taxation in the discourses about the meetings held within the scope of municipal services—highlighted by their sharing. The content of these meetings is "Lahti's recommended municipal tax rate for 2022 is 20.75%. Different proposals were made for income and property tax rates." explained as. Another subject of the meeting is budget negotiations. In announcing the budget negotiations, "Lahti Council accepted the financial plan for the 2022-2024 period at the 2022 budget meeting. You can watch the 2022 budget meeting online." It suggests that periodic financial planning is accepted, but the content of this meeting will be shared with the public online. Another prominent discourse regarding budget meetings is grant appropriations. This statement is "At the budget meeting of the Lahti Council, it was decided to increase the organizational grants by 150.000 € in order to support the hobbies of children/young people within the framework of Covid-19 regulations." embodied by the description.

Regulations regarding the urban traffic plan are also included in the contents of transportation services, and the explanation regarding the arrangements made in this context is as follows: "In the meeting held by Lahti City Council, the urban traffic plan was accepted with 34 votes." Another issue mentioned about Lahti's transportation services is the construction of sports tracks and the route of road construction works. Announcing these services, "The construction of cross-country sports tracks continues! The roadwork activities ended on the

Salpausselä route, following the Hollola road." described briefly and clearly.

In the discourse of the municipality regarding the tender, which is within the scope of the service, information is given about the location of the land to be processed. In this context, Lahti municipality's statement regarding the tender: "Niemi Tietotie land has been put up for sale. The parcel is approximately 2.2 km from the center. The tender will end on November 27. The date of the tender to be held, the location, and the name of the land subject to the tender can be associated with the principle of transparency and accountability.

While serving the public, institutions cooperate with their stakeholders in various fields. Lahti municipality explains the institutions and fields it cooperates with as follows: "As a result of cooperation with Elmas company, a research center will be established within the Lahti campus." After announcing the research center that the city will have as a result of this cooperation established in the field of education, it announces the opening of the snow rink as a result of another cooperation it has established in the field of sports. This service is, "Snow track is getting ready to serve with the cooperation of sports services and @lahtiaqua." is shared with the public. Lahti municipality makes the following statements regarding the importance of cooperation with all stakeholders in order to maintain sustainability after being chosen as the ecological capital: "It should cooperate with all its stakeholders in order for Lahti to achieve the goals it has set as a sustainable city within the framework of the EU Green Deal." In this context, the municipality of Lahti wants its cooperation to be adopted by all stakeholders.

The efforts of Lahti municipality to establish a partnership in the ecological city discourse and its participation in the COP26 program stand out. In this context, "Climate action is necessary. COP26! Lahti is the eco-city model of Stockholm and Oslo." states that it is a necessity to create a climate action plan, and within this necessity, Lahti, Stockholm, and Oslo are examples on environmentalism. He expresses the consensus of this model city with other cities as follows: "The mayor met with the mayors of Stockholm and Oslo at COP26. In this meeting, they exchanged ideas on the sustainable city mission and carbon-neutral construction."

Lahti notes that the mayors of Oslo and Stockholm were consulted at the COP26 conference to continue the carbon-neutral construction creation and sustainable city mission. In the ecological city title, the topic of discourse explaining the 1.5-degree target of Lahti municipality is carbon footprint. The discourse that creates the approach with carbon footprint: "Niina will reduce its carbon footprint by restricting travel by car. Join the 1.5-degree practice of life." It is exemplified through the changes in the lifestyles of individuals. Another example shared on this subject is as follows: "Eveliina Hämeenoja has decided to reduce its carbon footprint by reducing shopping. So she thinks to spend the money she saves on projects that reduce carbon emissions." The municipality of Lahti gives individuals examples from daily life regarding the 1.5-degree target to reduce their carbon footprint, thus instilling a sense of responsibility in every individual to protect nature.

LAHTI MUNICIPALITY TWITTER POSTS MICRO DISCOURSE ANALYSIS

Lahti municipality used Lahti, Lahti council, and a president in their posts. Simple sentences were preferred in their sharing. Active sentences have been established. In tweets, a causal relationship has been established with references. Companies participated in the climate partnership conference with Päijät-Häme's connections to this approach. Uniting in the fight against climate change works best!" discourse is an example. In this context, it is vital to create cooperation in these conferences, as participating in the climate partnership conference and creating a unity of power and discourse will create the most efficient result.

The rhetoric of tweets is persuasion by example. In the content of the Green Tomb, the actions of individuals who want to achieve the goal of 1.5 degrees regarding carbon footprint are explained, and these individuals are presented as exemplary people with responsibility in society. These statements are "Lahti residents such as Nina and her family, Eveliina Hämeenoja, aim to reduce their carbon footprint to 1.5 degrees. With the 1.5 degrees target, the carbon footprint of the City of Lahti will be even lower than other cities". The persuasion approach by giving an example is not carried out only on the city's residents. It is stated that studies are carried out to make carbon footprint practices public policy. Regarding these policies, "The vote was held to neutralize the carbon footprint. As seen in the statement, Lahti's goals towards becoming a carbon-free city will continue in 2025.

When the word cloud of Lahti municipality's shares is analyzed, the prominent words and their frequency distribution are as follows: Budget (f=11), Lahti (f=8), carbon footprint (f=7), climate (f=7), COP26, tax (f=6), cooperation (f=5), tender (f=5), opening (f=5),

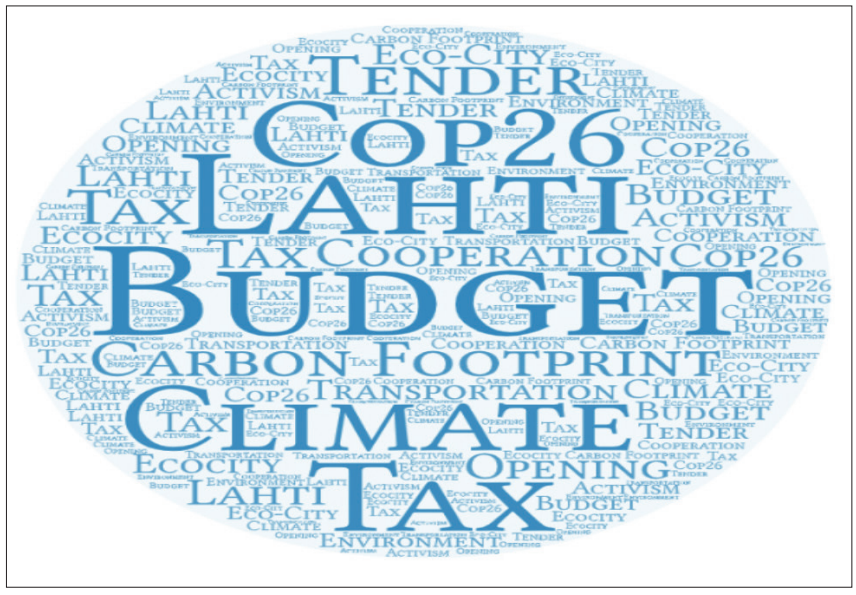

Figure 3: Lahti Municipality Twitter Posts Word Cloud

transportation (f=4), eco-city (f=4), environment (f=4) and activism (f=3), ecocity (f=1). In this context, it is seen that the word groups are compatible with the content of the subject, and the words Lahti, Budget, and climate are emphasized the most.

CONCLUSION AND EVALUATION

In this study, the use of social media for the recognition/promotion of Lahti municipality, chosen as the ecological capital of 2021, was analyzed. It has been determined that the municipality of Lahti, which was declared the ecological capital at the Ecocity Forum, shared 89 tweets between November 1 and November 30, 2021. After analyzing these tweets with discourse and content analysis method, the findings are as follows: The topics shared by the municipality were determined as Covid-19, Lahti activism, ecological city, and municipal services. Therefore, the first research question, "Which subjects were shared during the ecological municipal capital selection process?" These four headings can be given as an answer to the question. The sub-categories of these four titles are Covid-19: epidemic information; Lahti activism: health activism, cultural activism; municipal services: cooperation, staffing/appointments, meetings, transportation, tender announcements, events, Lahti, and security measures. The last title is the ecological city: calm city, eco-city choice, green Lahti and climate partnership, and COP26.

Topics that the municipality shares the most: Budget meeting (f=11), carbon footprint (f=7), climate partnership and COP26 (f=7), cooperation (f=5), tender (f=5) and opening (f=5). It has been determined that Lahti municipality's use of Twitter is about financial issues, opening activities in which services are implemented, and sharing about the ecological philosophy of life, as it represents its ecological approach. In this context, when the use of Twitter is associated with the principles of municipalism, it can be said that Lahti mostly shared on municipal services and ecological city during the process of being elected as an ecological municipality.

The main topic that constitutes the macro discourse in using Twitter by Lahti municipality is municipal services. Topics covered in this context are; The City of Lahti is the Art of Light under the title of urban transportation, openings, tender announcements, taxes, and budget negotiations under the title of the meeting, cooperation, and activity. Another topic that constitutes the macro discourse of the municipality in the use of Twitter is the climate partnerships discussed in the ecological city and the carbon footprint with the COP26 congress. In this context, which constitutes the second research question of the study, "Which discourse comes to the fore in the process of choosing an ecological municipal capital?" In response to the question, content related to municipal services can be answered.

The language used in the Twitter posts of Lahti municipality is everyday and straightforward. Therefore, the sentence structures formed are active and straightforward. A causal relationship is established with the reference link in the contents of the tweets. It establishes the reference link as an example/model and is responsible through politicians, other ecological municipalities, and ordinary citizens. Thus,

the municipality increases the persuasiveness by strengthening the effect of the discourses of cooperation and participation in the policies it produces with the reference method.

As a result; In this process, Lahti municipality's ecological discourses use a collaborative and unifying language focused on creating social awareness. In the process of being elected as an ecological municipality, the municipality of Lahti shares the data related to the municipal service with the public in a clear, straightforward, and understandable way on its official Twitter account. In this context, it fulfills its responsibilities towards the public by sharing corporate budget discussions, tender announcements, transportation services, and establishing collaborations with the public based on transparency and accountability principles. In other words, it can be said that the municipality realizes its corporate citizenship and strengthens its image and reputation as it makes its recognition/promotion activities and social performances transparent through this network.

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The Emergence of Technoparks as a New Organizational Form: A Study from the Perspective of Coevolution*

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ABSTRACT

This study aims to reveal the emergence of technoparks as a new organizational form, the conditions, and actors effective in this process from the perspective of coevolution. Following the exploratory nature of the research, we preferred a qualitative method and collected the data through document analysis and semi-structured interviews. The findings showed that the technopark form emerged in a coevolutionary process. Moreover, the transition to a free-market economy on January 24 in 1980 is the event that initiated the coevolution process. Then, conditions such as ensuring university-industry collaboration triggered the interaction between the actors in the emergence process of technoparks. Also, we revealed that Technology Development Center was the catalyst that accelerated the process, and METU Technopark, which was established before the law, was a proto form. Based on coevolution, our study contributes to the literature by revealing the environmental conditions that triggered the emergence of a new organizational form, the actors involved in dynamic process, the interactions between the actors, and the step-by-step emergence process of the form.

Keywords: New Organizational Forms, Coevolution Perspective, Technoparks, Turkey, Coevolution Theory.

JEL Classification Codes: M1, M10, M19.

INTRODUCTION

The emergence of new organizational forms has been studied in population ecology and institutional theory for many years. Population ecology studies have focused on density dependence in explaining the emergence of the form (Amburgey & Rao, 1996; Divarcı Çakmaklı, Boone & Van Wittelosstujin, 2020; McKendrick & Caroll, 2001) have accumulated an impressive set of quantitative evidence on the establishment of forms (Bogaert et al., 2016). Institutional theory studies, on the other hand, have explained the emergence of a form how it spreads over time and gains legitimacy by associating it with institutional change and institutional logics (Jha & Beckman, 2017; Mutch, 2021; Riaz & Quereshi, 2017) But these theories do not clearly explain the process of emergence, although they indicate the emergence of an organizational form. We argue that the perspective of coevolution is more appropriate to explain the process leading up to the appearance of a new form, the interactions of actors in this process, the dynamics and mechanisms.

The coevolution theory suggests that organizations and their environments affect each other in a two-way over time and that there is an interaction between organizations and their environments (Baum & Singh, 1994; Garcia-Cabrera & Duran-Herrera, 2016; Karhu, 2020; Lewin &Volberda, 1999; Lewin, Long & Caroll, 1999). The coevolution theory assumes that new organizational forms will be shaped by the mutual interaction of organizations and their environment (Lewin &Volberda, 1999; Lewin et.al, 1999).

Few studies that act together from the point of view of coevolution have studied how new organizational forms emerge. Lewin et al. (1999) stated that as the rate of environmental change increases, organizations develop new organizational forms to adapt to their environment. Dijksterhuis, Den Bosch & Volberda (1999) stated that changing environmental factors trigger new organizational forms and that these new organizational forms form the basis of changes in their environment. Djelic & Ainamo (1999) point out that environmental changes and organizational transformations in the luxury fashion industry feed each other over time, and this process reveals new organizational forms.

On the other hand, we still know less about how environmental changes and conditions trigger interactions

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*This study is based on the first author's doctoral dissertation.

between specific organizations or actors in an institutional environment and how the results of the interaction process between actors reveal a new organizational form. The actors involved in the process from the initial idea stage to the final realization of the birth of a new organizational form, the interactions between the actors, and their learning abilities have been overlooked. In addition, issues such as actors who take the initiative and take action in this process, actors that accelerate or slow down the process, trial-and-error mechanisms, form types tried before the final form emerges, or pre-form applications have been ignored. Therefore, studies are needed that focus on the process of the emergence of the form.

This study aims to examine the emergence of technoparks as a new organizational form in Turkey the conditions and actors that are effective in this process from the perspective of coevolution. Changes in Turkey's institutional environment and triggering conditions have created the interaction between universities and government agencies. Technoparks have emerged as a result of the interaction of these actors.

Our study contributes to the theory by revealing the conditions that triggered the emergence of a new organizational form, the actors involved in this process, and the interactions between these actors, catalyst and proto form that accelerate the process, and the step-by-step emergence process of the form.

As follows, the study is structured. First, we review a theoretical background of the emergence of new organizational forms from the perspective of coevolution and outline technoparks in the context of Turkey. Second, we explain our methodology. Then, we present our findings and explain the conceptual model we developed in this direction. Finally, we present the outcomes of the study and offer concluding remarks.

THEORETICAL BACKGROUND

The Emergence of New Organizational Forms from the Perspective of Coevolution

Research questions such as how organizational forms emerge, develop and change have been of critical importance in organizational theory (Bogaert et al., 2016; Dentoni et al., 2020; Fiol & Romanelli, 2012; Romanelli 1991; Ruef, 2000; Weber et al., 2016; Winter et al., 2019).

Early studies of organizational forms were developed from the population ecology theory. Ecologists conceptualized organizational forms based on the common characteristics of organizations by analogy with the concept of biological species (Carroll & Hannan 1989; Hannan & Freeman, 1977; Hannan & Freeman, 1987; Hannan & Freeman, 1989). Early studies in institutional theory focused on how the institutional environment, state, and industry norms shape organizational forms and the isomorphism of organizational forms living in the organizational field (DiMaggio & Powell, 1983; Fligstein, 1991; Streeck & Schmitter, 1985). These theories explain the evolution of new organizational forms at the macro level and focus on the determinism of the environment.

In recent studies based on previous studies, Weber et al. (2016) explained the emergence and legitimacy of social networking sites as a new organizational form by associating it with density dependence and recognition by other actors. Liu and Elliott (2016) examined how normative and cultural change elements affect the development of hybrid colleges in China. Jha and Beckman (2017) examined the role of institutional logics and the identities of founding actors in the emergence and legitimation of charter schools in California. Boone et al. (2018) examined the interplay of political and ideological struggles in Turkey's emergence and diffusion of religious high schools and western-centered cosmopolitan high schools. Winter (2019) shows the effect of institutional, sociotechnical, and market factors (regulators, policymakers) on the emergence and legitimacy of APCD, a database that provides data governance in the US healthcare sector, as an organizational form. Soydemir and Erçek (2020) revealed the role of institutional logics in the emergence, diffusion, and demise of Ottoman agricultural credit cooperatives as a hybrid organizational form. Han (2021), on the other hand, examined how the organizational forms of companies privatized by the government's decision changed radically and how this external decision shaped the strategies and performances of the organizations. Recent studies have emphasized the role of environmental, technological, and institutional changes, institutional pressures, institutional logics, or density in the emergence and diffusion of organizational forms. Thus, recent literature fails to show how an organizational form emerges step by step in a dynamic context.

Coevolution, which brings a different perspective to the organization and environment relations, argues that the environment and organization feed each other by interacting over time, so the environment and the organization develop together (Baum & Singh, 1994, Dijksterhuis et al., 1999; Djelic & Animo, 1999; Lewin and Volberda, 1999). From the perspective of coevolution, early studies focused on organizational forms and indicated that organizational forms emerged in response to changes in the environment, changing competitive forces, and increasing complexity (Dijksterhuis et al., 1999; Djelic & Animo, 1999; Lewin & Volberda, 1999).

Recent studies on coevolution theory have focused on the coevolution of the music industry with its environment (Uli, 2015), the coevolution of MNEs and institutions (Garcia-Cabrera & Duran Herrera, 2016), the coevolution of institutions, culture, and industrial establishments in

the Chinese film industry (Xin & Mossig, 2017), the role of family members in the evolution of the Sainsbury firm with its environment (Aluko & Knight, 2017), the role of government and institutional entrepreneurs in the formation and development of microfinance associations (Olsen, 2017), the coevolution of organizational processes in the business practices of a service firm (Uli, 2018), the coevolution of an MNE and its institutional environment in Finland (Karhu, 2020). These studies emphasize the coevolution of an organization and its environment, or a single industry and its environment.

On the other hand, Abatecola, Breslin, and Kask (2020), in their study, in which they critically analyze the coevolution literature, state that there are theoretical inadequacies in explaining the coevolution process and that deeper analyzes are needed. They imply that coevolving entities must be clearly defined, and the relationships between these entities must be transparent, reciprocal, and simultaneous. They point out that coevolution mechanisms are needed to explain the relationships between coevolving entities. In addition, Abatecola et al. (2020) also suggest examining how new organizational forms are formed in coevolution studies.

We argue that by considering the emergence of a new organizational form from the perspective of coevolution, we may fill some of the gaps in both organizational form and coevolution literature. First, we clearly define the coevolving actors in the emergence of the form. We explain the interactions between these actors in the dynamic context. We propose the concepts of catalyst and proto form as mechanisms of coevolution to explain the interrelationships between these actors.

We use biological coevolution to explain catalysts, the first concept we propose as a mechanism of coevolution. *Biological catalysts* are mechanisms that accelerate relational reactions between existing enzymes and arise unaffected by reactions (Jimenez et al., 2008; Marti et al., 2008). In this study, catalysts as a mechanism of coevolution are actors that promote, accelerate, and inspire a certain change or action. Catalysts provide interaction between actors or organizations. Catalysts, by their actions, cause other actors in the coevolutionary process to sustain their interaction (Villani & Philips, 2021). They can accelerate the coevolution of actors in the process of change in the institutional environment. Moreover, effective catalysts accelerate and support the emergence of a new application or form in an institutional environment.

The second concept we propose as a mechanism of coevolution is proto forms. We use the proto form to describe the trial and error processes that precede the emergence of a new organizational form. Proto forms are new practices or innovations created by actors to initiate transformation in the institutional environment (Lawrence, Hardy & Philips, 2002; Li & Khessina, 2020). Some actors who take the initiative can develop proto forms to expand their fields of action (Lawrence et al., 2002) and speed up the process. In other words, proto forms arise when the actors attempt possible applications of the form. When the proto form first came out, it might not be in perfect shape. In this process, improvements continue until the form reaches its final shape. Since the proto forms are in the development process, they can change due to negotiations and adaptation processes (Kleinaltenkamp et al., 2018). Interactions and collaborations between actors can transform the proto form into its final form. Proto forms play a vital role in the emergence of the new organizational form. Because they provide an understanding of form to other actors in interaction (Li & Khessina, 2020), they can also direct regulatory actors to legal action.

We also consider McKelvey's (2002) arguments to more clearly explain the coevolution among actors and the emergence of a new organizational form as a result of coevolution. McKelvey (2002) notes that for coevolution to occur, certain conditions are required. First, heterogeneous actors (agents, molecules, genes, organisms, species, organizational processes, individuals, groups, organizations, or populations), for instance, must exist. Second, actors must be capable of changing / learning. Third, actors must be able to interact and reciprocally influence each other. There must be some greater degree of adaptation and restriction that motivates the mechanism of coevolution. Moreover, it must be an event that initiated coevolution.

On the other hand, McKelvey (2002) also mentions damping mechanisms while talking about cevolution. Coevolution produces nonlinear results. Managers need to manage the process through damping mechanisms when coevolution develops in an undesirable (negative) direction. Damping mechanisms are methods of controlling the rate of coevolution or turning it off completely. "*Their timing seems random-damping mechanisms may occur too soon or too late*" (McKelvey, 2002: 8). When damping mechanisms are too strong and applied at the beginning of the coevolution process, it can immediately stop the coevolution process. Therefore, damping mechanisms should be activated when necessary to end coevolution (McKelvey, 2002).

To sum up, with this study, we focus the emergence of technoparks as a new organizational form from the perspective of coevolution. We explain the events that started the coevolution, how the first idea about the form was born, how this idea developed, the various coevolving actors, the actions and interactions of the actors. Also, we study the catalysts that accelerated the process, how the proto form was formed in the first application process, how the proto form was revised and how the established. We expand the theory by highlighting and revealing these issues.

EMPRICAL CONTEXT: TECHNOPARKS IN TURKEY

Our study is based on the emergence process of technoparks in Turkey. The establishment of Technoparks in Turkey started in 1987-1989 in line with the decisions taken by the State Planning Organization during the Özal government period (Cansız, 2017; Harmancı & Önen, 1999). In these years, although there was not enough legal infrastructure, universities such as Middle East Technical University (METU) and Istanbul Technical University (ITU) started to work on establishing a technopark (Cansız, 2017).

In 1990, at the invitation of the State Planning Organization, a team from the United Nations Development Fund for Science and Technology (UNFSTD) came to Turkey. In Istanbul, Ankara, Izmir, Gebze, and Eskisehir, explored the possibilities of universities and research centers. Then, a project titled "Program for Establishing Technoparks in Turkey" was initiated between Turkey and the UNFSTD. As a result of the project, with the Small and Medium Enterprises Development Organization and METU, Technology Development Centers affiliated to the Small and Medium Enterprises Development Organization started to be established. Technology Development Centers are structures that play a role in developing of university-industry cooperation in Turkey and are the first step of technoparks. Technology Development Centers' activities accelerated the technopark process and contributed to the relative increase of its quality and success (Cansız, 2017).

As a result of the joint efforts of METU, The Scientific and Technological Research Council of Turkey (STRCT), and the Ministry of Industry and Trade, "Technopark Regulation" was put into effect by the Small and Medium Enterprises Development Organization in 1997 (3th STHC Decisions, 1997). This regulation acted as an incentive to accelerate the establishment of technoparks and to attract technology-based companies to technoparks until enacting the law. According to this regulation, the first approved technoparks were METU Technopark and The Scientific and Technological Research Council of Turkey Technopark. However, these technoparks have been fully operational after 2001. Finally, The Law on Technology Development Zones (In the study, the name technopark is used.) was approved on June 26, 2001. It came into force on July 6, 2001, after its publication in the Official Gazette. Table 1 summarizes the timeline of significant events about the emergence of technoparks in Turkey.

Table 1. The Significant Events About The Emergence Process of Technoparks

1987-1989	During the Turgut Ozal Government Period, Adnan Kahveci researched on technoparks through the State Planning Organization (Today known as Ministry of Development).
1987	METU collaborated with the State Planning Organization to organize a conference on technoparks at METU.
1989	It was agreed in the 6th Development Plan that technoparks would be promoted.
1990	"Program for Establishing Technoparks in Turkey" was initiated between Turkey and the UNFSTD. As a result of the project, Technology Development Centers affiliated to the Medium Enterprise Development Organization began to be established with the initiatives of METU.
1992	ITU Technology Development Center, METU Technology Development Center, and The Scientific and Technological Research Council of Turkey (STRCT) Technology Development Center were established.
1995	It was agreed in the "Breakthrough in Science and Technology Initiative" within the framework of the 7th Development Plan that the Technoparks legislative structure would be made.
1996	METU and the Turkish Technology Development Foundation sent delegations abroad to cooperate in the Technoparks inquiry.
1996	The draft Law on Technoparks/Technology Development Zones prepared by the Ministry of Industry and Trade was introduced to the Prime Minister. However, the resolution was sent back by the Prime Minister for review.
1997	Small and Medium Enterprises Development Organization Technopark Regulation has been prepared. In addition, the first building construction protocol was signed between METU and the first investor and entrepreneur of METU Technopark, Emrehan Halıcı.
1998	The first approved technoparks were METU Technopark and STRCT Technopark, according to the Small and Medium Enterprises Development Organization Technopark Regulation.
2000	The Council of Minister passed the Technology Development Zones Law at the Turkish Grand National Assembly.
2001	The Law on Technology Development Zones was approved on 26 June and came into force on 6 July after publication in the Official Gazette.

METHODOLOGY

Research Setting and Data Collection

This study aims to understand the emergence process of technoparks as a new organizational form. Thus, we designed this study with an exploratory approach to qualitative research. We used qualitative methods preferred when variables could not be measured and a subject or problem needed to be discovered. Qualitative research provides the opportunity to examine the subject in-depth and detail (Creswell, 2007).

We collected the data through semi-structured interviews and document analysis. We used purposeful sampling and snowball sampling in the study. First, we interviewed people who knew about the technoparks emergence process. Later, we reached the individuals guided by these people. In this context, we started interviews with the manager of METU Technopark, the first technopark in Turkey. Next, this manager led us to two former deputies who played an active role in the legal process and establishment. One of these individuals was METU Technopark's first investor and entrepreneur. The other is the Technopark Manager at Hacettepe.

The Ministry of Industry and Technology, on the other hand, carries out the tasks of providing technoparks with infrastructure funding, providing tax incentives, and supervising technoparks. That is why we connected with the retired senior manager of the Ministry of Industry and Technology. Then, we interviewed the ITU manager Ari Technopark, one of the first technoparks set up under the Technology Development Zones/ Technoparks Law. Via this manager, we reached out to the former chairman of the board of METU Technopark. Finally, we met with the assistant manager of Ankara Technopark. Interviews continued until saturation was achieved. In other words, we gathered the interview data until the concepts and processes obtained in the direction of the research question started to repeat (Mason, 2010). Therefore, we interviewed seven persons in total.

The first author guided interviews from July 13, 2018, to May 6, 2019. The interviews lasted between 50 and 90 minutes. In order to understand what environmental conditions that trigger the emergence of technoparks in Turkey and the actors who played a role in the emergence of technoparks, questions such as "What can you say about the environmental factors (political, economic, technological, social) that create technoparks?", "How has the establishment process developed?", "What are the difficulties and incentives experienced in this process?", "Which institutions or actors contribute/affect the development of technoparks?", "How have the policies, practices, and mechanisms of the state shaped technoparks?", "What is the reason for the establishment of technoparks in universities?" were directed to the participants. We transcribed interviews and collected 101 pages of interview data. Table 2 contains comprehensive details about the interview

In the study, we analyzed the Development Plans, Technopark Regulation for Small and Medium Enterprises Development Organization, Technology Development Zones (Technoparks) Law Draft and General Justification, Technology Development Zones

Table 2. Information About Participants and Interviews

Coded Names	Institutions	Jobs	Date of Meeting	Time	Duration	Meeting Place
K1	Z Technopark	Executive Manager	December 6, 2018	14:30	65 minutes	Manager's office
K2	X Technopark	Board Chairman and Professor	May 6, 2019	13:30	60 minutes	Manager's office
K3	X Technopark	Deputy and Entrepreneur	October 5, 2018	14:00	50 minutes	Manager's office
K4	Y Technopark	Deputy and Manager	July 23, 2018	14:00	90 minutes	Manager's office
K5	X Technopark	Manager	July 13, 2018	13:30	55 minutes	Manager's office
K6	Ministry of Industry and Technology	Head of Department	December 6, 2018	16:30	85 minutes	Manager's office
K7	T Technopark	Manager	May 6, 2019	15:15	60 minutes	Manager's office

Table 3. Information About Documents

Documents	Date
5. Development Plan (1985- 1989)	July 13, 1984
6. Development Plan (1990-1994)	June 22, 1989
7. Development Plan (1996-2000)	July 18, 1995
8. Development Plan (2001-2005)	June 27, 2000
Small and Medium Enterprises Development Organization Technopark Regulation	1997
Technology Development Regions/Technoparks Law Draft and General Justification	May 30, 2000
Technology Development Regions/Technoparks Law	June 26, 2001

Law documents. We discussed the era between 1980-2001 in the study for the establishment of technoparks. We reviewed one thousand two hundred two pages of documents within the framework of the study. We revealed the conditions and institutional arrangements that cause the emergence of technoparks through these documents. Detailed information on the documents reviewed as shown in Table 3.

To increase trustworthiness within the scope of the study, we have diversified data using different methods (interview and document analysis) in data collection. In addition, we also diversified the data sources in order to obtain different perspectives on the event and phenomenon under investigation and included participants with different characteristics. Thus, this triangulation of sources and data increases qualitative research's trustworthiness (Lincoln & Guba, 1985).

Data Analysis

In order to understand the emergence of technoparks as a new organizational form, we analyzed our data with an inductive approach (Corley and Gioia, 2004). We relied on interviews as the primary data source regarding the emergence process of the form. We have used the document data to understand the events that trigger the changes in the institutional environment and to reveal the legal regulations related to technoparks due to the interaction between the actors.

We know that changes and triggering conditions in the institutional environments and systems lead to the birth of a new form. In this sense, we first created our themes related to the trigger conditions that create changes in the institutional environment. We have identified the actors that we predict will be affected by changes in the institutional environment. We assumed that the actors would interact, and a new form would emerge due to these interactions.

We transcribed our interview data and transferred it to the N-Vivo program along with the documents. In the first stage, we reread and reevaluated the data. Next, we identify the initial concepts by coding small pieces or sentences that make sense. We combined similar concepts among these categories under the open coding process (Corley & Gioia, 2004; Strauss & Corbin, 1998).

In the second stage, axial coding begins (Strauss & Corbin, 1998, Charmaz, 2006). We have grouped similar categories related to each other under themes that we have created related to the trigger conditions that create changes in the institutional environment. On the other hand, we also created new categories according to the meanings that emerged from the data, which we could not find in theory. We grouped the interrelated ones among these categories, which emerged from the interaction of the actors in the emergence of the form, into new second-order themes (Corley & Gioia, 2004; Gioia et al., 2013). We have gathered these themes in the inclusive dimensions we propose as catalysts and proto forms.

Moreover, we integrated the emergent findings to develop a conceptual model explaining the emergence of technopark as a new organizational form. Figure 1 displays the final data structure outlining some variables in the conceptual model.

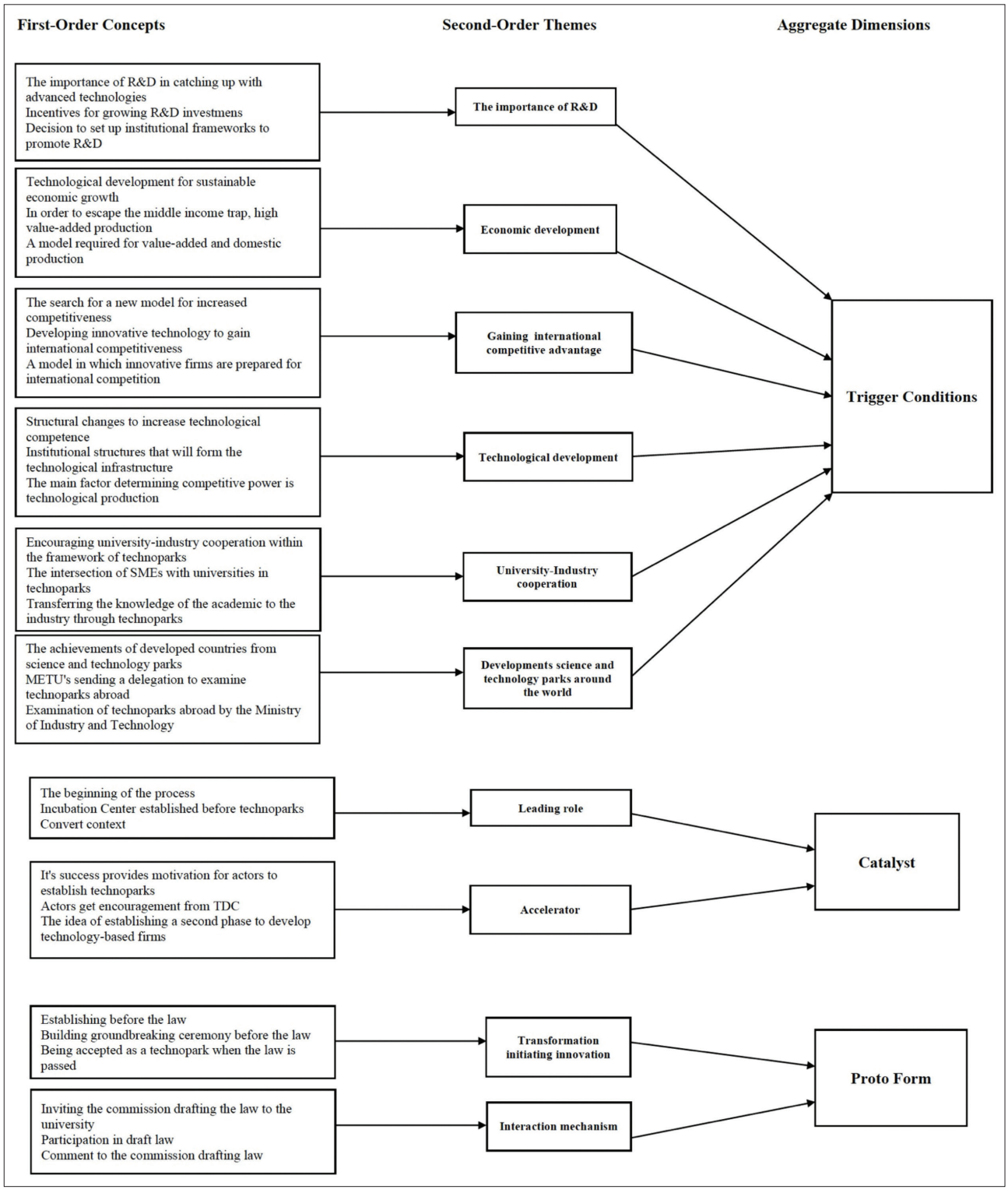

Figure 1. Data Structure

Also, Table 4 shows additional supporting data that provide evidence for our developed model.

Table 4. Supporting Data Providing Evidence

Aggregate Dimension: Trigger Conditions	
Second-Order Themes	**Representative Quotations**
The importance of R&D	R&D activities are of great importance in catching up with advanced technologies. (Technopark Law's General Justification, 2000).
	Before technology parks establishing in Turkey, the proportion spent on research and development was around 0.6 percent. In other words, outside the defense industry sector, research and development seemed almost nonexistent (P4).
	Why are all these laws on research and development supported? The number of entrepreneurs is increased, more technological goods are made, more added value is generated, more exports are produced, products are localized as far as possible (P6).
	Such as supporting creative entrepreneurship, regulating R&D incentives ... developing institutional structures that will support R&D related to the establishment of technoparks and venture capital institutions required for this …(7th Development Plan, 1995).
Economic Development	It is of primary importance to build and protect a sustainable growth climate, to use advanced technology to boost Turkey's international competitiveness, develop and produce… to create a technological infrastructure technology development zones/technoparks ...The law in force should be governed by the applicable legislation (Technoparks Law's General Justification, 2000)
	With this law, technology-intensive production and entrepreneurship are supported ... to contribute to economic development and regional development ...(Technoparks Law's General Justification, 2000)
	Turkey has no choice but to develop high value-added products to escape the middle-income trap (P4)
	Technoparks are required model for the country to produce value-added products and domestic production (P1)
Gaining international competitive advantage	Countries that dominate science and technology are on the way to gain absolute superiority in all areas of economic activity. The key factors that decide the competitive advantage of nations are science and technology policies...(Technoparks Law's General Justification, 2000)
	Turkey has sought a new model, especially for its industry to compete, and employ university graduates, trained workforce (P5).
	Since innovative technologies are not developed, international competitiveness cannot be gained. (7th Development Plan, 1995).
	Technoparks offer essential opportunities to prepare innovative companies for international competition. (P5)
Technological development	Significant structural changes will be made to increase technological competence. (7th Development Plan, 1995).
	Establishing institutional structures that will form the technological infrastructure …(7th Development Plan)
	Let us look at things from a broader perspective. What should it do to be a developed country? It has to produce technology, export technological products. (P6)
	Producing and exporting technology provides a competitive advantage in world markets for countries. (Technoparks Law's General Justification, 2000)
University-Industry collaboration	University, research institutions, and industry cooperation will be supported and encouraged within the framework of technoparks. (6th Development Plan)

	There was a history of industrial research in universities that was nott nil, yet it was entirely focused on those personal relationships. Not very formal or systematic, it was (P2).
	R&D studies of SMEs will be encouraged, and it will be ensured that they intersect with universities in technoparks (8th Development Plan)
	Transferring the knowledge of universities to the industry in the shortest way… This is achieved by formations such as technoparks (Technoparks Law's General Justification, 2000)
Developments in the world's science and technology parks	In the last 30 years, science and technology parks have been created in developed countries such as the USA, England, France, and Germany. (Technoparks Law's General Justification, 2000)
	These new production models in developed countries have achieved great success. (P1)
	Then this process continues at METU with the sending of delegations abroad. Delegations are going to America and Europe to examine and assess the technology parks there (P5).
	There are a few technoparks all over the world, you know very well. For example, Silicon Valley is in America, Sophia Antipolis is in France, and Tefen Technopark in Israel. My colleagues working in the Ministry of Industry and Technology researched Sophia Antipolis, Tefen Technopark, and Silicon Valley (P6).
Aggregate Dimension: Catalyst	
Second-Order Themes	**Representative Quotations**
Leading Role	It is vital to include Technology Development Centers (TDC) at the beginning of this process. (P2)
	While giving an introductory speech about technoparks, a telecommunication company manager said, "Hodja, you are dreaming, such a Technology Center in Turkey is useless, no one invests in technology either." I said, wait 2-3 years and you will see the results. I said we have an example of TDC (P2)
	I was the chairman of the board of the Teknopark company from 1998 to 2008. I lived there for the first ten years of its founding period. In the most difficult process, we were going towards an unknown. I mean, there are examples in the world, but the investment climate in Turkey is technology development skills. If we didn't have the TDC example, we would be very scared.
	TCDs are a critical core. First, TDC has provided a moderator condition. Second, TCDs have a transformative effect on the context. Based on this example, actors have turned to such models more courageously. (P7).
	The World Bank's subsidiaries report, "For the early establishment of technoparks in Turkey, but there are benefits at the start of this study. First, incubation centers are established, then reached a certain maturity industry technopark model can be established." sums up. Following this report, Technology Development Centers, which are incubation centers, started to be established in cooperation with The Small and Medium Enterprise Development Organization and universities. The first TDCs were established in 1991 at ITU and in 1992 at METU. (P5)
Accelerator	Seeing the success of TDC was an excellent motivation for us. (P2)
	Prof. Dr. Ömer Saatçioğlu should be given his due. He was the rector at that time. TDC was founded with his contributions. I think it was a very important thing, if we didn't see that success, it would be hard to believe, stop continuing. (P2)
	Based on this example, actors have turned to such models more courageously. (P7).
	Firms leaving the Technology Development Center do not know what to do. In other words, these entrepreneurs are leaving, but they are quickly emerging from a protective atmosphere to an environment they do not recognize. So we said, could we do a second stage? What this might be, Technoparks. (P2)

Aggregate Dimension: Proto Form	
Second-Order Themes	**Representative Quotations**
Transformation initiating innovation	During this time, a couple of similar things were going on together in the late 80s and early 90s. One of them was founded the management of METU Technoparks Corporation in 1990, before the Technoparks was established in Turkey (P5).
	The foundation of the first building of METU Technopark was laid in 1999 (P2).
	METU was established before the law, and Gebze STRCT also set out before the law (P7).
	The Ministry of Industry also took some things from us by using similar criteria in the evaluation of technoparks. When it was the first Technopark (P2).
	METU Technoparks were officially accepted as technoparks when the law was enacted (Technoparks Law, 2001).
Interacting Mechanism	In 2000, we invited the commission that prepared the Technopark law to the university (P2).
	Together with the team at the Ministry of Industry, we also attended the draft law preparation meetings. How can we retouch and give advice? There was good interaction between the university and the Ministry of Industry at that time. (P2)
	While preparing a law, especially when making a law like Technopark, you get ideas from many institutions, it is important to get ideas. You look at the examples, for example, there is an example from METU. How is this place managed? (P6)
	At that time, there was good communication between the university and the Ministry of Industry when this law was passed. We also put the thing clause into the law; "STRCT and METU technoparks are considered as Technology Development Zones from the moment this law is passed" (P2).
	We told the commission that if universities are not going to be partners, it is tough to establish technoparks within the university. Because the university will give land, give academic support, and provide infrastructure support. There must be a legal basis. The commission listened to our advice and made changes to the draft law. (P2)

FINDINGS

As a result of the data analysis, we revealed how the coevolution of actors in the institutional environment emergences the technopark organizational form. Moreover, in this direction, the conceptual model we developed within the scope of this study is shown in Figure 2. Our conceptual model describes the flow inspired by McKelvey (2002). We developed the model in line with our predictions that conditions changing the institutional environment will lead to the emergence of a new form and in line with the flow of findings from data analysis. The model we have developed includes the events that cause changes in the institutional environment and the triggering conditions, the actors who play and interact in this process, the outputs of the interaction, the catalysts, the proto form.

Based on McKelvey's arguments (2002), we present our findings under the headings of initiating events, interacting actors and the interaction process.

Findings Regarding Initiating Events

The free market economy in Turkey started with the implementation the 24 January 1980 Stabilization Program. These decisions started a new era in Turkey (Boratav, 2007; Kırmızıaltın, 2012; Pamuk, 2012). In addition, with the implementation of these decisions, significant institutional changes have been experienced in the economic and political fields (Buğra & Savaşkan, 2015; Dirlik, 2016; Kibritçioğlu, 2004; Özen, 2002). In the new era, import substitution and a state-centered industrialization approach are unnecessary. The main objective of the new period is to open the economy to international markets, focus on exports, and focus on a market-centered understanding (Kırmızıaltın, 2012; Pamuk, 2012). In order to achieve these goals, the devaluation was made, the exchange rate policy and imports were liberalized, the arrival of foreign capital in the country and exports were encouraged, price controls and subsidies were abolished, and regulations were made against labor in the capital-labor conflict, and policies aimed at narrowing domestic demand were

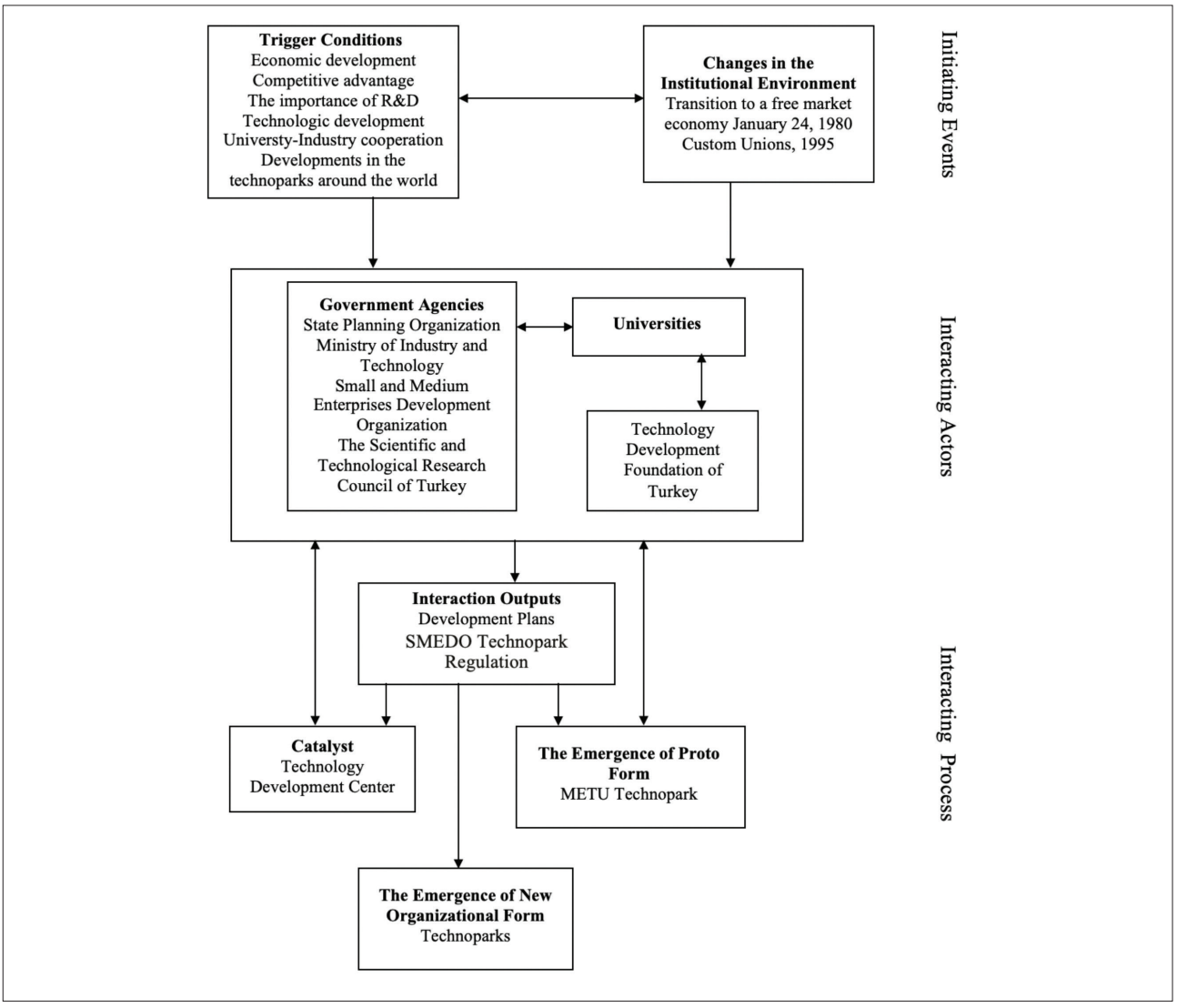

Figure 2. The Emergence of Technoparks as a New Organizational Form

implemented (Boratav, 2007; Kazgan, 2006; Kırmızıaltın, 2012; Pamuk, 2012).

On the other hand, the focus was put on the development of science and technology policies during this time, and it was reported that frameworks would be developed to promote research and development (R&D) studies, advanced technology production, and university-industry cooperation (Çalışır & Gülmez, 2010; Özdaş, 2000; Yıldız et al., 2010). One of these frameworks is the technoparks are intended to be established to achieve national objectives (2nd STHC Decisions, 1993; 4th Development Plan, 1995).

The decisions of the Customs Union were adopted in 1995 and came into effect. The introduction of the Customs Union is expected to increase competition, increase investment, accelerate industrialization and accelerate technological development. Growing foreign investment in the capital has led to an increase in competition. The increasing rivalry has led domestic firms to turn to more productive working methods and thus to investments in research and development to gain sustainable competitive power. Technological development was helped by the technological goods that arose as a result of these R&D investments (Yıldırım & Dura, 2007; Türker, 2009). In order to gain a competitive advantage in the international arena, it can also be said that technoparks play a essential role in promoting and supporting R&D and innovation-oriented firms.

Findings Regarding the Interacting Actors

In this section, we briefly introduce the actors who played role in the emergence of technoparks.

State Planning Organization/SPO (Today known as the Ministry of Development) is the government agency that came up with the first idea about technoparks in Turkey.

Ministry of Industry and Trade (Today known as the Ministry of Industry and Technology) is the government agency that carries out the work of legal regulations related to technoparks.

Small and Medium Entreprises Development Organization (SMEDO) was established in 1990. SMEDO, in line with the instructions of the Ministry of Industry, established Technology development centers and issued the Technopark Regulation.

The Scientific and Technological Research Council of Turkey (STRCT) is a government agency responsible for coordinating activities related to technoparks and supporting companies that will operate in technoparks.

Universities are one of the main actors that ensure university-industry cooperation, which is the primary purpose of technoparks. Universities have been involved in establishing technoparks in Turkey by taking the initiative.

Technology Development Center has emerged due to the interaction of universities and government agencies. The purpose of the establishment of TDC is to establish and develop new technology-based firms, support the R&D activities of these firms and SMEs, and ensure the cooperation of small enterprises with universities, public and private sectors R&D institutions.

Technology Development Foundation of Turkey (TDFT) is an autonomous institution established to support and increase the competitiveness of the private sector in the international market, R&D, and innovation activities. TDFT supported the research of technoparks abroad and the feasibility study of technoparks in cooperation with universities.

Findings Regarding the Interacting Process

The first idea about technoparks in Turkey was brought to the Minister of Treasury Adnan Kahveci in 1987. Adnan Kahveci started research on technoparks through the State Planning Organization. The participant said the following about this issue:

It is said that during the Turgut Ozal government, Adnan Kahveci attached great significance to this work. It knows that he quickly adopted the technopark concept and gave instructions through the State Planning Organization to examine specific processes and develop a model (P5).

After this decision, METU took the initiative and got involved in the process. METU organized a conference on technoparks in cooperation with SPO. Regarding the involvement of METU in the process, the participants said the following:

In the second half of the 1980s, the rector of METU, vice-rectors, advisors, and the board of directors of the foundation said that there is a need for a technopark in Turkey. They act with the thought of "Can we, as METU, lead this?" (P2).

Afterwards, a conference on technoparks is held at METU, again in cooperation with the SPO, 1987 as far as I know (P5).

Regarding the reason why universities are involved in this process, the participants stated that:

University professors can also open companies in technoparks to turn the technologies they have developed into products (P6).

I thought that this structure would work at METU, the best university in Turkey. Because both student and academic resources are perfect, the software is promising here (P3).

After these developments, a decision on technoparks was taken in the 6th Development Plan in 1989.

In order to develop University-Industry cooperation, necessary changes will be made in the legislation, technoparks operating in this field will be encouraged and expanded (6th Development Plan).

In 1990, at the invitation of the SPO, the United Nations Development Fund for Science and Technology (UNFSTD) came to Turkey. As a result of UNFSTD's research on technoparks in Turkey, a project was conducted in cooperation with SPO and UNFSTD. According to the project report, it is recommended to establish incubation centers as a preparatory stage for technoparks.

In 1992, Technology Development Centers affiliated to SMEDO started to be established with the initiatives of METU. Participants describe the initiatives of METU in the emergence of TDCs as follows:

METU Technopark Corporation is being established under the METU Development Foundation. This is the first act of the university. On the other hand, negotiations with SMEDO continue in the public sector. The university decided to establish TDC in 1992. The university says to SMEDO that we will give the land, you set up the building and provide financial support and let us operate this model (P2)

METU plays a leading role. TDCs, which are incubation centers, started to be established in cooperation with SMEDO and Universities. The first two are starting to serve at METU and ITU (P5).

Regarding the role of TDCs in this process, the participants expressed the following:

Since there were Technology Development Centers before the technology parks, the first was established at METU. What was TDC, an organization that develops and supports new technology-based firms? The basic idea of technoparks comes from TDC (P2).

Before the technoparks, SMEDO had TDCs. To develop small entrepreneurs. Firms were entering this incubation, leaving after a bit of budding (P6).

Over time, starting from 1992, it has been shown that there is a potential in the Technology Development Center, i.e., companies entering the Technology Development Center are very successful. This situation inspired us as well (P2).

In the 7th Development Plan in 1995, legal regulations related to technoparks were mentioned.

The Legislation on Technology Development Zones (Technoparks) will be implemented within the Science and Technology Project Breakthrough (7th Development Plan).

On the other hand, in 1995, METU started the construction of the technopark building in order to advance this process as a result of its success in TDC. The participant stressed it as follows:

In 1995, METU says that my incubation was established, I started to progress, now I will gradually mature the technopark process and go beyond incubation. In 1995, together with Semra Teber, creating a conceptual plan for this place was started… This area is started to be planned for the development of a technopark within METU, in a greener area (P5).

In 1996, in cooperation with METU and TDFT, a delegation of faculty members from METU went abroad to examine technoparks in the world. A feasibility study has been prepared on the formation of technoparks in Turkey. Participants underlined:

The first study on this subject in Turkey came to the fore with a feasibility study conducted by a committee under the chairmanship of STRCT vice president, Professor Doctor Metin Ger, who is also a faculty member at METU, to examine structures such as Technopark, Technocity, and science park in the world (P4).

Metin Ger's is called this Technopark or something, but let us see what foreign examples of this are. That is when it starts (P2).

If technoparks could be established in the days when that feasibility study was carried out, if the law had been enacted, they would have entered almost at the same time as France and Japan. Unfortunately, things are moving slowly in Turkey due to bureaucracy. We notice many things early. We are working and preparing the reports, but it is difficult to implement (P4).

In 1997, "SMEDO Technopark Regulation" came into effect due to the joint efforts of METU, STRCT, and the Ministry of Industry and Trade. On the other hand, with the participation of the president, ceremonies were held for both the METU Twins building and the Halıcı Software house. In addition, the first projects started to be formed in METU, and the first protocol was signed with Emrehan Halıcı. Participants stated that:

In 1997, the first projects are being prepared. Emrehan Halıcı and METU are signing a protocol. The projects of the first technopark building and the twin building we are in are being prepared, and the groundbreaking ceremony is held with the participation of Süleyman Demirel. These are the first breakthroughs… In 2000, we see that the Twins building was put into service. The Halıcı building, on the other hand, was put into service at the beginning of 2001. The first technopolis buildings were put into service at the beginning of 2000 and 2001. These are the first steps in Turkey (P5)

I wanted to do something more concrete beyond civil society work. I met with the rector of METU, Süha Sevük. I tried to explain the importance of the software with the reports I have. As a result of long negotiations, we signed the first protocol in 1997 (P3).

We realized that we needed new investors. I think he was meeting with Emrehan Halıcı in 1997. Do you invest? Emrehan also develops software. He says why not, but there is still a need for incentives. Coming to the contract phase with Emrehan (P2).

According to the SMEDO Technopark Regulation in 1998, METU Technopark and STRCT Technopark are the first technoparks to be approved. METU Technopark Corporation, founded in 1992, has gained an official qualification according to this regulation.

In 1999, the technopark law is being discussed in the Turkish Grand National Assembly. Participants expressed:

I was elected as a deputy from the "Demokratik Sol" Party (DSP) in 1999. I became the group vice-chairman of Prime Minister Bülent Ecevit. Meanwhile, the Technopark Law was being discussed in the parliament. The Information Technologies group was established in the parliament, and I joined this group as a çivil society organization representative. The work to establish a technopark started here and then moved to the parliament. "Doğru Yol" (DYP) and "Refah" (RP) contributed among the other parties. Especially Abdullah Gül and İlyas Yılmazyıldız were very supportive. The Technopark Law is one of the rare laws that the majority supports. In this process, I became the first investor, and I think I played an important role in the law (P3).

A technology commission was established under the chairmanship of Professor Doctor Ziya Aktaş. This law was discussed extensively in the commission. By the way, Emrehan Halıcı was the vice president of the DSP group at that time. He built the first building in the Technopark in METU. So at that moment, there was a mature idea. I also actively participated in the DYP and studied the systems in the world. Finally, we passed this law in July 2001 (P4).

While the debate on the technopark law continued in the Grand National Assembly of Turkey, in 2000, METU Technopark invited the commission that prepared the law to the university. METU shared its views and experiences

about technoparks with the commission members. The participants noted this issue as follows:

Legislative questions were asked, especially at METU (P7).

The structure of METU is taken as an example. They also supported while preparing the law (P6).

In 2000, it was accepted that legal and institutional arrangements would be made in the 8th Development Plan. At the same time, the Draft Law on Technopark and its justification were accepted. Finally, the official gazette of the Technopark Law was published in 2001.

DISCUSSION

Our aim in this study has been to reveal the emergence of technoparks as a new organizational form from the coevolution perspective. Our study makes some theoretical contributions. The first is a contribution to the literature on organizational forms. The emergence of organizational forms is not a stable but a dynamic process. The formation of an organizational form takes place step by step in a dynamic process. The thoughts, actions, interactions of many actors, who participate or leave the process at various stages, and their efforts to learn through trial and error shape the process incrementally. However, the organizational form literature has ignored these processes. Population ecology theory emphasizes the evolution of new organizational forms, transforming a new organizational form into a legitimate form, and the dynamics underlying diversity and changes in organizational forms. The institutional theory focuses on the process of legitimation rather than the emergence of organizational forms, emphasizing the impact of institutional arrangements, institutional changes, and institutional logics in this process. These two theories, which focus on macro processes, do not explain the evolution of a new form from the idea stage to a viable form. By considering the emergence of a new organizational form from the perspective of coevolution, we show how this dynamic process develops step by step and how the interactions of actors in this process shape a new form. In this sense, we extend the theory about organizational forms.

Second, it is a contribution to the coevolution literature. Coevolution focuses on the evolution of organizations with their environments at the industry level, the interaction of organizations and environments in institutional change, and how existing organizational forms evolve with their environments. However, it ignores the process of the emergence of a new organizational form. Based on McKelvey's (2002) coevolution argument, we show how a new organizational form emerges due to the interaction of various actors. We also fill in some gaps that pointed out by Abatecola et al.(2020) in their work, by revealing the coevolving actors and interrelationships between them, and the concepts of catalyst and proto form as mechanisms of coevolution. So, we extend the coevolution theory by showing that the emergence of a new organizational form can be explained by coevolution.

Turkey switched from a closed economy to an open economy integrated with global capital on January 24, 1980. The transition to a market economy integrating with the global order has brought about critical institutional changes. Interactions with foreign actors have begun, and steps have been taken to adopt policies and practices in foreign countries. With the removal of barriers for foreign investors to enter the country, competitive pressure has increased, and technology and innovation have gained importance in terms of competitive advantage. These changes have led to developing an innovative model of economic development. Factors such as research and development and university-industry cooperation have emphasized in the government's policy documents. These developments, which changed the institutional environment's nature, provided institutional actors opportunities to initiate new practices, models, and regulations. The first idea about technoparks in Turkey emerged by the state as the most critical decision-making factor. This structural transformation, which started with the January 24 Decisions, is the event that started the coevolution process as stated by McKelvey (2002) and may have led to unexpected and unpredictable results such as the emergence of technoparks.

In late industrialized and poorly institutionalized countries like Turkey, the state plays a vital role in initiating new practices and directing entrepreneurial activities (Buğra, 1994; Özen, 2010). In this context, the representative of a governemnt agency (SPO) started the process with research on technoparks by using public authority. On the one hand, this action of the SPO, on the other hand, the increase in the importance of university-industry cooperation and research and development factors in the government's policy documents affected universities and universities that took the initiative were included in this process. Universities have been involved in this process to gain profit through the commercialization of their academic products and to benefit from qualified human resources. On the other hand, it has been observed that TDFT (through METU) and UNFSTD (through SPO) are involved in a short-term process at some stages. These interactions and developments between actors explain McKelvey's (2002) argument that there must be heterogeneous actors for coevolution, and these actors must interact with each other.

However, while the state and universities play a role in the formation process of technoparks, it is seen that the

companies that make up the third pillar of technoparks are not involved in this process. The fact that companies did not participate in this process can be explained by the economic conditions of the 1980s and the cultural codes of the actors. The economic conditions of the period, such as the export performance being based on incentives rather than industrial development, the dependence of exports on imports in the production process, the inability to produce high value-added products due to dependency on technology, high-interest rates, devaluation and reduction of production costs, and reduction of production costs for foreign markets (Boratav, 2007) may have caused companies not to be involved in the formation process of technoparks.

On the other hand, when the relations between the state and the private sector are evaluated, there is an order in which the private sector expects the solution to every problem it faces from the government, avoids taking responsibility, and needs state support for jobs that require significant investments (Buğra, 1994). In the new period that started with the January 24 decisions, companies have doubts about the success of the market mechanism, which operates according to its own rules without the state's intervention, and whether the new policies will be permanent and stable (Pamuk, 2012). In such an environment, it can be said that companies are not involved in the formation process due to cultural codes such as avoiding the uncertainty created by a new model such as a technopark and not wanting to take risks.

TDC was established with the joint ventures of Small and Medium Enterprise Development Organization and METU. TDCs established before technoparks have similar purposes to technoparks. However, according to the SMEDO regulation, a company can receive support from SMEDO for a maximum of three years. At the end of this period, companies completed their R&D projects. TDC has contributed to the success of many R&D projects. Despite this, companies cannot come to a level where they can compete with existing corporate companies in the market. Achievements from SMEDO motivated universities. It has taken action to continue supporting the development of companies in a second stage. Universities, which set SMEDO as an example, put pressure on government agencies to establish technoparks. In this context, we can say that TDCs are the catalysts that we define as an actor that plays a leading role in the emergence of a new form and accelerate the interaction between actors.

TDC as catalyst ensured the continuation of the interaction between the actors and the acceleration of the process. Catalysts are essential because they are the actors that accelerate the process of coevolution. Because coevolution requires mutual, simultaneous relationships. Without catalysts, the emergence of a new form would not have occurred in many years, or even at all. Catalysts have played a leading role and activating actors in the coevolution process. Like biological catalysts, organizational catalysts have emerged unaffected by this process while accelerating the interaction of coevolving entities. Catalysts (TDC) continued to exist even after the technopark form emerged. Catalysts illustrate McKelvey's (2002) argument that they must be entities that motivate or accelerate coevolution.

On the other hand, in response to these actions of universities, government agencies did not take any action at times. This situation can be associated with the bureaucratic functioning of the state structure in Turkey. Government actors may have slowed down the coevolutionary process. It explains McKelvey's (2002) argument that higher-level entities may constraint or slow down coevolution.

By examining the technoparks in the world, METU gained knowledge about how the technopark model should be and how it can work in Turkey. According to SMEDO Regulation, METU Technopark was established. METU has been in constant interaction with the actors establish and support technoparks and to establish the legal basis for the operation of the model. METU participated in the draft law prepared by the Ministry of Industry and Technology and expressed its opinion on technopark model. METU Technopark tried to persuade regulatory actors to use legal regulations to develop the new form (Dorada, 2005). Therefore, these actions of METU show that it influenced the government in the law-making process.

Thus, the proto form that we define as a new application that starts transforming the institutional environment is METU Technopark. This action of METU provided an understanding of form to other interacting actors. METU Technopark is in the development process as it is a new application that has emerged through trials. The proto form can transform into its final form, especially as a result of interactions with the relevant actors of the government. It has been observed that interactions and collaborations between actors continue transforming the preliminary form into the final form. The proto form was accepted as a technopark with the law's enactment and became the final form. The proto form explains McKelvey's (2002) argument that for coevolution, actors must have the ability to learn.

Li and Olga (2020) define a proto form as a temporary organizational form that emerges when entrepreneurs try out possible applications of innovation based on pre-existing organizational forms. Similarly, in our study, universities, as actors in the process of coevolution,

started an application of this new structure based on technoparks abroad. Unlike the work of Li and Olga, METU Technopark as a proto form goes beyond the temporary form. Because, with the law enacted by the state, the proto form turned into the main form and thus gained a permanent feature.

Finally, the technopark organization form is an example of a positive and constructive coevolution process (McKelvey, 2002) that emerged due to the interaction of actors. Therefore, since coevolution between actors did not develop in an undesirable direction, we can state that the damping mechanisms that McKelvey (2002) stated did not emerge in this study.

CONCLUSION

This study focuses on the coevolution perspective to better explain the emergence of new organizational forms. We tried to understand the environmental conditions that triggered the emergence of technoparks, the influential actors in this process, and the dynamics of interaction between these actors. We have reached that technoparks, as a new organizational form, arose through the interaction of actors in the institutional environment due to the coevolution of actors.

The dynamics between actors taking place in institutional environments, however, are distinct from the biological environment. In an institutional environment, the interactions between actors interacting cannot be explicit, closely, and sequentially related. Instead, there may be integral working and loosely connected relationships with similar objectives between actors with distinct goals. Actors could have had multiple effects that may have created the same effect indirectly and concurrently. In other words, the actors' acts and activities have taken place in various ways and can influence each other over time.

According to the findings obtained this study, it is possible to assume that there is such a relationship between the actors who interact. There is a better meaning of job descriptions of government and government actors regarding the establishment of technoparks. Often these actors have hierarchical relationships. In this process, however, there is no instruction or a prescribed duty provided by the government or a higher-level approved actor to universities. Instead, there is an initiative for technoparks launched by universities. It can be said that technoparks emerged as a result of a process of coevolution where there were indirect effects that happened over time, the effects of the actors' actions on the concrete performance were not apparent. It was not obvious which actor was how powerful and dominant.

Based on coevolution, this study contributes to both coevolution and organizational forms studies by revealing the environmental conditions that trigger the emergence of a new organizational form, the actors involved in the process in a dynamic context, the interactions between the actors, and how this dynamic process develops gradually. However, to investigate the emergence of new organizational forms from the perspective of coevolution, new empirical research is needed.

Our study has some limitations. First of all, the most important constraint is the inability to reach every actor who plays an active role in establishing technoparks, since the history of the formation of technoparks is quite old. Secondly, this study focuses only on the emergence of the organizational form, based on McKelvey's coevolution argument. However, since we do not focus on the development process of technoparks, the extent to which the co-evolution between actors progressed positively and when the damping mechanisms started to be used in the development process are beyond the primary purpose and scope of our study.

Future studies can examine the evolution of technoparks and the actors they interact with within the development process. In addition, damping mechanisms can be studied in the coevolution of technoparks with their environment. Thus, our understanding of the coevolution of an organizational form with its environment can be extended.

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Knowledge Sharing Strategies and Innovation: The Impact of Business Group Affiliation in an Emerging Economy*

Özlem ÖZEN[1]

ABSTRACT

Business groups provide a setting where affiliated firms, connected with various ties, share knowledge and enhance their innovative capabilities. The relations between knowledge sharing and innovation have been investigated in various contexts; however, whether firms connected with a business group utilize knowledge more than independent firms do in fostering innovations has been addressed to a lesser extent. Therefore, using survey data from 128 Turkish business group affiliated and independent manufacturing firms, this study examines the impact of explorative knowledge and exploitative knowledge sharing strategies on firms' innovative activities and the moderating effect of business group affiliation in this relation. The findings indicate that while explorative and exploitative knowledge sharing enhance innovation, firms affiliated with business groups benefit less from both types of knowledge sharing than independent firms in terms of innovation. This study contributes to the business groups and knowledge research by examining whether groups create value for affiliated firms when firms operate in an emerging economy. The results of this study have policy and strategy implications in emerging economies and in the context of business groups.

Keywords: Business Group Affiliation; Knowledge Sharing; Explorative Knowledge Sharing; Exploitative Knowledge Sharing; Innovation.

JEL Classification Codes: L21, L25, O30.

INTRODUCTION

In emerging economies, business groups have strong effects on countries' development (Chang & Choi, 1988; Holmes, Hoskisson, Kim, Wan & Holcomb, 2018; Khanna & Palepu, 1997). Due to the lack of efficient markets and institutions in such economies, they contribute to the operations of affiliated firms by providing an internal labor and capital market for resources, such as knowledge and technology (Belenzon & Berkovitz, 2010; Hobdari, Gammeltoft, Li & Meyer, 2017; Mahmood & Mitchell, 2004). Particularly, business group affiliates can have advantages over unaffiliated firms in knowledge exchanges with other affiliates and group reputation enables affiliates to collaborate with firms outside group boundaries easier than independent ones to get access to knowledge. Then, this knowledge leads to increase in innovation capabilities (Hsieh, Yeh & Chen, 2010; Komera, Lukose & Sasidharan, 2018).

Knowledge exchanges with other firms, specifically, knowledge exploration and knowledge exploitation relate to innovative activities (Chesbrough, 2003; Choi & McNamara, 2018; Faems, Looy & Debackere, 2005; Katila & Ahuja, 2002; Laursen & Salter, 2006; March, 1991; Rosenkopf & Nerkar, 2001; von Hippel, 1988). However, transferring this knowledge is difficult due to the tacit characteristic (Kogut & Zander, 1992; Szulanski, 1996). In this case, while all firms form relations among themselves to get access to knowledge and innovate, the ties that have been established between group affiliates generate opportunities for these firms to get knowledge easier than unaffiliated ones (Lamin, 2013; Lamin & Dunlap, 2011). Prior studies have addressed knowledge sharing strategies and innovation relations in different settings, such as alliances (Jiang & Li, 2009; Rothaermel, 2001), joint ventures (Chen, Lin, Lin & Hsiao, 2020; Yao, Yang, Fisher, Ma & Fang, 2013), clusters (Lai, Hsu, Lin, Chen & Lin, 2014; Mitchell, Boyle, Burgess & McNeil, 2014; Zhang & Li, 2010) and multinational corporations (Subramaniam, 2006; Tsai, 2001). Researchers have also investigated affiliation impact on innovation (Belenzon & Berkovitz, 2010; Chang, Chung & Mahmood, 2006) and performance consequences of knowledge sharing in business groups (Kang & Lee, 2017; Lee, Choo & Yoon, 2016; Lee & MacMillan, 2008; Lee, MacMillan & Choe, 2010; Lee, Yang & Park, 2020); however, whether business group affiliates benefit from knowledge sharing differently from independent firms in their innovation activities in an emerging economy needs further investigation (Lee, Park, Ghauri & Park, 2014). Therefore, this paper explores the impact of knowledge sharing on firms' innovative activities and whether business group affiliation has a moderating effect in this relation through an empirical analysis of unique survey data from both affiliated and

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independent manufacturing firms operating in an emerging economy, namely Turkey. Although there are various conceptualizations of knowledge (i.e., tacit, explicit), this paper specifically focuses on explorative and exploitative knowledge sharing as these types of knowledge relate to innovative activities (Benner & Tushman, 2003; Chiang & Hung, 2010).

The contribution of this paper to the business group and knowledge literatures is two-fold. The main one relates to how business group affiliation affects firms' knowledge sharing strategies and innovation relations. As Carney, Gedajlovic, Heugens, van Essen and van Oosterhout (2011) and Lamin (2013) raise, research on business groups has provided limited evidence on whether affiliated firms' strategies differ from independent firms' implementations. In line with this view, the investigation of whether firms under control of a group contribute to knowledge sharing in terms of innovative activities more than independent ones do is essential. Moreover, when all firms exist in an emerging economy, including a sample of independent firms allows us to see the contingent value of knowledge exchanges in different settings (Yiu, Bruton & Lu, 2005). Secondly, this study extends the knowledge and innovation research by examining knowledge exchanges in an emerging economy. Firms' knowledge sharing and innovation relationships in emerging economies may differ from developed economy firms' behavior (Hoskisson, Eden, Lau & Wright, 2000; Meyer & Peng, 2016). Moreover, the role of knowledge exploration and exploitation in innovation may be affected by the context (i.e., business group), especially when firms engage in knowledge search beyond their boundaries (Wilden, Hohberger, Devinney & Lavie, 2018). This research advances the business group and knowledge research by exploring the impact of interfirm knowledge exchanges on innovation and considering the business group affiliation from the emerging economy perspective.

The remainder of this paper is organized as follows. In the second section, business group affiliation, knowledge sharing strategies and innovation relations are reviewed and hypotheses regarding the relationships are proposed. In section three, the research methodology is explained and in section four, the results are presented. In section five, findings are discussed. In the sixth section, implications, limitations and further research avenues are considered.

CONCEPTUAL FRAMEWORK AND HYPOTHESES

Business Groups and Knowledge Sharing

Business groups are the prevalent type of organization in emerging economies (Carney, van Essen, Estrin & Shapiro, 2018; Colli & Colpan, 2016; Leff, 1978). Groups are described as a collection of legally independent firms, which are under control of a core firm (Granovetter, 1995; Khanna & Rivkin, 2006). They have emerged in response to inefficient markets and institutions in emerging economies for generating their own internal labor, product and capital markets (Khanna & Palepu, 1997, 2000). Groups are conceived of as a network type of organization (Chang, 2006; Cuervo-Cazurra, 2006; Mahmood, Zhu & Zajac, 2011). Group firms are legally independent; however, they are interdependent through various ties such as crossholdings, interfirm loans, director interlocks and social bonds (Goto, 1982; Strachan, 1976). These formal and informal interfirm ties provide affiliates with an advantage of sharing tangible and intangible resources, such as human resources, research and development (R&D) capabilities, technology and knowledge that may not be achieved through other interfirm relations (Chang & Hong, 2000; Chittoor, Kale & Puranam, 2015; Luo & Chung, 2005). Among these resources, particularly, knowledge, which is regarded as one of the most important resources of a firm, is shared among affiliates to build capabilities and innovate (Grant, 1996).

Affiliation with a group is regarded advantageous for firms in the inefficient environments of emerging economies, as group structure facilitates resource sharing, knowledge transfer and learning between members (Borda, Geleilate, Newburry & Kundu, 2017; Chang & Hong, 2000; Kim, Kim & Hoskisson, 2010; Lee et al., 2016; Lee & MacMillan, 2008; Manikandan & Ramachandran, 2015; Wang, Yi, Kafouros & Yan, 2015). For instance, Lee et al. (2016), reveal that Korean business group firms benefit from knowledge spillovers more than unaffiliated firms do. Group firms not only engage in knowledge exchanges with other members, but also have connections with partners outside group boundaries (Bhaumik, Estrin & Mickiewicz, 2017; Wright, Filatotchev, Hoskisson & Peng, 2005). Group reputation, recognition and political ties allow firms to collaborate with foreign ones and exploit knowledge from their relationships (Bucheli, Salvaj & Kim, 2019; Gao, Zuzul, Jones & Khanna, 2017; Gaur, Kumar & Singh, 2014; Mahmood, Chung & Mitchell, 2017; Mukherjee, Makarius & Stevens, 2018).

Business Groups and Innovative Activities

In emerging economies, when external institutions and markets do not perform well, a group contributes to innovation of affiliated firms through providing an internal labor and capital market for resources, such as trained workforce, knowledge, technology and finance (Hobday & Colpan, 2010; Mahmood & Mitchell, 2004). These internal markets also have an essential role in facilitating knowledge exchange between affiliates and learning through knowledge exchanges allows for innovation (Belenzon & Berkovitz, 2010; Chang et al., 2006; Lee, Lee & Gaur, 2017), which is defined as the generating new things or doing things in a new way (Schumpeter, 1947). For instance, Hsieh et al. (2010) find that group firms innovate more than unaffiliated ones in Taiwan. Choi, Lee and Williams (2011), investigating Chinese firms, reveal a positive influence of affiliation on innovativeness. Wang et al. (2015), examining Chinese firms, demonstrate a positive impact of affiliation on innovative performance.

Groups may also have negative impacts, such as low levels of innovation (Pattnaik, Lu & Gaur, 2018). However, despite these mixed impacts of affiliation, groups may have wider facilities for their affiliated firms by providing them resources for innovation, which may be less available to unaffiliated firms. Nevertheless, this should not cause the misunderstanding that unaffiliated firms are closed entities. They also have relations with peers, such as suppliers, buyers or competitors; therefore, their knowledge utilization with partners affects their innovative activities as well.

Knowledge Sharing Strategies, Innovation and the Moderating Effect of Business Group Affiliation

Interfirm knowledge sharing refers to the interactions between firms to transfer and combine knowledge (Dyer & Singh, 1998). In emerging economies, firms operate under conditions where product, labor and capital markets are inefficient (Khanna & Palepu, 1997; Meyer & Peng, 2016), and R&D activities and internal knowledge creation are usually low (Wang & Libaers, 2016). Therefore, in such economies, firms search for knowledge externally and integrate this knowledge into their current processes in order to innovate. Firms' external relations with other ones provide them with knowledge that is essential and necessary to innovate (Chesbrough, 2003). Specifically, exploration and exploitation of knowledge with suppliers, buyers and other firms enhance innovation (Chiang & Hung, 2010). In organizational learning, while exploration refers to search, risk taking, experimentation, variation, discovery, flexibility, play and innovation; exploitation includes refinement, production, choice, efficiency, selection, implementation and execution (March, 1991). Firms' interorganizational learning includes both knowledge exploration and exploitation from partners to support innovative activities (Chen et al., 2020; Holmqvist, 2004). Explorative and exploitative knowledge sharing can be defined as the interfirm exchange of novel and existing knowledge, respectively, on products, technologies and processes (Arikan, 2009).

New knowledge exploration and existing knowledge exploitation with other firms are important for innovative activities (Benner & Tushman, 2003). In other words, product and process innovations require exploration of new competencies through the acquisition of new knowledge and skills and exploitation of existing ones through extension of present knowledge (Atuahene-Gima, 2005; Im & Rai, 2008). In emerging economies, where capital, labor and product markets are weak, interfirm relationships provide firms with access to knowledge; therefore, they utilize explorative and exploitative knowledge sharing in their innovative activities (Khan, Lew & Marinova, 2019; Khan, Lew & Sinkovics, 2015; Khan, Rao-Nicholson & Tarba, 2018). Based on these arguments:

Hypothesis 1a: The more explorative knowledge sharing, the higher level of firm innovation.

Hypothesis 1b: The more exploitative knowledge sharing, the higher level of firm innovation.

Affiliated firms benefit from knowledge sharing similar to the firms in various networked settings, such as clusters, industrial districts and multinationals (Connell, Kriz & Thorpe, 2014; Lee & Gaur, 2013). For instance, in a cluster context, Bell (2005) raises that firms in an industrial cluster have better access to knowledge than ones outside and reveals that Canadian firms operating in a cluster innovate better than their peers outside. Lai et al. (2014) demonstrate that knowledge management in the form of acquisition, creation and dissemination affects the innovative activities of cluster firms in Taiwan. Similarly, affiliates share technologies in order to integrate novel knowledge (Lee et al., 2010). Then, this technology sharing contributes to the development of products (Skold & Karlsson, 2012). For instance, Mursitama (2006) finds that sharing managerial and technological capabilities contributes to firms' productivity in Indonesian business groups.

Affiliated firms also create new knowledge for their innovation activities with firms outside their boundaries. For instance, Kang and Lee (2017), investigating how sharing explorative and exploitative knowledge between subsidiaries of Korean chaebol multinational enterprises and affiliated firms affects a subsidiary's performance, find a positive interaction effect of the two types of knowledge sharing on financial performance. On the other hand, Lee et al. (2010), investigating the influence of explorative technological knowledge exchange between affiliated firms and the transfer of such knowledge to affiliates' foreign subsidiaries on the subsidiary performance, find that an affiliated firm's such knowledge exchange with another one has a negative impact on the performance of its subsidiaries in Korean chaebols. While there are potential benefits and drawbacks of affiliation, knowledge flows among firms that are affiliated with a group may have a greater impact on innovation than for among ones with distant relationships (Lee et al., 2016). Based on these arguments:

Hypothesis 2a: The relationship between explorative knowledge sharing and innovation is positively moderated by business group affiliation.

In groups, utilizing existing knowledge creates a base for the use of novel knowledge, because this external knowledge utilization is based on prior knowledge in firms (Cohen & Levinthal, 1990). Affiliates' internal networks provide them with the ability to combine new knowledge with existing capabilities (Singh, Kryscynski, Li & Gopal, 2016). As such, affiliated firms may have superior absorptive capacity, which enables the integration of new knowledge from peers. Then, this absorptive capacity enhances product and process innovations (Castellacci, 2015). For instance, Lee et al. (2010) find a favorable impact of sharing exploitative technological knowledge between affiliates of Korean chaebols and transferring this knowledge to affiliates' foreign subsidiaries upon the

subsidiary performance. These opportunities may be less available to independent firms. Accordingly:

Hypothesis 2b: The relationship between exploitative knowledge sharing and innovation is positively moderated by business group affiliation.

RESEARCH METHODOLOGY

Data

This research is carried out in the context of Turkish business group affiliated and unaffiliated (independent) firms. Turkey is an emerging market, which is dominated by family-owned business groups structured under the control of holding companies (Bugra, 1994; Colpan, 2010; Colpan & Jones, 2016; Karaevli & Yurtoglu, 2018). Because affiliated firms are legally independent and have their own governance systems, they are comparable with independent firms in terms of the knowledge and innovation relations (Belenzon & Berkovitz, 2010). Hence, for the present study, the sampling frame is drawn from Turkey's 1000 largest manufacturing firms by using records of the Istanbul Chamber of Industry (ICI). The unit of analysis is the firm and the data is collected through an administered online survey. (The approval of Ethics Committee is obtained.) The targeted respondents are middle/ senior managers and senior executives who are knowledgeable about their firms' knowledge sharing strategies and innovation activities. Respondents are assured of anonymity to increase the likelihood of reliable responses and mitigate common method variance (CMV) (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). A pilot survey is initially issued to test question clarity and ensure the content and face validity of the measures being captured.

To improve response, all firms are initially contacted by both telephone and email. From the initial sampling frame, a total 661 firms agreed to receive the questionnaire. Following the initial issue of the survey, reminder emails were sent out after four and then six weeks. There was a total of 131 responses, with 128 having complete data for the current study, with a response rate of 19%, similar to previous studies (Jiang & Li, 2009; Ray & Chaudhuri, 2018). The number of usable responses for business group affiliated and unaffiliated firms is equal (N=64) across several industries (textile (25%), food (15%), fabricated metal product (17%), basic metal (15%), chemicals (9%), wood products (6%), coal mining (5%), paper products (4%) and non-metallic products (4%); see Appendix, Table A1 for industry breakdown and business group affiliation information). To test for nonresponse bias, a t-test is conducted on the mean differences between the early and late respondents with regard to innovation and knowledge sharing variables (Armstrong & Overton, 1977). The results do not reveal any significant differences between the two groups of respondents; therefore, nonresponse is not a problem.

Variables

Dependent variable: *Innovation* is captured as a construct variable based on survey items measuring the extent of a firm's innovation relating to introductions of product and processes following Tomlinson (2010) and Molina-Morales and Martinez-Fernandez (2009), with the items 'introduction of new product lines', 'changes/ improvements to existing product lines', 'introduction of new equipment/ technology in the production process', 'introduction of new input materials in the production process', 'introduction of organizational changes/ improvements made in the production process'. The respondents are asked to assess their firms' innovative activities on a Likert scale (1= Not at all to 5= A great extent). A measure for innovation is calculated based on the average of the items.

Independent Variables: *Business group affiliation* information is obtained from each firm's web page. The question, 'Is your firm affiliated with a Turkish holding/ business group?' was retained in the questionnaire to make a comparison between the initial information and the respondents' answers. A dummy variable is used with 1 representing affiliated firms with a business group and 0 representing unaffiliated firms. *Knowledge sharing* is captured as a construct variable based on survey items adapted from the studies of Lee et al. (2010) and He and Wong (2004). The type of *explorative knowledge sharing* strategy is measured with the items 'development of new products, extending product range and entering new technology fields'. The type of *exploitative knowledge sharing* strategy is measured with the items 'improving existing product quality, improving production flexibility and reducing production costs'. The respondents are asked to assess their knowledge sharing activities with suppliers and buyers on a Likert scale (1= Strongly disagree to 5= Strongly agree). The measures for both types of knowledge sharing are calculated based on the average of the relevant items.

Control Variables: Several control variables are included in order to ensure the robustness of the research. *Firm size* is measured as the number of employees (i.e., less than 50, 50-99, …, 5000-9999, 10,000 or more). *Firm size* variable gets values from 1 to 10 and higher value represents larger firms. *Firm age* is measured by the number of years since the founding date of the firm. A survey indicator of *R&D* expenditures is included to capture the extent of firm's absorptive capacity (0-20%, 21-40%, 41-60%, 61-80%, 81-100%). *R&D* variable gets values from 1 to 5 and higher value represents firms with more R&D activities. An *industry* classification dummy is included by splitting the sample into two groups, such as medium technology (chemical and petroleum, metals, machinery and equipment) and low technology industries (food and beverages, coal mining, wood and furniture, textile, paper) (ISIC Rev.3, 2011) based on information in the ICI firm lists (see Appendix, Table A1 for industry breakdown).

Table 1. Descriptive Statistics and Correlations

Variables	Mean	S.D.	1	2	3	4	5	6	7	8
1.Innovation	3.28	0.81	1							
2 Explorat. KS	3.48	0.78	0.23*	1						
3. Exploit. KS	3.53	0.82	0.19*	0.82*	1					
4.Affiliation	0.5	0.50	0.07	-0.12	-0.10	1				
5.Firm size	5.97	1.70	0.20*	0.21*	0.17*	0.09	1			
6.Firm age	33.44	16.52	0.09	0.18*	0.13	0.05	0.24*	1		
7.Industry	0.45	0.50	-0.03	0.07	0.12	-0.03	-0.13	0.06	1	
8.R&D	1.57	0.89	0.19*	-0.14	-0.09	-0.08	0.03	-0.05	-0.09	1

N=128 *p< 0.1 (2-tailed) KS: Knowledge sharing

Validation of the Measures

For the variables, a principal component factor analysis (PCF) with orthogonal (varimax) rotation is employed in Stata (V14.2). According to the results, all the factor loadings are significant ($p<0.001$), with several cross loadings on both types of knowledge sharing. In order to assess convergent and discriminant validity, a confirmatory factor analysis (CFA) is conducted using maximum likelihood estimation technique with a standardized solution. The results indicate that all the factor loadings are above 0.5 and significant ($p<0.001$). The average variances extracted (AVE) for innovation, explorative and exploitative knowledge sharing are 0.53, 0.63 and 0.62, respectively. In addition, the composite reliabilities for the same variables are 0.85, 0.91 and 0.91, respectively. The AVE values are above the acceptable level of 0.5 and the composite reliabilities of the variables are above the acceptable level of 0.6-0.7 (Bagozzi & Yi, 1988). Thus, these results show that the convergent validity is achieved. In addition, the Cronbach's alpha values for the innovation, explorative and exploitative knowledge sharing variables are 0.86, 0.91 and 0.91, all exceed the minimum 0.7 acceptable threshold (Hair, Black, Babin & Anderson, 2010), thereby satisfying the criteria for internal consistency and reliability. To test for discriminant validity, the variance extracted estimates for the constructs are compared with the square of their respective correlation coefficient (Anderson & Gerbing, 1988; Fornell & Larcker, 1981). The discriminant validity is achieved between knowledge sharing and innovation variables, but the two types of knowledge sharing constructs have strong correlation; however, they are well defined and reliable with composite reliabilities are higher than 0.8. Also, removing one of these variables to reduce multicollinearity, may bias the results because these variables represent knowledge sharing strategies based on the familiarity of knowledge. Therefore, these two variables are kept in the analysis.

In order to examine the common method variance (CMV), Harman's one factor (single factor) test is used (Podsakoff et al., 2003). Initially, the test is conducted in which all measures (both knowledge sharing variables and innovation) are loaded into a principal component factor analysis, where two factors emerge, with the largest factors accounting for 46.63% of the total variance. According to the results, one general factor does not emerge in the model; however, since the total variance explained is high, a further examination is conducted with confirmatory factor analysis. The model, which includes all items loading on single factor, is compared with the (original) model that have items loading on relevant variables. When the original and single factor models are compared, the one factor model show poorer fit with the data. Thus, it is unlikely that common methods bias is a problem in the data.

EMPIRICAL RESULTS

Table 1 provides details of the descriptive statistics and correlations. As can be seen, 50% of the firms belong to a business group. The average innovation conducted by firms is 3.28; while the average explorative and exploitative knowledge sharing activities are 3.48 and 3.53, respectively. Average age of the firms in the sample is 33 years. 66% of the firms have more than 500 employees. 45% of the firms operate in medium technology industries. 15% of the firms conduct R&D over 40%. According to the correlations, knowledge sharing, R&D and firm size are positively correlated with innovation.

Table 2 presents the results of the hierarchical moderated regression analysis. The model is tested using the OLS estimator in Stata (V14.2). Prior to the creation of interaction terms, independent variables (except group affiliation) are mean centered to reduce the potential problem of multicollinearity (Aiken & West, 1991). The mean VIF values are all within the limits of tolerance (i.e., less than 10). In the first model, the dependent variable - innovation - is regressed on the control variables. In the second model, independent variables group affiliation and explorative knowledge sharing are added. The third model introduces exploitative knowledge sharing variable. Interaction terms between group affiliation and the explorative, exploitative knowledge sharing are added in models four and five, respectively. When a full model (model six) is included with all the main effects and interaction terms, the individual variable

VIF values range from 1.05 to 6.32, with a maximum value of 6.32 for explorative knowledge sharing and one of 6.16 for exploitative knowledge sharing, which may be problematic in a small sample size study (Cohen, Cohen, West & Aiken, 2003; Hair et al., 2010). Consequently, explorative knowledge and exploitative knowledge sharing variables are retained; main effects and interaction terms are entered separately into the different models and because of the multicollinearity concerns explained above, the results related to the models with separate knowledge sharing variables and interaction terms are interpreted.

In model 1, firm size ($\beta = 0.090$, $p<0.05$) and R&D ($\beta = 0.170$, $p<0.05$) have positive and significant effects on innovation, thus indicating that larger firms and firms with high level of R&D are more likely to innovate. Hypothesis 1a proposes a positive impact of explorative knowledge sharing strategy on innovation. In model 2, the coefficient of explorative knowledge sharing is positive and significant ($\beta = 0.251$, $p<0.01$). Hypothesis 1a is supported. Hypothesis 1b predicts a positive impact of exploitative knowledge sharing strategy on innovation. In model 3, the coefficient of exploitative knowledge sharing is positive and significant ($\beta = 0.183$, $p<0.05$). Hypothesis 1b is supported.

Hypothesis 2a suggests that explorative knowledge sharing has a greater impact on innovation for group affiliated firms than for independent ones. In model 4, the coefficient of the interaction term between explorative knowledge sharing and innovation is negative and significant ($\beta = -0.463$, $p<0.05$), which means that hypothesis 2a is not supported. Hypothesis 2b suggests that exploitative knowledge sharing has a greater impact on innovation for group affiliated firms than for independent ones. In model 5, the coefficient of the interaction term between exploitative knowledge sharing and innovation is negative and significant ($\beta = -0.416$, $p<0.05$), meaning that hypothesis 2b is

Table 2. Results of the Regression Analysis

Dependent variable: Innovation						
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Control variables						
Firm size	0.090** (0.043)	0.063 (0.043)	0.071 (0.044)	0.054 (0.043)	0.065 (0.043)	0.054 (0.043)
Firm age	0.002 (0.004)	0.001 (0.004)	0.002 (0.004)	0.002 (0.004)	0.003 (0.004)	0.002 (0.004)
Industry	0.019 (0.144)	-0.005 (0.141)	-0.015 (0.143)	-0.002 (0.138)	-0.009 (0.141)	0.004 (0.140)
R&D	0.170** (0.079)	0.206*** (0.079)	0.190** (0.079)	0.196** (0.077)	0.184** (0.078)	0.197** (0.078)
Independent variables						
Affiliation		0.166 (0.140)	0.142 (0.141)	0.151 (0.137)	0.130 (0.139)	0.150 (0.138)
Explorative KS		**0.251*** (0.094)**		0.406*** (0.111)		0.421* (0.219)
Exploitative KS			**0.183** (0.089)**		0.322*** (0.106)	-0.017 (0.206)
Explorative KS X Affiliation				**-0.463** (0.186)**		-0.404 (0.308)
Exploitative KS X Affiliation					**-0.416** (0.179)**	-0.080 (0.291)
_cons	2.381*** (0.313)	1.590*** (0.418)	1.787*** (0.413)	1.079** (0.459)	1.295*** (0.457)	1.078** (0.468)
R^2	0.077	0.133	0.113	0.175	0.151	0.177
Adj R^2	0.047	0.090	0.069	0.127	0.102	0.114
F	2.581**	3.091***	2.565**	3.642***	3.053***	2.816***
VIF (mean)	1.05	1.08	1.07	1.22	1.21	2.91
N = 128						

Unstandardized regression coefficients. Standard errors in parentheses. KS: Knowledge sharing
* p<0.1; ** p<0.05; *** p<0.01. Two tailed tests. VIF: Variance inflation factor

not supported. The findings show that explorative knowledge and exploitative knowledge sharing have stronger effects on innovation for independent firms than for affiliated ones.

DISCUSSION

In line with the findings in similar studies, firms' explorative and exploitative knowledge sharing with each other have positive effects on innovation (Chiang & Hung, 2010; Faems et al., 2005); although other studies show a nonlinear relationship between knowledge exploitation and innovation (Chen et al., 2020), knowledge exploration and innovation (Bernal, Maicas & Vargas, 2019). However, knowledge sharing with partners is important in an emerging economy, that is, both types of knowledge exchanges of firms enhance innovative activities (Khan et al., 2019).

For the specific case of business groups, the findings related to group affiliation impact are similar to the results in some studies, which consider business groups, such as, Lee et al. (2010) find a negative impact of exploratory technological knowledge exchange on the performance of Korean business groups' foreign subsidiaries. Kang and Lee (2017) suggest that while exploratory knowledge sharing between Korean chaebol subsidiaries and affiliated firms negatively affects subsidiary performance, exploitative knowledge sharing has a significant and positive impact. Lee et al. (2014) suggest a balancing between sharing explorative, exploitative knowledge and performance of Korean chaebol affiliates. Chittoor, Sarkar, Ray and Aulakh (2009) argue that since affiliated firms benefit from internal markets within their group, accessing international financial and technological resources is more important for unaffiliated firms than for those affiliated with groups. Unaffiliated firms may lack access to group advantages; therefore, such firms need to be more efficient in knowledge sharing in order to innovate. Affiliates' network can be beneficial in integrating similar knowledge; however, the use of existing knowledge does not lead to increased innovation and new capabilities (Kang & Lee, 2017; Mahmood, Chung & Mitchell, 2013).

This paper contributes to the literature on business groups and knowledge by examining the impact of knowledge sharing strategies on innovative activities and the moderating impact of affiliation in such relationship in an emerging economy. It has been argued that the benefit of knowledge sharing may differ depending on the contexts in which firms operate (Inkpen & Tsang, 2005). Knowledge sharing impact within business groups are examined to a lesser extent; however, whether business group affiliates differ from independent firms regarding innovation and knowledge sharing relations is not fully captured. In addressing this gap, this research includes a sample of affiliated and unaffiliated firms in order to enhance the understanding of the impact of organizational setting in an emerging economy (Meyer & Peng, 2016; Su, Li, Yang & Li, 2011; Wilden et al., 2018). This study also enhances the existing literature by investigating the impact of knowledge sharing on innovation in emerging economy firms.

CONCLUSION

The results of this study have policy and strategy implications for firms in emerging economies and business groups. Since emerging economies lack well-functioning institutions, managers should be aware that explorative and exploitative knowledge exchanges are necessary for innovations. However, in a networked setting, affiliates' exploratory knowledge exchanges or the exploitation of existing knowledge may not help creating novel products and processes. Therefore, policy makers in groups should be more effective in utilizing knowledge from their internal and external environments to overcome the possible negative effects of their embedded group relations (Granovetter, 1985; Uzzi, 1997). However, groups continue to dominate the economic activities in developing economies and in some countries, they restructure themselves to become more efficient (Almeida & Wolfenzon, 2006; Carney et al., 2018; Hobdari et al., 2017; Khanna & Palepu, 1999; Khanna & Yafeh, 2007).

This study has a number of limitations which can trigger several avenues for further research. In this study, knowledge sharing is conceptualized as explorative and exploitative learning, which is extensively applied to research in developed economies. Future research can consider other knowledge conceptualizations, such as R&D, marketing know-how and management systems (Colpan, 2010; Gupta & Govindarajan, 2000). Future research can also include connections in various types of groups, such as horizontal or vertical (Holmes et al., 2018; Yiu, Lu, Bruton & Hoskisson, 2007). This study is based on Turkish firms which may limit the generalizability of the findings to other emerging economies (Singh & Gaur, 2009, 2013). Therefore, the relations can be explored in other emerging economies. A qualitative approach could be used to examine interfirm interactions deeper to uncover the effect of business group affiliation on such relations.

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Appendix

Table A1 Firm Industry and Business Group Affiliation

Industry	Observation	Proportion (%)	Split sample
Textile	32	25	Lowtech
Food	19	15	Lowtech
Fabricated metal product	22	17	Medtech
Basic metal	19	15	Medtech
Chemicals	12	9	Medtech
Wood products	8	6	Lowtech
Coal mining	6	5	Lowtech
Paper products	5	4	Lowtech
Non-metallic products	5	4	Medtech
Total	**128**	**100**	
Business group affiliation	Unaffiliated: 64 (N=128)		Affiliated: 64

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Sources of Meaning Inventory in Academia: An Inventory Development Study*

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ABSTRACT

This paper presents findings from an inventory development study of the 'Sources of Meaning Inventory in Academia' in order to make sense of the psychological processes underlying the experience of meaning in academia. With this inventory, the sources that make the work of academicians meaningful will be determined. By managing the determined sources, it will be possible for the academicians to attribute more meaning to their work and thus increases their performance and productivity. The study was carried out in 3 complementary stages. In Study 1 (n=815), an item pool was created, and after focus group interviews and expert opinions, trial measurements were made by the draft inventory. In Study 2 (n=352), the pilot study of the inventory was carried out and exploratory factor analysis was performed. In Study 3 (n=669), confirmatory factor analysis, reliability analysis and criterion-related validity analysis were performed. As a result of the 3 studies, an inventory consisting of 31 items and 5 dimensions was obtained. According to the model formed, the dimensions of the sources of meaning inventory in academia are 'passion for life', 'scientific contribution', 'benefiting', 'earning money and respect' and 'exploring and learning'. The dimensions of the source of meaning that are most related to the meaningfulness of the work were determined as 'benefiting' and 'passion for life'.

Keywords: Meaning of work, Sources of meaning, Sources of meaning in academia, Inventory development.

JEL Classification Codes: M12, I23, D23.

INTRODUCTION

What is the meaning of work for individuals? Why does work mean different things to different people? In today's business world, the importance of these questions has increased and also the answers of these questions have changed most of the definitions. Today it is known that if the work is meaningless to the employee the organizational performance and productivity will decrease significantly (Cropanzano & Wright, 2001; Dimitrov, 2012: 351; Peiro et al., 2019; Wright, Cropanzano & Bonett, 2007). Today, employees want more from their works and careers rather than to make money, they especially care that their works have meaning (Meinertsen, 2021). Changing dynamics about the performance of employees at work overtime (Darling & Chalofsky, 2004) have caused the traditional work definition to change as well. As a result of the change experienced, Graber and Johnson (2001) defined work not only with its challenging and interesting features, but also as a search for meaning and purpose, and defined work as a tool for one's self-realization and contribution to others. In the following years, business life, which covers a large part of human life (Baumeister, 1991; Wrzesniewski, 2003; Wrzesniewski, Dutton & Debebe, 2003), even became the center of life and identity, has witnessed the search for meaning.

The meaning of work studies sought an answer to the question: 'What is the meaning of work for individuals?'. In various studies, the answer to this question evaluated with certain scales from the lowest to the highest, and the positive effects of the meaning of the work are tried to be revealed with many concepts in his/her work and non-work life. As a result of the researches, a certain knowledge about the meaning of the work has been formed and a significant level of knowledge has been gained about the effects of this concept. However, another question that needs to be asked has not been discussed yet. This question is: 'What is the source of the meaning of the work?' or 'What makes the work meaningful?' The focus of this research is to reveal the 'sources of the meaning of the work', which has not come to light until now. As a result of revealing the source of meaning, it will be possible to increase the meaning of the work with individual and organizational interventions to the source and effective organizational policies to be applied.

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Academia is one of the most suitable working environments for the search for meaning. Academicians are one of the professions that contribute the most to themselves, their environment, the institutions they are affiliated with, the society and future generations with their activities such as research, obtaining information, examining, transferring information, and presenting scientific information. For this reason, it is of great importance for academicians to find their work meaningful. In the literature, researches on the meaning of many professions have been made (Akgündüz, Adan Gök & Alkan, 2020; Bertosso et al., 2019; Beukes & Botha, 2013), and these studies have revealed the factors affecting meaningful work and the positive results of meaningful work. In the literature review on the meaning of work, qualitative and quantitative studies were also found on the meaning of work in teaching (Balcı & Ağ, 2019; Demirkasimoğlu, 2015; Fourie & Deacon, 2015; Mert & Balcı, 2019; Toptaş, 2018), and even Göçen & Terzi (2019) have developed a meaningful work scale for educational organizations. However, a limited number of studies on the meaning of work in academia have been identified (Alparslan, Polatcı & Yastıoğlu, 2021; Balcı, Öztürk & Akar, 2019). And in these studies, content analysis, which is one of the qualitative research methods, and self-evaluations of academicians about the meaning of their works were used.

There are scales measuring whether work is meaningful or not in the literature (Lee, 2015; Lips-Wiersma & Wright, 2012; Steger, Dik & Duffy, 2012), but no scale related to the source of the meaning of work has been found. Research on this subject remained at the theoretical level (Rosso, Dekas & Wrzesniewski, 2010: 108), empirical research and results could not be produced because the scale was not developed on the subject. It is of great importance to deepen qualitative and quantitative research on the source of the meaning of work, which is of great importance for business life. In line with this purpose, in order to fill the gap in the literature, a conceptualization of sources of meaning in academia was made by using qualitative and quantitative research methods, and the 'Sources of Meaning Inventory in Academia' was developed. With this inventory, the sources that make the work of academicians meaningful will be determined. By managing the determined sources, it will be possible for the academicians to attribute more meaning to their work and thus increases their performance and productivity.

CONCEPTUAL FRAMEWORK

Meaning of Work

In the past, the effect of the employee's feelings about the job and the value he places on his job on performance has been ignored. However, over time, what the job means for the individual has changed, and it has been determined that the feelings about the job as well as the factors related to the employee and the job affect job performance (Cartwright & Holmes, 2006: 202). In addition, it has been revealed that positive emotions related to work have physical effects as well as psychological effects on the job and the individual (Morin, 2008).

Research has been conducted to determine whether work is just a way of making money and sustaining a life for individuals, or more. In some of these studies, the following question was asked to individuals in business life: 'If you had inherited enough money to live comfortably without working, would you still work or would you quit your job?' Results supported the idea that work gives people a sense of purpose in life and connects them to a larger society and a higher purpose beyond themselves. It has also been found that meaningful work plays an important role in creating and maintaining a healthy sense of self-esteem and personal identity (Harpaz, 2002; Morse & Weiss, 1955).

Different perspectives have been developed in defining and conceptualizing the concept of the meaning of work. According to Chalofsky (2003), one of the leading researchers on the meaning of work; it is a way of expressing the meaning and purpose of life through activities in the work process. The meaning of work with other definitions; 'a significant and positive evaluation of the work based on the subjective experiences and interactions the employee has had in the work environment' (Rosso et al., 2010) or 'a feeling about the reasons the person has for his/her job, what he/she seeks to achieve with his/her job, and continuity in his/her job' (Isaksen, 2000: 87). In its most general form, the meaning of work is the answer to that question: 'What is the meaning of work for individuals?' Contrary to the past, individuals attach more importance to the meaning of their jobs than their income, promotion opportunities, working conditions and job security (Bhatnagar & Aggarwal, 2020; Cascio, 2003).

Individuals' attitudes towards their jobs and the meaning they attribute differ, and it is known that there are different dimensions of the meaning of work in the literature. In this context, the meaning of work dimensions developed by Chalofsky (2003), Rosso et al. (2010), Steger et al. (2012), and Lips-Wiersma and Wright (2012) were examined. According to Chalofsky (2003: 77), who is the pioneer of meaningful business studies, meaningful work is a psychological structure that brings a person to 'integrated wholeness' consisting of three dimensions: sense of self, work itself and sense of balance. In the following years, Miller (2008: 93) added the sense of contribution dimension to these three dimensions and dealt with meaningful work in four dimensions. The coming together of these four dimensions enables one to reach wholeness in one's life. Rosso et al. (2010: 95-108) defined the meaning of work in four dimensions. These are the self, other person, work context and spiritual life. Steger et al. (2012: 324-325) examines the meaning of work in three different aspects. These are positive meaning in work, meaning making through work and greater good motivation. With a similar perspective, Lips-Wiersma and Wright (2012: 678) examined the meaning of work in seven dimensions. These are listed as unity with others,

serving others, expressing full potential, developing and becoming self, reality, inspiration and balancing tension.

The results of the research reveal the positive results of finding the job meaningful both at the individual and organizational level. Looking at the individual consequences of meaningful work, it affects job satisfaction (Bhatnagar & Aggarwal, 2020; Campbell, 1976; Fox, 1980; Frankl, 1996; Hagmaier & Abele, 2012; Kamdron, 2005; Littman-Ovadia & Steger, 2010; Lobene & Meade, 2013; May et al., 2004; Sparks & Schenk, 2001; Steger & Dik, 2010; Steger et al., 2012; Wrzesniewski et al., 1997), happiness (Bhatnagar & Aggarwal, 2020; Golparvar & Abedini, 2014), psychological well-being (Chartwright & Holmes, 2006; Golparvar & Abedini, 2014; Keleş, 2017; Melton & Schulenberg, 2008), hope (Feldman & Snyder, 2005), motivation (Hackman & Oldham, 1980) , mental health (Arnold et al., 2007), career development (Dik & Duffy, 2009; Dobrow & Tosti-Kharas, 2011; Domene, 2012; Reich, 2001), and individual performance (Hackman & Oldham, 1980; Wrzesniewski, 2003) on the positive direction; and frustration (Chartwright & Holmes, 2006), stress and depression (Elangovan, Pinder & McLean, 2010; Locke & Taylor, 1990; Treadgold, 1997), and cynicism and burnout (Creed et al., 2014; Hagmaier & Abele, 2012; Holbeche & Springett, 2004) on the negative direction. Considering the organizational consequences of the meaningfulness of work, it affects participation in decisions (Bhatnagar & Aggarwal, 2020; Campbell, 1976; May et al., 2004), organizational commitment (Fox, 1980; Mendes & Stander, 2011), organizational citizenship behavior (Schlechter & Maharaj, 2007) and positive organizational outcomes such as organizational performance, productivity and efficiency (Bunderson & Thompson, 2009; Neck & Milliman, 1994) on the positive direction; turnover intention (Dinç et al., 2019; Duffy, Dik & Steger, 2011) and absenteeism (Wrzesniewski, vd., 1997) on the negative direction.

Sources of Meaning at Work

The statements 'My job is meaningful to me', 'I have a meaningful career', 'My job is important to society' are the statements made by the employee who finds his/her job meaningful. And they bring many positive organizational outcomes such as job satisfaction, motivation and high performance (Dan, Roşca & Mateizer, 2020; Maharaj & Schlechter, 2007; Roberson, 1990). Every day, new studies are added to the studies that reveal the individual and organizational positive results of the meaningfulness of the work, and the importance given to the concept and the researches on this subject are constantly increasing (Rosso et al., 2010: 93). However, the same is not the case for the sources that cause the meaning of the work. There is limited research on the sources of the meaning of work (Dimitrov, 2012).

The concept of the source of the meaning of the work indicates where the meaningfulness of the work is based on (Rosso et al., 2010: 93-95), in other words, which factors enable the work to be perceived as meaningful. The factor or factors that affect the meaning or meaninglessness experienced by the individual in his/her work (Rosso et al., 2010: 95) are the sources of meaning of the work. If the individual can reach the sources of meaning in his current work, he will find his work meaningful, otherwise his work will not make sense for the individual.

Determining the sources of meaning of the job is of great importance in terms of increasing the level of employees finding their jobs meaningful. In this way, managers will create meaningful conditions for work, reduce employee turnover, increase employee satisfaction with work and life, and gain competitive market advantage with customer loyalty (Dimitrov, 2012: 353). As it is seen, many positive results can be obtained both individually and organizationally by identifying and managing the sources of meaning.

In some studies, the dimensions made by various researchers about the meaning of work are also expressed as the source of the meaning of work. In particular, the four dimensions in the meaning of work model developed by Rosso et al. (2010) are also expressed as the sources of meaning at work (Mercurio, 2019: 30; Rosso, 2010: 95). Bailey and Madden (2016), on the other hand, approached the concept of the source of the meaning at work from a different angle and listed the factors that make up the meaning of work as a whole as organizational meaning, relational meaning, task meaning and profession meaning. Dimitrov (2012) tried to identify the sources of the meaning at work in the tourism sector with qualitative research. As a result of the research, he stated that the dimensions of sources of meaning at work are work itself and pride in the product, the social environment, the self and spirituality at work and becoming a humane organization.

On the other hand, Rosso et al. (2010) also examined the factors that make work meaningful and named them mechanisms of meaning. According to them, these mechanisms consist of seven factors: authenticity, self-efficacy, self-esteem, purpose, belongingness, transcendence, and cultural and interpersonal sensemaking.

Sources of Meaning in Academia

For employees to find their business life meaningful, they need to find the sources of meaning in their business life. This also applies to scientists working in academia. There are limited studies on the factors underlying academicians' finding their work meaningful (Alparslan et al., 2021; Balcı et al., 2019). In these studies, the sources of meaning in the academy were tried to be discovered with qualitative research methods, and no further progress was made.

Balcı et al. (2019) conducted a qualitative research on the factors that make the work of academicians meaningful. As a result of the interviews, it was stated that the academicians mostly saw the individual development and teaching function as the source of the meaning of the work. Alparslan et al. (2021) developed a model for the first time as a result

of qualitative research on academics' sources of meaning at work. They named the model as 'Model of Sources of Meaning in Academia' and bringed together ten different sources of meaning. They discussed the source of meaning in four dimensions: 'internal', 'external', 'contribution-oriented' and 'development-oriented'. While the internal meaning sources are the factors that trigger the internal motivation of the person and make the essence meaningful, the external meaning sources express the sources that the person finds meaningful in the external context, apart from the essence. While contribution-oriented people, that is, those who take care of others in their work, believe that it is meaningful to contribute to life and people, development-oriented people live more self-focused and find their own development/success, personal victory and emotional states important/meaningful. According to this classification, an important model has been brought to the literature in the context of meaning sources (Figure 1).

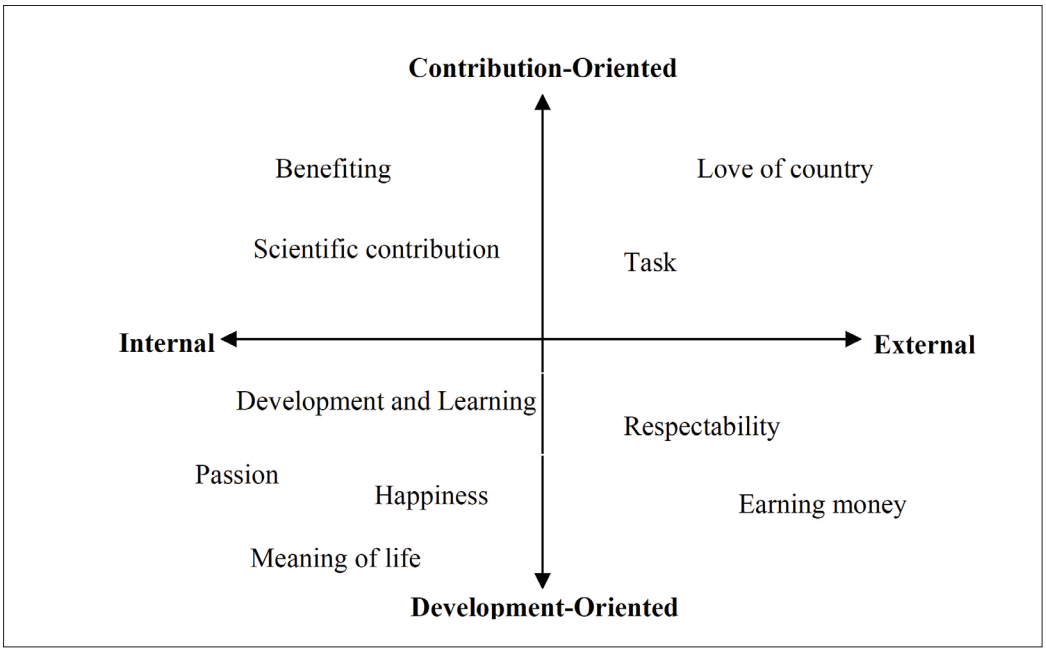

Figure 1. Model of Sources of Meaning in Academia (Alparslan et al., 2021)

In this research, it is aimed to develop the 'Sources of Meaning Inventory in Academia' in order to make sense of the psychological processes underlying the experience of meaning in academia. By this inventory, the resources that make the work of the academicians meaningful will be determined and it will be possible for the academicians to attribute more meaning to their work by managing these resources.

METHODS

Procedure

In this study, which was carried out to develop the Sources of Meaning Inventory in Academia, the three-stage inventory development process suggested by Hinkin (1995) was followed: (1) creating an item pool, (2) structuring the inventory, and (3) evaluating the inventory. Different analyzes were carried out at each stage. Ethical approvals were obtained before commencement. And IBM SPSS V24 and jamovi programs were used in all analyzes.

Study 1 was carried out between June and July 2020 in order to develop the items by following the inductive and deductive approach (Hinkin, 1995) during the creation of the item pool. Survey research design was used to obtain the data. Data were collected from the field using the online survey technique. In the content of the questionnaire, there was an open-ended question in order to determine the meaning that the academicians attributed to their profession, together with the questions containing the socio-demographic-professional information of the participants. The questionnaire was delivered to the participants via a link in the digital environment. The created questionnaire and its link were sent to all universities in Turkey with an official letter. The scale was finalized after the creation of the item pool, focus group discussion, expert opinion and pre-pilot application.

As a pilot application, Study 2 was carried out to determine the sub-dimensions of the measured structure in the measurement tool and to test the construct validity. The online survey technique was also used in the Study 2 conducted between December 2020 and January 2021. An online questionnaire containing the questions about the socio-demographic information of the participants and the 53-item 'Sources of Meaning Inventory in Academia' formed in Study 1 were delivered to the participants.

Structural status of the inventory was revealed by exploratory factor analysis on the collected data, then Study 3 was started in order to verify the factor structure of the inventory and test the validity of the criteria. In

the research carried out between February 2021 and April 2021, the online questionnaire, which includes the questions regarding the demographic and professional information of the participants, as well as the 'Sources of Meaning Inventory in Academia' and the 'Meaningfulness of Work Scale' used for criterion-related realibility, was sent to all universities in an official letter.

RESULTS

Study 1

Participants

815 questionnaires were collected from academicians living in 75 different citie of Turkey. Regarding the sample characterictics, 58% were male, 41% were between 31-39 age range. According to the academic titles 15% were professor, 14% were associated professor, 24% were assistant professor, 21% were research assistant and 26% were lecturer.

Establishing The Item Pool

In the process of creating the item pool, first of all, the theoretical framework was created. Then, inductive and deductive approaches suggested by Hinkin (1995) were used during the item development phase to determine the items that were supposed to measure the theoretical construct that was aimed to be measured. In the inductive approach, in order to determine the meanings attributed to the academia, the academicians were asked, 'What does your work/profession mean to you?' through a questionnaire. Thus, the qualitative data obtained from 815 academicians were subjected to content analysis. In the content analysis, the coding process was used to analyze the expressions containing the meanings attributed by the academicians to their work/profession (Strauss & Corbin, 1990). As a result of this analysis, expressions of similar nature were gathered under the same code and a total of 38 codes (source of meaning) were obtained (Table 1).

In the deductive approach, other meaning classifications and contents in the literature, which are thought to include some of the characteristics of the meaning sources of the academia were searched (Balcı et al., 2019; Lips-Wiersma & Wright, 2012; Miller, 2008; Rosso et al., 2010; Steger et al., 2012; Toptaş, 2018). Thus, 29 more items that could be the source of meaning for the academia were added and an item pool containing 67 items was created. Then, for the face validity (Şencan, 2005), the simplicity and clarity of the items, that they did not measure more than one feature/judgment, that all of them consisted of positive statements, and that they were easy to answer were checked.

Configuring the Measurement Tool

At this stage of the study, the created item pool (67 items) was presented to the focus group discussion and expert opinion. The focus group discussion was carried out with 12 academics working in the basic fields of social, health and science from three different universities. And two different focus group interviews were held in groups of 6 each. In both focus group discussions, the first question was 'Is your academic life meaningful?', and the second question was 'What is the source of meaning in your academic life?' The participants were encouraged to think with the question, and then the item pool created with the codes obtained as a result of the qualitative research was shared with the participants. At this stage, each item was discussed and joint decisions were made. In order to make some items more understandable, revision suggestions, and suggestions for adding and removing items were taken. The meetings were ended where it was thought that the production of ideas had ended. After the focus group discussions, the authors came together and combined the suggestions, evaluated them and created a draft inventory of 65 items.

Table 1. The Meanings Academicians Attributed to Their Professions (Code List)

Success	Educate people	Sanctity of the profession	Prestige
Contributing to others	Be beneficial to humanity	Heritage	Responsibility
Contributing to science	Love the profession/job	Happiness	Passion
Make difference	Dignity	Struggle	Serve the country
Livelihood	Be a good person	Honor/pride	Future of the country
Build a future	Career	Learn	Motivation to produce
Task	Self-actualization	Teach	Conduct of life
My dream	Explore/ Curiosity	Feel special	Take pleasure/ enjoy
The meaning of life	Self-improvement	Freedom	
Peace	Spiritual pleasure	Earning money	

N=815
Note: Codes are given in alphabetical order.

Expert opinion is important for the content validity of the inventory. In this context, the 65 item inventory was submitted to expert opinion at the last stage of content validity. From 6 faculty members working in 2 psychology, 2 education and 3 management and organization fields contributed to the inventory according to their expertise. In line with the opinion of the experts, the content validity ratio was used in order to obtain more reliable results from the subjective opinions in order to make the decision to remain or remove the items from the inventory. For the reliability of the evidence for content validity, the Lawshe method, which is generally preferred (Ayre & Scally, 2014; Lawshe, 1975) was used in the calculation of the compliance rate. The content validity ratio (CVR) specific to each item was calculated with the data obtained from the evaluations of the experts. Although there are different critical values for the CVR ratio according to the number of experts (Ayre & Scally, 2014: 85), in order for the item to remain in the inventory, it is recommended that the CVR value should not be below 0.78 at the a=0.05 significance level (Polit & Beck, 2006). In this study, after calculating the CVR values, five items below the critical value of 0.78 were removed from the inventory. In addition, expression changes were made in some items in line with the general suggestions from the experts. Thus, the draft inventory consisting of 60 items took its final form.

Preparation of the Inventory and Trial Measurement

The main purpose of the trial measurement is to test the face validity of the items, whether they are perceived in the same way or not by the participants (Yurdabakan & Çüm, 2017: 116). At this stage, a questionnaire containing 60 items was created. In the questionnaire form, an explanation was given to the participants about reviewing all sources of meaning and answering the questionnaire by considering the importance of each source of meaning while performing their profession. A 10-point Likert-type rating was used in the selection of inventory options as '1=Not at all Important … 10=Extremely Important'. After the preparation of the questionnaire form, a trial measurement was made to 103 academicians. After the application was completed, 7 items that were not found appropriate by the participants, could not be answered easily and were not sufficiently understandable were removed from the inventory. In the last case, an inventory consisting of 53 items was obtained.

Study 2

Participants

358 academicians participated in Study 2, which was conducted for the pilot application. 6 questionnaires with incomplete or extreme values were removed from the data set, and in the last case, analyzes were carried out on 352 data. In the study, 46% of the participants were women, and 49% were between the ages of 23 and 36, while 51% were between the ages of 37 and 66, 91% were working in public universities and 54% were in social sciences area.

Findings Related to Exploratory Factor Analysis (EFA)

In the 53 item inventory, EFA was performed using the varimax rotation technique to determine the factors (implicit structure) and to test the relationships between the items in this latent structure (Tabachnick & Fidell, 2013). Before proceeding to the factor analysis, the correlation between the items was checked and it was determined that the items did not show a correlation above 0.8 (Field, 2013). In addition, the Barlett test, Kaiser-Meyer-Olkin test were used to control the factorability of the scale, and the anti-image correlation was examined. As a result of Bartlett test, chi-square test is significant [$\chi 2$ (66) = 8852,353; p <.000], the KMO value is very good (0.926>0.80), and the lowest value was found to be 0.816 (>0.50) when the diagonal values were examined in the anti-image correlation matrix. Findings regarding the factorability of the measurement tool show that the data are suitable for factor analysis (Field, 2013).

The number of dimensions was not limited while performing the factor analysis. While deciding on the factor structure, the scree plot was examined and the dimensions with an eigenvalue above 1 were evaluated. As a result of the analysis, a 5-factor structure was revealed. Then, the factor loadings of the items were examined, and it was determined that there were items with a factor load of less than 0.40, with a load value in more than one factor, and with a difference between factor loads of less than 0.10 (Tabachnick & Fidell, 2013). Relevant items were removed from the scale one by one and the analysis was repeated each time. In the last case, 16 items were excluded from the analysis; considering the theoretical framework, a structure consisting of 37 items with 5 factors was obtained and it was seen that these factors explained 56.070% of the total variance.

When Table 2 is examined, it is seen that 11 items in the first factor, 10 items in the second factor, 8 items in the third factor, 5 items in the fourth factor and 3 items in the fifth factor. The factor loadings of the items ranged from 0.43 to 0.82. The factors explain 38.422%, 8.271%, 6.090%, 5.290% and 3.742% of the variance, respectively. By examining the meanings of the items collected in the factors on the basis of the theoretical framework; the first factor was named as 'passion for life', the second factor as 'scientific contribution', the third factor as 'benefiting', the fourth factor as 'earning money and prestige' and the fifth factor as 'exploration and learning'. The Cronbach Alpha (α) internal consistency value was calculated for the estimation of reliability in the context of each dimension. As a result of the reliability analysis, Cronbach's alpha values ranged from 0.81 to 0.92.

In addition, item analysis based on item-total correlation and item analysis based on lower and upper groups were performed to test internal consistency reliability (Table 3).

Table 2. Exploratory Factor Analysis and Reliability Results

Dimension	Item	Fac. Loads	Eigenvalue	Exp.Variance (%)	α
Passion for Life	Item 1	.791	14.216	38.422	0.92
	Item 2	.686			
	Item 3	.639			
	Item 4	.631			
	Item 5	.630			
	Item 6	.599			
	Item 7	.570			
	Item 8	.545			
	Item 9	.518			
	Item 10	.479			
	Item 11	.430			
Scientific Contribution	Item 12	.711	3.060	8.271	0.85
	Item 13	.683			
	Item 14	.639			
	Item 15	.579			
	Item 16	.576			
	Item 17	.558			
	Item 18	.541			
	Item 19	.524			
	Item 20	.520			
	Item 21	.501			
Benefiting	Item 22	.814	2.253	6.090	0.87
	Item 23	.776			
	Item 24	.644			
	Item 25	:638			
	Item 26	.627			
	Item 27	.561			
	Item 28	.553			
	Item 29	.549			
Earning Money and Respect	Item 30	.823	1.957	5.290	0.83
	Item 31	.744			
	Item 32	.666			
	Item 33	.649			
	Item 34	.470			
Exploring and Learning	Item 35	.768	1.384	3.742	0.81
	Item 36	.730			
	Item 37	.429			
Total Explained Variance: 56.070					

N= 352; α= Cronbach Alfa

Table 3. Item Analysis Results

Dimension*	Item	Adj. Item Total Correlation (N=352)	27% Upper Group (N=95)		27% Lower Group (N=95)		t	Cohen's d
			Ort.	S.	Ort.	S.		
1	Item 1	.793	9.74	.687	6.34	2.086	15.085***	2.20
	Item 2	.706	9.55	.987	5.29	2.466	15.604***	2.27
	Item 3	.741	9.85	.412	6.96	1.850	14.884***	2.15
	Item 4	.714	9.94	.245	7.75	1.707	12.375***	1.80
	Item 5	.751	9.84	.512	7.00	1.564	16.831***	2.44
	Item 6	.740	9.71	.713	6.68	1.953	14.164***	2.06
	Item 7	.699	9.78	.687	7.23	1.795	12.918***	1.88
	Item 8	.693	9.91	.388	7.58	1.654	13.346***	1.94
	Item 9	.695	9.91	.294	7.78	1.538	13.235***	1.92
	Item 10	.591	9.92	.347	8.42	1.403	10.077***	1.46
	Item 11	.637	9.96	.202	8.42	1.135	12.990***	1.89
2	Item 12	.649	9.99	.103	8.91	1.158	9.087***	1.31
	Item 13	.647	9.96	.202	8.76	1.191	9.679***	1.40
	Item 14	.579	9.98	.144	8.96	1.020	9.659***	1.40
	Item 15	.562	9.82	.601	8.66	1.190	8.463***	1.23
	Item 16	.534	9.89	.371	9.02	1.000	7.985***	1.15
	Item 17	.527	9.47	.966	7.48	1.873	9.202***	1.33
	Item 18	.568	9.99	.103	8.79	1.287	9.057***	1.31
	Item 19	.545	9.92	.453	8.61	1.240	9.634***	1.40
	Item 20	.584	9.86	.402	8.28	1.404	10.536***	1.53
	Item 21	.605	9.95	.224	7.97	1.660	11.517***	1.67
3	Item 22	.742	9.98	.144	8.24	1.706	9.890***	1.44
	Item 23	.721	9.86	.612	7.47	2.072	10.778***	1.56
	Item 24	.633	9.69	.800	6.80	2.350	11.365***	1.65
	Item 25	.654	9.97	.176	8.79	1.020	11.102***	1.61
	Item 26	.664	9.89	.371	7.38	1.793	13.389***	2.00
	Item 27	.611	9.86	.518	8.09	1.186	13.321***	1.94
	Item 28	.677	9.92	.453	8.44	1.310	10.358***	1.51
	Item 29	.543	9.86	.475	8.13	1.223	12.907***	1.87
4	Item 30	.680	8.79	1.624	6.02	2.021	10.408***	1.51
	Item 31	.617	8.21	2.036	4.82	2.352	10.619***	1.54
	Item 32	.709	9.60	.856	6.60	2.381	11.558***	1.68
	Item 33	.513	8.80	1.843	4.94	2.259	12.916***	1.87
	Item 34	.657	9.00	1.902	5.22	2.307	12.319***	1.79
5	Item 35	.750	9.97	.228	8.65	1.039	12.052***	1.76
	Item 36	.720	9.98	.144	8.42	1.087	11.919***	2.01
	Item 37	.525	9.97	.176	8.52	1.175	13.842***	1.73

*N=352; ***p<.001. df=188*

**Note: Dimension 1= Passion for Life; Dimension 2= Scientific Contribution; Dimension 3= Benefiting;Dimension 4= Earning Money and Respect; Dimension 5= Exploring and Learning*

Table 4. Confirmatory Factor Analysis and Reliability Results

Please indicate how important the sources of meaning in the work presented below mean to you, in order of importance. (1=Not at all important, 10=Very important)				
Dimension	**Item**		**Fac. Loads***	**α**
Passion for Life	1	My way of life	.693	0.881
	2	Discover myself	.770	
	3	Make life meaningful	.632	
	4	My inspiration	.789	
	5	Way of expressing myself	.743	
	6	My energy source	.671	
	7	My source of spiritual pleasure	.706	
Scientific Contribution	8	To contribute to science	.720	0.857
	9	To research	.642	
	10	To leave useful works	.752	
	11	To contribute to other researchers with my research	.660	
	12	To transfer knowledge and experience	.601	
	13	To be a known academic in my field	.631	
	14	To do work that I'm proud of	.708	
	15	To be successful	.637	
Benefiting	16	To benefit the university/institution	.659	0.843
	17	To serve the region I live in	.642	
	18	To raise beneficial generations for society	.632	
	19	To represent my country with my profession	.725	
	20	To contribute to practitioners in the field	.716	
	21	To educate students	.609	
	22	To serve humanity	.727	
Earning Money and Respect	23	To earn financial gain	.642	0.829
	24	To earn additional income as a result of my work	.690	
	25	To have a title	.804	
	26	To gain power	.730	
Exploring and Learning	27	Love of learning	.656	0.832
	28	The excitement of learning and teaching	.633	
	29	Being open to innovations	.679	
	30	To specialize	.730	
	31	To provide professional development	.776	

	X^2/df	SRMR	CFI	TLI	RMSEA
Goodness of Fit Indices	1419/419 (3.39)	0.445	0.91	0.90	0.0597
Acceptable Values**	$3<X^2/df<5$	<0.80	>0.90	>0.90	<0.80

N=669;
**p<0.001*
** Hu & Bentler (1999); Byrne (2016)

Item-total correlation is expected to be higher than 0.30 (Karagöz, 2019: 1004). In this study, it was in the range of 0.513 – 0.793. In item analysis based on lower and upper groups, it is recommended that the upper group averages be larger and there should be a significant difference between the lower and upper groups in order for the items to have the distinguishing feature (Karagöz, 2019: 1011). In the 27% lower-upper group comparison, it was determined that there was a significant difference between the averages of the lower-upper groups ($p<0.001$) and the t values were positive. Cohen's d effect size was calculated to determine the size of the differences between the groups. The Cohen's d effect size values of the items vary between 1.23 and 2.44, and the difference between the groups has a large effect size (Cohen's d >0.80). Therefore, it can be said that the inventory has internal consistency and that all items are sufficient to distinguishing feature to be measured.

In addition, normality was tested for the mean scores of the dimensions determined as a result of CFA and correlation analysis was performed. The skewness values ranged from -.655 to -1.249, and the kurtosis values (kurtosis) ranged between .661 and -1.789. Therefore, normality was achieved (Tabachnick & Fidell, 2013). Correlation analysis was carried out in order to reveal the interdimensional relationships. Significant and positive relationships were found between all dimensions ($p<0.001$).

Study 3

Participants

670 academicians from 68 universities participated in the last stage of the research. 1 questionnaire, which was determined as an extreme value in the data set, was removed from the data set, and in the last case, descriptive statistics were examined on the data of 669 participants and hypothesis tests were carried out. Considering the gender distribution of the academicians participating in the research, 52.8% of the participants were male, 37% were in the age range of 36-44, 89% were working in public universities and 47% were in social sciences area.

Confirmatory Factor Analysis (CFA) Findings and Reliability Analysis

The jamovi 1.6.23 (The jamovi Project, 2021) package program was used in the analysis of the collected data. In order to create additional evidence for the construct validity of the measurement tool, whose factor structure was revealed by exploratory factor analysis, CFA was performed using the maximum probability method on the data obtained from Study 3. Before starting the analysis, the assumption of normal distribution was tested.

As a result of the EFA performed in the previous step, a structure consisting of 37 items and 5 factors was obtained. In this stage, 2 items removed from the inventory because of lower factor loads included in the CFA analysis. Therefore, the structure of the Sources of Meaning Inventory in Academia, which consists of 39 items and 5 factors, was tried to be verified with CFA (Table 4).

As a result of the CFA, the standard regression coefficients and modification suggestions were examined due to the poor model fit values, and 8 items with a standard regression coefficient below 0.60 and which impair the goodness of fit according to the modification suggestions were excluded from the scale.

When Table 4 is examined, it is seen that the factor loadings of the items in the last case ranged from 0.609 to 0.776 ($p<0.001$). As the goodness of fit values showed acceptable results [X^2/df= 1419/419 (3.39), SRMR=0.445, CFI=0.91, TLI=0.90 and RMSEA=0.0597) (Hu & Bentler, 1999; Byrne, 2016), the structure of the inventory was confirmed.

The Cronbach Alpha internal consistency coefficient (α) was calculated to test the reliability of the inventory whose structure was confirmed as a result of CFA. The α coefficient of the dimensions is in the range of 0.83 – 0.88. Values indicate that internal consistency reliability is achieved (Field, 2013). In the analysis, the item-total correlation values for all dimensions and the correlation map showing the inter-item correlation were examined. It was determined that all of the item-total correlations in all dimensions were above the threshold value of 0.25 (Karagöz, 2019) and the correlation values between the items were in the range of 0.30 – 0.80 (Tabachnick & Fidel, 2013). Values indicate that internal consistency reliability is provided.

Criterion-Related Reliability

Criterion-related validity was examined as concurrent validity (DeVellis, 2017). In order to test the criterion-related validity of 669 data obtained with Study 3, besides the 'Sources of Meaning Inventory in Academia' whose structure was validated by this research, The Meaningfulness of Work Scale which was developed by Steger et al. (2012) and validated in Turkish by Fındıklı et al. (2017), was used. As a result of the CFA performed with the meaningfulness of work scale, its structure as a one-dimensional scale was confirmed [X2/df= 66.5/13, CFI=0.971, TLI=0.953, RMSEA=0.0784]. The Cronbach Alpha reliability coefficient value of the scale was determined as 0.86.

Correlation analysis was performed to test concurrent validity. According to the findings (Table 5), it is seen that there are positive and significant relationships between all dimensions of the sources of meaning inventory in academia and the meaningfulness of work scale ($p<0.001$). Thus, it can be said that concurrent validity is ensured. The final version of the scale is presented in Appendix 1.

Table 5. Descriptive Statistics and Correlations

Variables	1	2	3	4	5	6
1. Passion for Life	1					
2. Scientific Contribution	.587***	1				
3. Benefiting	.683***	.640***	1			
4. Earning Money and Respect	.431***	.335***	.355***	1		
5. Exploring and Learning	.693***	.694***	.763***	.308***	1	
6. Meaning of Work	.508***	.403***	.516***	.213***	.485***	1
Mean	8.49	9.20	8.91	6.63	9.21	4.28
Standard deviation	1.23	.787	1.02	2.02	.794	.575
Skewness	-.707	-1.00	-.880	-.507	-.856	-.585
Kurtosis	-.048	-.462	-.181	-.098	.049	-.146

*N=669; ***p<0.001*

CONCLUSION, DISCUSSION AND RECOMMENDATIONS

In the literature, the meaning of work is expressed as a significant and positive evaluation of work based on subjective experiences and interactions in the work environment (Rosso et al., 2010). The source of meaning of the work examines the factors that enable the individual to perceive the work as meaningful. Determining the sources of meaning of the work is of great importance in terms of increasing the level of employees finding their jobs meaningful. By identifying the sources of meaning, managers will create meaningful conditions for the work, decrease the employee turnover rate, increase the work-life satisfaction of the employees and gain competitive market advantage with customer loyalty (Dimitrov, 2012: 353). Examining the sources of meaning causes many positive results both individually and organizationally.

Although it has great importance in terms of individual and organizational aspects, there are not enough studies on the sources of meaning of work yet. While there are many studies on the positive results of the meaning of work in the literature (Bhatnagar & Aggarwal, 2020; Bunderson & Thompson, 2009; Chartwright & Holmes, 2006; Dik & Duffy, 2009; Dinç et al., 2019; Dobrow & Tosti-Kharas , 2011; Domene, 2012; Hagmaier & Abele, 2012; Littman-Ovadia & Steger, 2010; Lobene & Meade, 2013; Melton & Schulenberg, 2008; Mendes & Stander, 2011; Uzunbacak & Akçakanat, 2018), research on the source of meaning is limited (Bailey and Madden, 2016; Mercurio, 2019; Rosso et al., 2010). In these studies, the theoretical framework was generally tried to be defined; empirical research is thought to be insufficiently focused.

The aim of this study is to develop an inventory in order to determine the sources of meaning of the work in the academic profession. In this way, the factors that make the academic profession meaningful will be revealed and it will be possible to manage these factors in a way that produces positive results.

In the study, the scale development process consisting of qualitative and quantitative stages was followed, and the Sources of Meaning Inventory in Academia was developed, consisting of 5 dimensions (passion for life, scientific contribution, benefiting, earning money and respect, exploring and learning) and 31 items. There are 7 items in the passion for life dimension, 8 items in the scientific contribution dimension, 7 items in the benefiting dimension, 4 items in the earning money and respect dimension, and 5 items in the exploring and learning dimension of the inventory.

There are scales to evaluate the meaning of work in the literature (Lee, 2015; Lips-Wiersma & Wright, 2012; Steger et al., 2012), but no scale has been found to determine the source of the meaning of work. For this reason, research on the source of meaning of the work remained at the theoretical level (Rosso et al., 2010: 108), and empirical research and results could not be produced because the scale was not developed on the subject. It is of great importance to deepen qualitative and quantitative research on the source of the meaning of work, which is of great importance for business life. The most important contribution of this study is that it fills the gap in the literature on this subject by presenting an inventory of meaning sources.

In future research, individual and organizational results that are affected by the sources of meaning can be revealed by using the Sources of Meaning

Inventory in Academia. Differences in sources of meaning can be studied according to the demographic and socio-cultural characteristics of academics, their fields of study and seniority. By means of this inventory, the meaning sources that reveal more positive results can be determined and the development of the said meaning source(s) can be achieved. On the other hand, by determining the sources of meaning that will be beneficial for the academia, significant contributions can be made to the career orientation and personnel selection processes in public and foundation universities.

In this study, the sources of meaning were examined through academics, who are considered as one of the most suitable environments for the search for meaning. The reason for this is to focus on academics and to make a comprehensive inventory of academics by examining the sources of meaning belonging to this profession group in depth. However, this situation also constitutes the most important limitation of the research. In future studies, inventories can be developed for the sources of meaning in different occupational groups, as well as an inventory that can cover all occupational groups in general.

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Appendix 1: Sources of Meaning Inventory in Academia

How important the sources of meaning in the work presented below mean to you?
1. My way of life
2. Discover myself
3. Make life meaningful
4. My inspiration
5. Way of expressing myself
6. My energy source
7. My source of spiritual pleasure
8. To contribute to science
9. To research
10. To leave useful works
11. To contribute to other researchers with my research
12. To transfer knowledge and experience
13. To be a known academic in my field
14. To do work that I'm proud of
15. To be successful
16. To benefit the university/institution
17. To serve the region I live in
18. To raise beneficial generations for society
19. To represent my country with my profession
20. To contribute to practitioners in the field
21. To educate students
22. To serve humanity
23. To earn financial gain
24. To earn additional income as a result of my work
25. To have a title
26. To gain power
27. Love of learning
28. The excitement of learning and teaching
29. Being open to innovations
30. To specialize
31. To provide professional development

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The Nexus Between Income Inequality and Tax Composition: A Cross-Country Perspective

Oya EKİCİ[1]

ABSTRACT

We perform an empirical analysis to investigate the relationship between income inequality and the tax composition of countries. We first group the countries with respect to the composition of their taxes on income and taxes on goods and services as a share of gross domestic product. The clustering method is employed to identify country groups. Then, we examine the effect of being in a category on the countries' income inequality represented by the Gini index. To deal with the endogeneity issue, we use the instrumental variable method in the analysis. We find that the composition of tax revenues of countries is associated with the Gini index and the countries that impose a higher tax on income relative to tax on goods and services expose a lower level of income inequality; whereas the countries that place a higher tax on goods and services expose a higher level of income inequality. As a policy implication, structuring an effective tax composition will ultimately help the economies reduce inequality. Understanding the potential of the distributive effect of fiscal policy will contribute to managing taxation tools better and thus improving economic development.

Keywords: Gini index, Income Inequality, Taxes on Income, Taxes on Goods and Services, Clustering.

JEL Classification Codes: H20, H21, D63b.

INTRODUCTION

According to the World Inequality Report 2018, income inequality in many countries has risen in recent decades. However, it does not grow at the same rate across countries due to their different national policies and institutional structures (Alvaredo et al., 2018). Countries' fiscal policies are primary instruments that affect their national income distributions. Therefore, there is an increased interest in analyzing the tax systems and implication differences of countries.

Although a significant part of government revenues comprises tax revenues in many countries, their taxation structures expose important country variations (see Figure 1). Revenues from tax fall into two categories – indirect taxes, which comprise the taxes on goods and services, sales and trade, and direct taxes which involve the taxes on income, profits and property. For advanced economies, tax revenues rely considerably on income taxes. In the case of developing countries, these revenues heavily count on taxes collected from consumption and trade. But Turkey atypically has experienced a major shift from income to consumption taxes. As for low-income countries, direct taxes contribute a comparatively small portion to their revenues (ICTD, 2019; McNabb, 2017; Prichard et al., 2014). As countries become more developed, the share of direct taxes to gross domestic product (GDP) rises (Acosta-Ormaechea and Yoo, 2012; Bahl and Bird, 2008).

We focus in particular on the countries' internal income distributions and inequalities with an approach considering the overall development levels of countries. Income inequality is defined as a situation in which the distribution of income among individuals shows disparity in an economy. It is generally measured by Gini index. When seen from the countries' Gini indices data in the world development indicators table, no patterns are observed in the inequality level of the countries over time.

Many theoretical and empirical papers (Agnello et al., 2014; Ball et al., 2013; Ciminelli et al., 2019; Martinez-Vazquez et al., 2012; Muinelo-Gallo and Roca-Sagales, 2013) refer to the tax system as one of the most direct tools used to reduce income inequality. The studies of Adam et al. (2015) and Pickering and Rajput (2018) consider reverse causality and examine the effect of income inequality on tax policies. Similarly, Borge and Rattso (2004) explore the income distribution effect on tax structures and provide evidence that unequal income distribution shifts the existing tax burden to property tax. Drucker et al. (2017) refer to this reverse direct effect from net inequality on tax composition as political influence.

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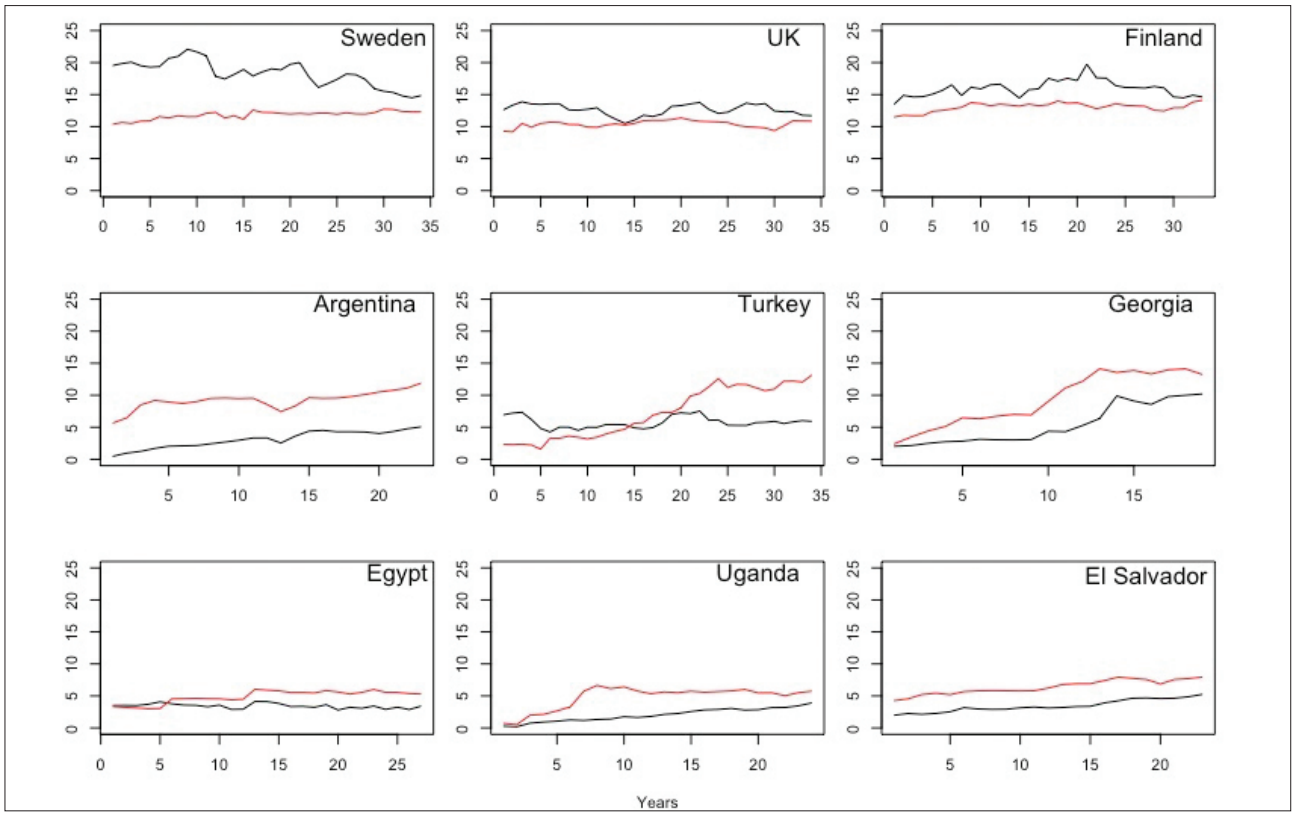

Figure 1. Selected countries' income (black) and consumption (red) taxes over time (% of GDP).

Fiscal policies of countries and their tax compositions, to some extent, are determined institutionally, and countries' tax preferences impact the level of income inequality. The associated empirical literature (Borge and Rattso, 2004) tests the hypothesis within countries. Drucker et al. (2017) and Akgun et al. (2017) use cross-country data to assess the tax structure effect on income inequality. Alternatively, considering the correspondence level, we explore preferred tax compositions and the resulting inequality from a cross-country perspective. Unlike other empirical studies, we perform a macro-level analysis that allows us to involve a wide range of country data and address the endogeneity problem with instrumental variable analysis.

In this study, we present evidence on the relationship between the tax composition of countries and their income inequality levels by analyzing cross-country data. For this, we cluster countries based on their tax composition: taxes on income and taxes on goods and services (as % of GDP). Next, we examine whether being in a cluster is associated with income inequality levels. Our empirical analysis reveals that income inequality is associated with the tax structure and compared to consumption tax: as the income tax increases, inequality also increases. With this study we articulate the theory of the relationship between tax policy and income inequality from a cross-county perspective. As a policy implication, structuring an effective tax composition ultimately helps the economies reduce inequality.

The paper is organized as follows: The next section provides a literature review, a problem-focused theoretical background, and the primary hypothesis of this study. Then, it describes the data and provides details about our method to investigate possible factors affecting income inequality. The paper continues with a section giving the estimation results and evaluation of the empirical findings. The last section discusses the overall findings of this study and offers some concluding remarks.

LITERATURE REVIEW

As is known, OECD has member countries non-homogeneous in terms of their development levels and account for almost 60% of world GDP. With this form, it provides a central knowledge source for reliable and representative data (OECD, 2022). The trends in income inequality of OECD countries highlight a long-term rise in income inequality. The growing disparities in income distributions of the countries lead the economies to be financially more fragile. It might also have the effect to undermining economic growth. There is a broad literature working on this effect. Some of them are the studies of Cingano (2014), Shin (2012), Voitchovsky (2005), and Mo (2000). Regarding economic and social welfare, the economies follow up on the behavior of income inequality changes. From this aspect, income inequality is one of the critical indicators that matter for an economy and requires getting to the bottom of it.

The factors affecting income inequality have been extensively investigated by different studies. The educational regime is a primary equalizer in the long run, as World Bank (2002) report and Glomm and Ravikumar (2003) show in detail. For the European Union region, Rodrigez-Pose and Tselios (2009) examine the causal factors of income inequality and indicate that higher inequality in educational attainment is associated with higher income inequality. The other factors that they determine are population aging, unemployment, female participation in the labor force, urbanization, agriculture, and industry. One can go over more detail the other determinants of income inequality and see the studies of, for example, Iacoviello (2008), Aghion et al. (2018), Hailemariam et al. (2021), and Jones and Kim (2018).

Additionally, for the countries at different stages of development, there is ample investigation on the changes in this indicator. But first and foremost, cross-country analyses depend on the availability of reliable and comparable databases. To estimate the existing income inequality database's accuracy and comparability, Solt (2020) revised the evaluations of standardized world income inequality database, as one of the most preferred sources. In reference to applications, Gottschalk and Smeeding (2000) make a cross-national comparison, and suggest that the level and trend in inequality in rich nations are different from those in the developing world. When Atkinson (2003) focuses nine OECD countries and considers the various hypotheses, he concludes a disparity on the income distribution changes of OECD countries. On the side of developing countries, Ravallion's (2014) research unveils that while inequality between developing countries is decreasing, average inequality within developing these countries is increasing. Roser and Cuaresma (2016) work with an average Gini index for 32 industrialized economies. Using that panel data set, they reveal that imports from low-income countries, democratization, and technological and educational interplays affect inequalities in industrialized countries.

Alternative to these determinants, taxation is one of the most widely accepted policy instruments for governments that need to control income distribution. The paper of Stiglitz (2010) emphasizes the importance of a distinctive tax design for countries that differ in structure and policy purposes. Similarly, Besley and Persson (2014) illustrate that low, middle, and high-income countries have various tax formations. Moreover, these heterogeneous structures drive the countries to change or broaden their tax base to increase their revenues. Gordon and Li (2009) mention the variability of tax structures across the countries to elucidate the differences in social preferences, such as policies on military spending, education, insurance, or investments. Thus, the researchers point out that governments of developed and developing countries use taxation instruments dissimilarly. These papers classify countries concerning their income level and then analyze their tax structure. However, considering the discrepancies between countries, we group them based on their tax compositions with a novel approach.

The heart of the matter discussed in this paper is the relationship between income inequality and tax composition, which is broadly analyzed by a substantial number of studies. While Poterba (2007), Martinez-Vazquez et al. (2012), Ball et al. (2013), Ciminelli et al. (2019), and Agnello et al. (2014) use the models searching the effect of the tax system on income inequality, conversely, Pickering and Rajput (2018), and Adam et al. (2015) investigate the effect of income inequality on the tax structure. Alternatively, Muinelo-Gallo and Roca-Sagales (2013) contribute by considering the mutual relationships between income inequality and economic growth in the determination of fiscal policy. All these researches by Adam et al. (2015), Poterba (2007), Pickering and Rajput (2018), Agnello et al. (2014), Ball et al. (2013), Ciminelli et al. (2019), Martinez-Vazquez et al. (2012), and Muinelo-Gallo and Roca-Sagales (2013) mention the endogeneity issue in common among tax composition and income inequality. To eliminate this, we propose a novel approach and add a new variable reflecting the tax structure. Then, in the estimation of the model, we use the instrumental variable method, which gives reliable results.

MORE FOCUSED THEORETICAL BACKGROUND AND HYPOTHESIS

As many previous studies remarks, the tax policy is one of the principal tools to prevent growing income inequality. (Agnello and Sousa, 2014; Ball et al. 2013; Cubero & Hollar, 2010; Woo et al., 2017). There is an extensive literature devoted to the examinations of this relationship. The prior economic research on income inequality has primarily focused on indicating the effect of the taxation levels of countries in micro level. The key argument that we develop in this paper is on the ability of reflecting the effect of governments' tax policy preferences. The determining the situation of countries' different tax compositions enable us to create an overall categorization of tax practices. So, we extend previous studies and consider the general tax composition with a single variable, Cluster, which is based on an objective clustering procedure and generated from a cross-country data. Then we examine the cluster effect with instrumental variables regression method. Hence, we state our main hypothesis.

***Hypothesis**: The tax compositions and the relevant practices of the countries have effect on income inequality in the countries. Higher dependence on income taxes results in lower levels of income inequality when compared to the indirect taxes*.

The other factors affecting the income inequality arise from a large body of literature analysis. Introducing the level of GDP, population, unemployment, investments, age dependency ratio (Kanbur, 2000; Tanzi, 1989; Devarajan et al., 1996; Jarven, 2013) allows for controlling the effect of macroeconomic factors. Besides, the effect of the various types of government expenditures

are discussed in the prior studies (Clements et al., 2015; Devries et al., 2011; Easterly, 1995; Fournier and Johansson, 2016; Martinez-Vazquez et al., 2012; Meltzer and Richard, 1983). We followed the literature in deciding the coverage of control variables.

DATA AND METHODS

For the empirical analysis, we use ordinary least squares (OLS) regression, generalized methods of moments (GMM) model and instrumental variables (IV) regression. We primarily run linear and ordered logistic regression models. By considering two-way causality, we account for the association between income inequality and tax compositions of countries. Before focusing on each country's income inequality change in response to their tax structure and vice versa, we group countries according to their two main tax components—income and consumption taxes—as a share of GDP and analyze these groups' association with income inequalities. Transforming the covariates into categories that reflect countries' tax structures did not help with the issue of endogeneity.

To deal with the endogeneity, we use instrumental variables regression. The method requires to introduce control variables so that the regression can find variables that is correlated with categories but uncorrelated with the error term of the model. Besides, in our analysis, including control variables enables the examination of other exogenous factors in income inequality.

Variable generated from clustering analysis

Our tax data (ICTD UNU-WIDER, 2019) consists of countries' total taxes on income (individual and corporate) and total taxes on goods and services (including VAT and sales taxes). This data is available for 189 countries. For each year, the number of available data changes: for example, for 2012, 64 countries are considered. From 2006 to 2012, for seven years, we clustered tax data (see Table 1 for the statistics of the clustering procedure). For overall descriptive statistics of Cluster variable (the variable generated from clustering analysis) see Table 2.

Based on the bivariate tax data, we group the countries with k-means clustering. The standard method using the Hartigan-Wong algorithm defines the clusters that have the minimum total intra-cluster variations. To exemplify our clustering outcome, we demonstrate the clusters defined for 2012 in Figure 2. Extreme unbalance data is not seen among the clusters in the covered years.

The three clusters shown in Figure 2 broadly correspond to the meaningful groups of countries with similar incomes: high-income, upper- or lower-middle income, and low-income economies. Also, these meaningful classifications are held over when different time periods are analyzed. For the periods under review, the optimal cluster number is three, which is confirmed by a Bayesian clustering analysis. Testing the main hypothesis of this study relies on the significance of the effect of the Cluster variable.

Dependent Variable

For our income inequality data (World Inequality Database, 2018), the Gini index is used as one of the most quoted measures. It quantifies the area between the Lorenz curve and 45-degree line that represents perfect equality. A Gini index of zero (0%) indicates perfect income equality, whereas an index of 1 (100%) corresponds to perfect income inequality. First row of Table 2 represents the descriptive statistics of the Gini index data (World Inequality Database, 2018).

Control variables

In order to clearly identify and control the cluster effect and to reflect the impact of other potential variables, we add a number of control variables. In one group of control variables, macroeconomic characteristic is represented by *GDP* per capita PPP in current international dollar units (*GDP*), unemployment rates as percent of total labor force (*Unemployment*), total population (*Population*), gross fixed capital formation as percent of GDP (*FixCapForm*), age dependency ratio as percent of working-age population (*AgeDep*) and household final consumption expenditure as percent of GDP (*HConsExp*). In the other group of control variables, government spending characteristic

Table 1. Clustering statistics for the years

Years	# of countries in Cluster 1	# of countries in Cluster 2	# of countries in Cluster 3	Total number of countries	Total number of countries for available data
2012	18	25	21	64	45
2011	13	31	22	66	46
2010	15	20	28	63	43
2009	18	27	25	70	49
2008	14	29	25	68	43
2007	18	22	22	62	46
2006	19	23	20	62	44
Total					**316**

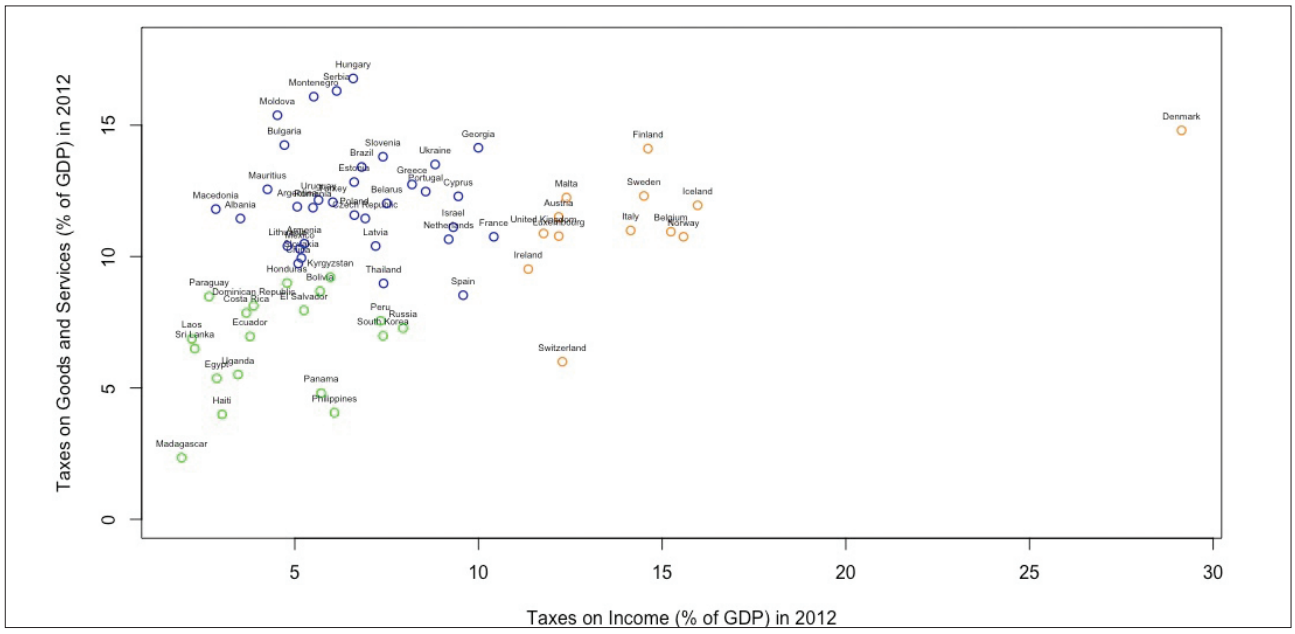

Figure 2. Country clusters for 2012 data.

Table 2. Descriptive Statistics

Variables	n	Mean	Sd	Median	Min	Max	Type of variable
Gini Index	316	33.11	5.94	32.60	23.70	63.40	numeric
Clusters	316	1.74	0.78	2.00	0.00	3.00	categorical
Population	316	16.00	1.64	15.86	11.39	21.02	numeric
GDP	316	9.99	0.72	10.15	7.20	11.43	numeric
Unemployment	315	8.24	4.51	7.27	0.58	26.67	numeric
FixCapForm	315	23.93	6.09	22.67	11.97	48.41	numeric
AgeDep	316	20.82	6.25	22.40	5.50	32.24	numeric
HConsExp	315	59.37	13.03	57.18	31.33	95.80	numeric
HealthExp	278	5.59	1.86	5.93	0.76	8.87	numeric
EducExp	278	5.21	1.18	5.36	2.58	8.03	numeric
SocProtExp	277	14.64	4.75	14.69	2.20	24.84	numeric
PubSerExp	279	6.06	2.37	5.57	0.23	17.11	numeric
PubOrdExp	253	1.89	0.65	1.84	0.00	5.15	numeric
EnvirExp	277	0.68	0.38	0.65	-0.26	2.11	numeric
RCultExp	278	1.19	0.56	1.15	0.14	3.57	numeric
EcoAffExp	278	5.14	2.28	4.64	1.64	25.04	numeric
AgricExp	241	0.73	0.71	0.58	-0.15	4.53	numeric
DefenExp	246	1.40	1.14	1.25	0.00	8.58	numeric
D2012	316	0.14	0.35	0.00	0.00	1.00	dummy
D2011	316	0.15	0.35	0.00	0.00	1.00	dummy
D2010	316	0.14	0.34	0.00	0.00	1.00	dummy
D2009	316	0.16	0.36	0.00	0.00	1.00	dummy
D2008	316	0.14	0.34	0.00	0.00	1.00	dummy
D2007	316	0.15	0.35	0.00	0.00	1.00	dummy

Note: Population and GDP data are in logarithmic scale.

is represented by government expenditures on health (*HealthExp*), education (*EducExp*), social protection (*SocProtExp*), public services (*PubSerExp*), public order (*PubOrdExp*), environment (*EnvirExp*), recreation, culture and religion (*RCultExp*), economic affairs (*EcoAffExp*), agriculture, fishing, forestry and hunting (*AgricExp*) and defense (*DefenExp*). All control variables under government spending characteristic are in percent of GDP. The data of control variables is retrieved from World Bank's World Development Indicators (World Bank, 2020).

We created a dummy variable for each year. The year dummy takes the value of one for the relevant year and zero otherwise. Down from the third row of Table 2 reports descriptive statistics for control variables and dummy variables.

Methods

Given the data, we preliminarily estimate a linear model and ordered logistic regression model to account for reverse causality. The models have the following forms:

$$Gini_i = \alpha_0 + \alpha_1 Cluster_i + \varepsilon_i$$
$$logit[Prob(Cluster_i \leq j \mid Gini_i)] = \beta_0 + \beta_1 Gini_i + \eta_i \quad (1.1)$$

where $Gini_i$ refers to ith countries' Gini coefficient and $Cluster_i$ refers to ith countries' tax structure cluster. α_0, α_1 denote, respectively, the intercept and tax structure effect. In the logistic regression model, j stands for the country category and β_0, β_1 represent, respectively, the intercept and inequality effect. Finally, ε_i, η_i are the error terms of the models. We initially use the models to test the causal link between tax structure and income inequality. The regular OLS regression does not consider heterogeneity across time and the omitted variables bring the bias problem of estimator. Therefore, we add control variables to the simple linear regression model and estimate OLS model with,

$$\begin{aligned} Gini_i &= \alpha_0 + \alpha_1 Cluster_i + \alpha_2 Population_i + \alpha_3 GDP_i \\ &+ \alpha_4 Unemployment_i + \alpha_5 FixCapForm_i + \alpha_6 AgeDep_i \\ &+ \alpha_7 HConsExp_i + \alpha_8 HealthExp_i + \alpha_9 EducExp_i + \alpha_{10} PubSerExp_i \\ &+ \alpha_{11} EnvirExp_i + \alpha_{12} RCultExp_i + \alpha_{13} EcoAffExp_i \\ &+ \alpha_{14} AgricExp_i + \alpha_{15} DefenExp_i + \sum_{j=1}^{k-1} \beta_j Dum_{ji} + \varepsilon_i \end{aligned} \quad (1.2)$$

where $Gini_i$ is the dependent variable, $\alpha_0, \ldots, \alpha_{h+1}$ are $1+h$ unknown parameters of h covariates. The β_j coefficient of time dummy Dum_{ji} is to measure potential change over time. By adding the dummy, we check for the unobserved time effects in the OLS model. Thus, the model provides a fixed effect OLS results. For fixed OLS method, since the data is not severely unbalanced, we do not need to remove the subjects or reduce the number of time periods or countries.

Due to the potential endogeneity between income inequality and the clusters we estimate both GMM and IV regression models. We fit GMM with the number of observations $i = 1, \ldots, n$

$$Gini_i = \gamma X_i + \varepsilon_i \quad (1.3)$$

where the dependent variable $Gini_i$ is q-*by*-*1* vector, X_i is a q-*by*-s matrix and ε_i is is q-*by*-*1* vector of errors. γ is unknown parameter vector with s-*by*-*1* dimension. GMM contains potential endogenous and exogeneous variables.

We adopt instrumental variable approach and identify the IV Regression model,

$$\begin{aligned} Gini_i &= \delta_0 + \delta_1 X_{i,Cluster} + \delta_2 X_{i,PubOrdExp} + \delta_3 W_{i,HConsExp} \\ &+ \delta_4 W_{i,HealthExp} + \delta_5 W_{i,EducExp} \\ &+ \delta_6 W_{i,PubSerExp} + \delta_7 W_{i,EcoAffExp} \\ &+ \delta_8 W_{i,AgricExp} + \sum_{j=1}^{k-1} \lambda_j W_{i,Dum_j} + \varepsilon_i \end{aligned}$$

and

$$\begin{aligned} Z = (&Z_{i,Population}, Z_{i,GDP}, Z_{i,Unemployment} \\ &, Z_{i,FixCapForm}, Z_{i,AgeDep}, Z_{i,SocProtExp} \\ &, Z_{i,EnvirExp}, Z_{i,RCultExp}, Z_{i,DefenExp}) \end{aligned} \quad (1.4)$$

with the number of observations $i = 1, \ldots, n$ where $Gini_i$ is the dependent variable, $\delta_0, \ldots, \delta_{m+1}$ are $1+m+r+k$ unknown regression coefficients. $W_{i,HConsExp}, \ldots, W_{i,AgricExp}, W_{i,Dum_j}$ are r+k exogenous variables which are uncorrelated with the error term ε_i. The λ_j coefficient of k dummy variable W_{i,Dum_j} is to account for the effect over years. In the model, $X_{i,Cluster}$ and $X_{i,PubOrdExp}$ are m endogenous variables that are instrumented by Z where consisting p variable $Z_{i,Population}, \ldots, Z_{i,DefenExp}$.

In all models above, we regress the lagged values of all explanatory variables.

FINDINGS

First, we interpret our clustering results. The three defined clusters are significative. Compared with the other two clusters, Cluster 1 consists of the countries with higher income tax relative to consumption tax and higher total tax revenue. Cluster 3 consists of the countries with lower income tax relative to consumption

tax and lower total tax revenues. Lastly, Cluster 2 consists of the countries with lower income tax relative to consumption tax but higher than the third cluster, and total tax revenue share is between the first and third clusters. Thus, $Cluster_i$ is our ordered categorical variable with the values 1, 2, and 3.

are unobservable effect which contributes to error term. Therefore, as a next step we fit an extended OLS model (1.2) which involves the control variables and the year-specific dummy variables. The estimation results of the model (1.2) are given in Table 3. In OLS the parameter a_1 let us to test our study's main hypothesis. Regarding

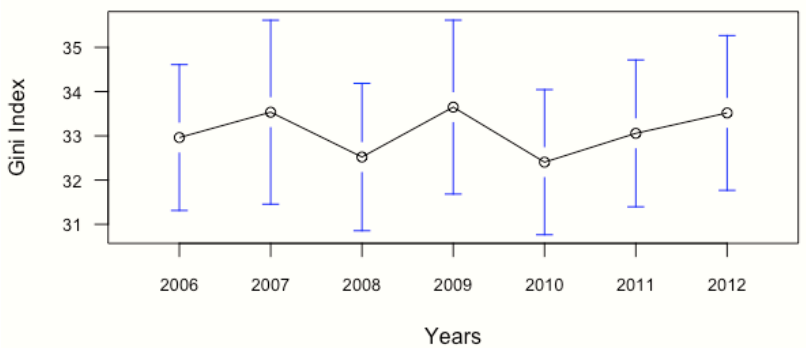

Figure 3. Heterogeneity across Years

It is plausible to assume the heterogeneity of the parameters across countries. Because, Gini indices varies for different level developed countries and based on this distinctness we achieve to classify the countries. On the other hand, we do not have reason to expect heterogeneity across the years. Our data exploration justifies this (see Figure 3).

If we start with preliminary results of simple linear regression and logistic regression analysis, we see that clusters associated with income inequalities and tax structures affect the income distribution for a given year (see Appendix A1 for Table A1). We regress the previous year's tax structure clustering to the existing year's Gini index. The results show that as the cluster number increases, which means that as the imposed income tax share decreases and tax revenues in total decreases, the Gini index—that is, income inequality—also increases. In this way, we treat examining the relationship for every year as a way of testing the causality. Replication of the analysis for different years confirms the findings. Consistently, the logistic regression analysis results indicate that as the inequality increases compared to consumption tax, the income tax share in the tax composition rises. We regress the previous year's Gini index to the existing year's tax structure clustering. We see that a one-unit increase in the Gini index is expected to result in a 0.22 increase in the odds of being in a higher number of clusters (see Appendix A2 for Table A2). For example, 6.16 is the expected odds of being defined as a Cluster 1 country. As the goodness-of-fit measure, the LR chi-square of 27.79 with a p-value of <0.0001 implies that the logistic model is statistically significant, as compared to the null model.

In the Methods section, we mentioned the issues of omitted variable bias. In the simple linear regression model, the other covariates are not included. Also, there

the Cluster effect on income inequality is significant at $p < 0.05$ level. The *Cluster* and *Gini* are positively related. As *Cluster* number increases *Gini* also increases. The control variables in macroeconomic characteristics, *Population*, *GDP*, *Unemployment* and *HConsExp* are positively related to *Gini* and significant. *AgeDep* has negative sign and significance. The other group of control variables in government spending characteristic, *HealthExp* and *EducExp* are negatively related to *Gini* and both are significant. The year specific fixed effects are jointly insignificant. We do not move forward in the interpretation on findings from OLS.

It is possible that *Gini* and *Cluster* variables to be affected by some of the control variables. In the case that these effects exist, OLS estimates become inconsistent. Hence, we employ instrumental variable analysis, and fit GMM (1.3) and IV regression model (1.4) to estimate *Cluster* effect. Since the standard errors of IV estimates are not consistent, we compute the sandwich estimator of covariance matrix for robust -heteroskedasticity consistent - standard errors.

Table 3. Results of Empirical Analysis (dependent is Gini Index)

	OLS		**GMM**		**IV Regression**	
Variables	*Estimate* (α)		*Estimate* (γ)		*Estimate*(δ, λ)	
Intercept	-20.40 (10.98)		42.66 *** (4.03)		41.21 *** (4.84)	
Cluster	0.85 * (0.42)		2.68 *** (0.90)		3.06 *** (0.95)	
Population	0.77 *** (0.18)					
GDP	3.87 *** (0.80)					
Unemployment	0.20 ** (0.07)					
FixCapForm	0.07 (0.06)					
AgeDep	-0.24 *** (0.06)					
HConsExp	0.21 *** (0.03)		0.17 *** (0.03)		0.14 *** (0.03)	
HealthExp	-0.78 *** (0.21)		-1.14 *** (0.29)		-0.99 *** (0.25)	
EducExp	-0.73 ** (0.27)		-0.87 *** (0.28)		-0.75 * (0.34)	
SocProtExp						
PubSerExp	-0.06 (0.11)		-0.55 *** (0.11)		-0.53 *** (0.13)	
PubOrdExp			-4.65 *** (0.65)		-4.03 *** (0.78)	
EnvirExp	-0.34 (0.69)					
RCultExp	-0.49 (0.56)					
EcoAffExp	-0.04 (0.12)		0.17 * (0.07)		0.14 * (0.12)	
AgricExp			-2.78 *** (0.61)		-2.71 *** (0.56)	
DefenExp	-0.004 (0.22)					
Dum2012	-0.42 (0.87)		-0.19 (0.85)		-0.37 (1.02)	
Dum2011	-0.25 (0.88)		-0.02 (1.07)		-0.60 (1.05)	
Dum2010	-0.07 (0.90)		0.30 (1.07)		0.09 (1.12)	
Dum2009	0.54 (0.86)		1.54 (1.12)		1.13 (1.05)	
Dum2008	-0.49 (0.88)		-0.08 (1.19)		-0.15 (1.03)	
Dum2007	-0.49 (0.86)		-0.37 (0.92)		-0.29 (0.97)	
					W.Inst. (Clust)	11.95 ***
					W.Inst. (PubOrdExp)	11.53 ***
The Tests for The Models	R^2	0.56			*Wu-Hausman*	32.62 ***
	F -Stat (p-val)	13.39 *** (<0.001)	*J-test (p-val)*	9.78 (0.20)	*Sargan (p-val)*	13.07 (0.07)
	Obs.	208	*Obs.*	204	*Obs.*	195

Notes: Robust standard errors in brackets. *** for p<0.001 ; ** for p<0.01; * for p<0.05.
Source: Author's calculations

In model specification, to decide on which variables are under the exogenous set and which are under the instrumental variables set, we apply the classification that relies on the distinction between productive and non-productive expenditures (discussed by Adam and Bevan, 2005 and Chu et al. 2020).

For the instrumental variables we determine two group of relevant variables sets: From the macroeconomic indicators; GDP, population, unemployment, gross fixed capital formation for investments, age dependency ratio and from the non-productive government spending; expenditures on social protection, environment recreation, culture & religion and defense. On the other hand, for the exogenous variables set we specify the productive type of government spending and cover the variables of the government expenditure on health, education, economic affairs, general public services and agriculture, fishing, forestry and hunting.

Based on the J-statistic of GMM model, we fail to reject the null hypothesis of instrumental variables are exogeneous. This suggest that our instrumental variables are valid. From F-test of IV regression, we reject the null hypotheses of the instruments are weak, so we inferred that the instrumental variables *Cluster* and *PubOrdExp* are sufficiently strong. Our decision remains unchanged when we consider the critical values for F test suggested in Stock et al. (2002). We apply Wu-Hausman test to check for the difference between OLS and IV regression results. We reject the null hypothesis implies that there is significant difference between two approaches and we need to employ IV regression method. For the validity check of instrumental variables, we use Sargan test. We get a similar result to J test of GMM, we fail to reject the null hypothesis; one or more instruments are invalid. The test results suggest that our instrumental variables are valid. Considering all these diagnostics results of IV analysis we move forward to interpret our estimated parameters of the IV model (1.4).

First, to explore the main hypothesis of this study we check the δ_1 estimation of *Cluster* variable in Column 3 of Table 3. Accordingly, *Cluster* variable significantly affects *Gini* and *Cluster* number has positive effect on the level of *Gini* index. Relying more heavily on consumption taxes is expected to increase the income inequality in the economy. As for the control variables under government spending characteristic, *HealthExp*, *EducExp*, *PubSerExp*, *AgricExp* have statistically significant negative effect on *Gini*. Government expenditures on essential considerations like health, education, agriculture and public services explicitly have a reducing impact on the level of income inequality. We check the cases where the sign of the effects flip. The column 3 in Table 3 suggests that among the government spending type of control variables, only *EcoAffExp* has significantly small effect but in opposite direction. Since this expenditure provides relatively an indirect type of support, it's not clear enough how it's allocated among the segments of the economy. Finally, the net effect of *HconsExp* on *Gini* index is positive and significant. The higher level of household final consumption expenditure is expected to be associated with a larger income inequality level. This is because the revenue from consumption taxes increases and it leads a less equal distribution in income. We might have considered the household consumption expenditure as endogenous, but it's out of the scope of this study. The estimation results of the dummies are insignificant across time specifications.

We have been limited by the weaknesses of cross-country income inequality, tax and government expenditures data. To work with standard-consistent data, we had to restrict the both time and country coverage.

The findings of this study put emphasis on the policies under which tax composition is beneficial to lowering income inequality of the countries. Developing countries rely more heavily on consumption taxes, whereas developed countries levy more tax on income. For that reason, determining the relevance of countries' income inequality levels and their tax compositions is essential in identifying policy interventions that countries' decision-makers should consider to reduce inequality. The required policy adjustment is feasible for developing economies. However, it is unlikely to be achieved for low-income countries without specifying other supportive policy tools. Since the policies that proposing higher proportion of income taxes requires a more powerful economic structure.

CONCLUSION

Tax composition of the countries play a pivotal role in controlling income inequality of countries by policies which change the distribution of tax among the segments of the society. To reduce income inequality, the commonly proposed adjustments are based on tax-related policies. Beyond this much discussed association in economic theory, we examine the relationship between tax structure and income inequality. We discuss the problem at the macro level and contribute to the literature by defining tax structures with a data mining method, k-means. The analysis generated meaningful clusters of countries regarding their tax composition. A preliminary logistic regression analysis indicates that clusters associated with income inequalities and tax structures affect the income distribution for a given year. We then explore the relationship between the clusters that represent different tax structures and income inequality levels and analyze them by using IV regression. At the macro level, our findings emphasize that the tax implications of countries are

associated with their income inequality levels. The outcomes of the models in detail reveal that leaning excessively on consumption taxes is expected to increase the income inequality in the economy. The control variables related to government expenditures on essential considerations like health, education, agriculture, and public services explicitly have a reducing impact on the level of income inequality. Among the government spending type of control variables, only economic affairs expenditures have a significantly small effect but the reverse. Lastly, the higher level of household final consumption expenditure is expected to be associated with a higher income inequality level.

To some extent, the tax compositions of countries follow the policy choices of governments. Therefore, to reduce income inequality, policymakers should find a way to increase the share of tax gained from income in emerging countries, which requires stronger corporate and individual income structures. This, consequently, addresses the need for structural reforms in the economies which impose higher level indirect taxes when compared to the direct taxes.

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Appendix A1. Table A1

Table A1. Results of Linear Regression Analysis (dependent variable is Gini index)

Coefficients	Estimate	Std. Error	t-value	Pr(>|t|)		Year
	20.79***	2.39	8.68	<0.0001	0.45	2013
(cluster effect)	7.62***	1.16	6.59	<0.0001		

*** for p<0.001

Source: Author's calculations

Appendix A2. Table A2

Table A2. Results of Logistic Regression Analysis (dependent is Clusters)

	Estimate	Std. Error	Wald	p-value
(Gini effect)	0.221***	0.051	4.30	<0.0001
Intercepts:				
1/2	6.16**	1.65	3.74	0.002
2/3	9.91***	2.12	4.69	<0.0001
Goodness-of-fit statistic				
LR chi-square				27.79***
(p-value)				<0.0001

** for p<0.01 and *** for p<0.001

Source: Author's calculations

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Are the effects of energy security on economic growth symmetric or asymmetric in Turkey? An application of non-linear ARDL

Gökhan KARTAL[1]

ABSTRACT

This paper is examined whether the relationship between economic growth and energy security risk level is symmetric or asymmetric in the case of Turkey between 1980 and 2018. What makes different of this study from the others few studies that examine the effects of energy security on economic growth by considering the 4A of energy security is that it examines the asymmetric impacts of energy security on economic growth by using the NARDL method. Accordingly, the results of the linear ARDL demonstrate that there is no long-term relationship between energy security risk level and economic growth. On the other hand, the results of the non-linear ARDL indicate that there is an asymmetrical relationship between economic growth and energy security risk level both in the long and short-term. Furthermore, according to the NARDL results, a 1% increase in energy security risk level decreases economic growth by approximately 0.60%, while a 1% decrease in energy security risk level increases economic growth by approximately 1.72%. These results demonstrate that economic growth in Turkey is significantly affected by positive and negative changes in the energy security risk level. Therefore, the results reveal the importance of policies to ensure energy security and allow for important policy implications for policymakers.

Keywords: Energy Security, Economic Growth, Energy Policy, Non-linear ARDL, NARDL, Turkish Economy.

JEL Classification Codes: C22, O13, O40, O47, Q40.

INTRODUCTION

Energy is one of the most considerable elements in the functioning of the modern world economy. As in Peter Voser's (2012) testimony, energy is the "oxygen" of the economy and the "life-blood" of growth. At the same time, energy is one of the most important elements of social welfare. The current importance of energy has revealed the concept of energy security by making the inaccessibility to energy a nightmare of the modern world economy. At the beginning of the First World War, Winston Churchill, who was the First Lord of the Admiralty, made a historic decision by shifting from coal to oil the power supply used in ships in the British Navy. The reason for this historical decision is to make the British navy faster than the German navy, thus maintaining Britain's effectiveness on global issues. This transition meant that the Royal Navy was based not on coal in Wales but on insecure oil from Persia (Çelikpala, 2014: 79; Yergin, 2006: 69). During World War I and World War II, since oil supply to fuel warships, tanks, and fighter planes was vital, oil supply (in a sense energy security) was equivalent to national security. During the 1950s and 1960s, after the world energy demand has more than doubled, the oil-exporting countries, which are increasingly uncomfortable with the control of the international oil supply system by western companies, in a sense laid the foundations of the oil crises of the 1970s by establishing OPEC. It can be argued here that in energy security, which was previously associated with fossil fuel depletion and interrupted access to energy, a new era has begun after the oil crises of the 1970s with the addition of the affordability dimension of energy security. In this context, the oil crisis in the 1970s has also shaped the perception of modern energy security. Furthermore, increasing energy insecurity caused disturbances in oil-importing countries and led to the establishment of the IEA by OECD in 1974. Thus, the increasing importance of energy for states and societies in the historical process has revealed the concept of energy security and has made energy security a national strategy issue. Moreover, in the 1990s, the Gulf War and the fall of the Soviet Union; in the early 2000s, the 9/11 Terror Attacks, the wars in Afghanistan and Iraq, the Arab Spring Events, and attacks by terrorist organizations as the DEAS have led to further tensions and instability in the perception of energy security. Finally, the Covid-19 pandemic and the continuing effects of the Russia-Ukraine War have revealed a significant break in the perception of global energy

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security. Moreover, it can be also argued that the effects of this transformation have the potential to produce different results. On the other hand, developments such as the institutionalization of global warming problems and increased awareness of climate change troubles have revealed the acceptability dimension of energy security, whose importance is increasing day by day. Thus, energy security together with what has happened in the historical process has become a multi-dimensional concept that it is included the dimensions expressed as 4A's, which availability, affordability, accessibility, and acceptability (Energy Charter Secretariat, 2015: 6-8; Kartal, 2020: 82-85). In this context, what the 4A of energy security means, the risks it includes, and the solution proposals for these risks are summarized in Table 1. Accordingly, the main factor shaping the energy security perception of countries is the "availability" dimension of energy security, which means having energy resources. Due to the unbalance geographical distribution of resources in the world, while energy resources have abundant in some countries, these resources either do not have or have inadequate in some countries. In other words, the current status of a country in terms of the "availability" dimension of energy security also shapes the value and meaning of other dimensions of energy security in that country, which are affordability, accessibility, and acceptability.

Table 1. Dimensions of Energy Security for Countries

Dimension		For Exporter Country	For Importer Country
Availability	The meaning of dimension	It has more than its own needs in terms of energy resources. Therefore, it exports the portion of production exceeding consumption.	Energy sources are absent or too low to meet consumption. It has to imports.
	Potential risks	• Field safety of energy resources. • High dependence of the economy on revenues from energy exports.	• Highly dependent on imports in energy. • The use of energy as a weapon in international relations. (If you do not/do not give, I will cut off the gas, you will feel cold)
	Policy Recommendations	• Security measures should be taken (requires cost). • Diversity in economic activities should be ensured by directing the revenues from energy exports to new investments.	• Resource diversification (the use of renewable energy sources), energy efficiency, and energy-saving: reduces the degree of dependency. • Country diversification: possible risks are reduced thanks to imports from alternative countries (If you cut the gas, I buy it from another country).
Affordability	The meaning of dimension	The prices in the energy market must be more (or at least equal) than costs such as extraction, transportation, and refining of energy sources. (price≥cost=profitability).	The price of imported energy must be affordable.
	Potential risks	• If the price of the energy source is below the cost, production will not be profitable. Therefore, there is no importance of "availability" of energy sources, export of energy resources also not be profitable (So, negative profit from exports). • If the country's economy is highly dependent on energy revenues, fluctuations in energy prices (decreases) will instability the country's economy.	• If the country's economy is highly dependent on energy imports, fluctuations in energy prices may make the country's economy unstable. • Since energy imports are in foreign currency, fluctuations in the exchange rate may also affect access to energy at an affordable price.
	Policy Recommendations	• The following policies can be implemented: a) If the country's production level is strong enough to control price movements, it can reduce supply and increase prices to an optimal level. (This usually requires to compromise with other energy importers) b) If the quality of the product is low, energy needs must be met through imports rather than production (So, the country has been an importer, not an exporter). c) If the product is of good quality, production costs should be reduced with new production techniques; if this is not possible, it should be preferred to bear this cost instead of dependence on imports (This extra cost is preferable, as dependence on imports will cause another risk.) • Diversity in economic activities: Policies to reduce the share of energy revenues in exports should be produced, and diversification should be made in export products by investing in sectors with high added value.	• A diversification policy should be applied: a) Resource diversification (the use of renewable energy sources), Energy efficiency, energy saving: It provides to meet energy needs from more suitable sources. b) Country diversification: By reaching more exporters, it provides access to the most cost-effective energy source among the alternatives. It also gives bargaining power. • The implementation of monetary policies aimed at stability in the exchange rate. • Trading in local currency by developing mutual trade relations with energy importer countries.

Dimension		For Exporter Country	For Importer Country
Accessibility	The meaning of dimension	It means uninterrupted access to existing resources.	It means uninterrupted access to resources through imports.
	Potential risks	• The field security of energy resources. • The security of distribution channels. • The security of transition routes.	• The security of transition routes in imports. • Disruption of energy flow because of problems that have been experienced or are likely to occur with exporting countries for political, military, economic, etc. reasons or natural causes (Energy can use as a weapon).
	Policy Recommendations	• Taking deterrent security measures. • Using high-security modern distribution channels. • Implementing diversification policies: • Choosing safe routes. • Diversification of transition routes.	• Safe routes must be preferred when determining crossing routes. • Diversification policies should be implemented to can be engaged different alternatives as a precaution for possible problems: a) Diversification of country in imports. b) Diversification of distribution channels (Pipeline, ship, and tanker transportation). c) Diversification of crossing routes.
Acceptability	The meaning of dimension	Environmental effects of energy consumption.	
	Potential risks	Intensive consumption of energy increases carbon emissions endangering natural life and human life (health): • Climate change. • Air pollution. • Ecological deterioration. • Water pollution. • Soil pollution. • Traffic jam. • Depletion of resources due to excessive consumption. • Accidents that have occurred/are likely to occur during the energy transport by sea, tanker, or pipeline	
	Policy Recommendations	• Implementing policies to reduce fossil fuel consumption: a) Increasing renewable energy consumption. b) Energy efficiency. c) Energy-saving. • Establishing modern distribution channels and transportation networks to minimize risks; making legal arrangements to protect the environment in energy trade and consumption.	

Source: Prepared by the author.

The concept of energy security, which was previously evaluated to a few dimensions, has been expanded to include issues such as environment, governance, and energy efficiency by increasingly being integrated. Azzuni and Breyer (2018), on the other hand, have examined energy security in fourteen dimensions by analyzing the concept of energy security from a wider perspective. In this context, the concept of energy security is a very comprehensive concept with 14 dimensions and 42 parameters. On the other hand, Sovacool and Mukherjee (2011) created a broad synthesis by dividing energy security into five dimensions (availability, affordability, technology development, sustainability, and regulation), these five dimensions into 20 components, and these components into 320 simple indicators and 52 complex indicators. On the other hand, as with many concepts, there is no consensus on the definition of energy security. In line with this, Sovacool and Mukherjee (2011) state that they have identified 45 different definitions of energy security. Based on Table 1, the fact that the meaning and importance of energy security are different for each country also leads to the emergence of many definitions of energy security. Because every country has made sense of energy security by considering current conditions. In this context, according to the definition of IEA (2020), which is one of the most concise definitions of energy security, energy security is the uninterrupted availability of energy sources at an affordable price. This definition is quite important in terms of forming the essence of the concept of energy security. However, this definition of energy security includes the 3A of energy security including availability, affordability, and accessibility, and reflects the classical energy security perception. Therefore, this definition of IEA's energy security has been expanded in a study by Kartal (2022a) as "the uninterrupted availability of energy sources at an affordable price in accordance with the environment and social welfare". Thus, the definition of energy security has been restated to include the 4A of energy security by adding the acceptability dimension of energy security to the definition in question.

In this respect, the fact that energy security is a multidimensional concept causes both to affect many areas and be affected by many areas. In this direction, energy security can be expected to both affect the economy and be affected by economic conditions. It can be argued that the fact that energy is the most considerable input of the modern world economy reveals the necessity of a serious examination of the economic effects of energy security. Furthermore, many macro-economic variables are affected differently by positive and negative shocks, and therefore it is necessary to examine these effects with non-linear methods as well as linear methods. Therefore, this study investigates the relationship between economic growth and energy security in Turkey by using both linear ARDL and non-linear ARDL methods. In this context, the main motivation of this study is to reveal the first study examining the relationship between economic growth and energy security with both linear and non-linear approaches. Moreover, the other motivations of this study are to reveal the fact whether positive shocks or negative shocks in energy security have a greater impact on economic growth in Turkey, to arise the importance of energy security in Turkey, and to present a projection for energy security for policymakers in this direction. Accordingly, in the next part of the study, Turkey's situation in terms of energy security is analyzed by presenting some statistical data within framework 4A of energy security. Then, the literature on the relationship between energy security and economic growth is examined. In the next section, the empirical method and methodology to be used in the study are introduced. Finally, the findings obtained from the empirical applications on the relationship between energy security and economic growth in Turkey are reported and interpreted, and then policy recommendations are made in line with the findings obtained.

Energy Security in Turkey

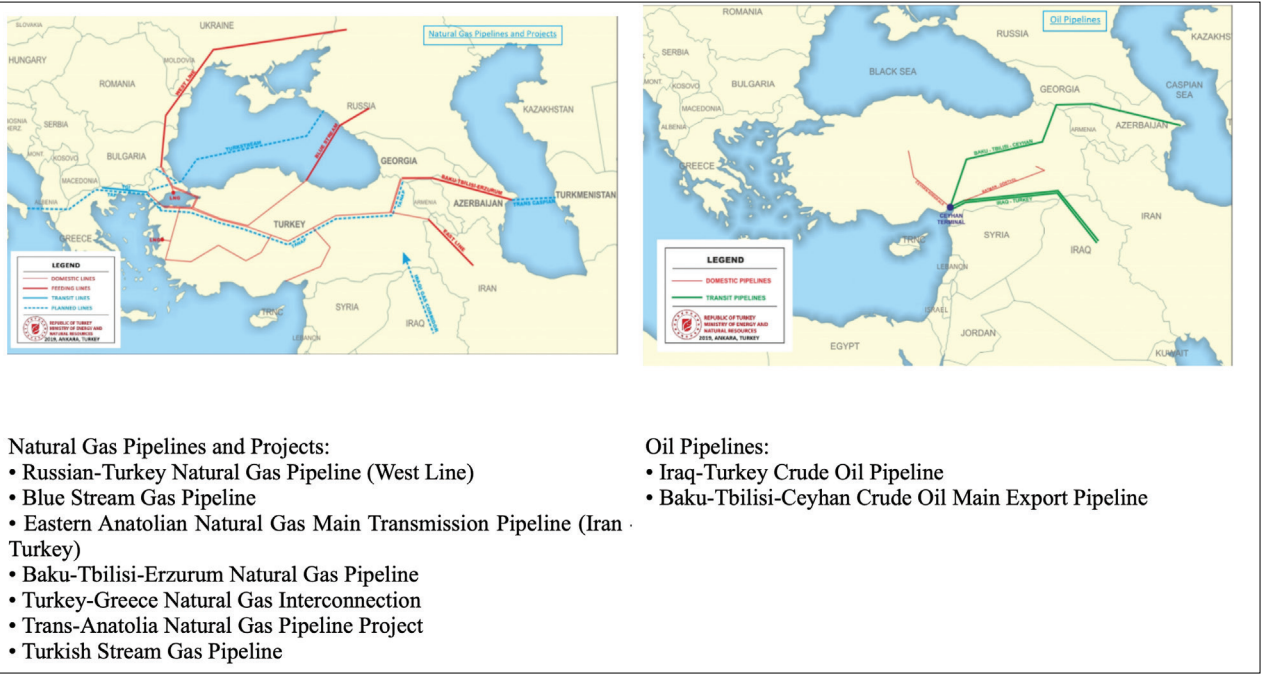
When Turkey's situation in terms of energy security is evaluated, it should first be started with the availability of energy security, which significantly determines the meaning and importance of the other dimensions of the 4A's of energy security. As stated before, the most important energy security dimension that determines the meaning and importance of energy security for countries is availability. In this context, Turkey is not a self-sufficient country in energy but is dependent on external energy suppliers. This demonstrates that Turkey's situation in terms of energy security dimensions should be evaluated according to the points given for the importing countries in Table 1, where the meaning and importance for the countries are given. Accordingly, the degree of dependence on energy imports is one of the most important factors affecting the energy security risk level. According to Trade Map (2021) data, total energy imports for Turkey are $50.7 billion in 2021. While the share of energy imports in the total import share is 18.7%, worldwide this rate is 11.7%. In this context, it can be argued that the share of Turkey's energy imports in total imports is above the world average, increasing Turkey's risk level in terms of this dimension of energy security. The reduction of energy security risks by countries with foreign dependence on energy depends on country diversification. According to Kartal (2022a), occupies Russia 31%, Iran 13%, and Azerbaijan 4% of energy imports in Turkey, while the majority of the remaining imports are made from other Middle Eastern countries. These three countries account for 48% of Turkey's energy imports. Accordingly, Turkey's low country diversification in energy imports constitutes an important energy security risk. The risk of a major energy access problem may arise in possible problems with countries with a high degree of energy dependence, similar to the risk that arose in the bilateral problem with Russia due to Turkey's downing of the Russian warplane. As a result, such situations can significantly affect the accessibility dimension of energy security.

Moreover, Turkey's high dependence on energy and the fact that its energy imports are limited to a few countries arise significant risks in terms of affordability, which is another dimension of energy security. In this direction, it is clear that the effect of the increase in oil and natural gas prices after the Russia-Ukraine War creates a quite important energy security risk. The ongoing consequences of this emerging situation in the Turkish economy have once again demonstrated the importance of the affordability aspect of energy security. The affordability dimension of energy security in the Turkish economy is significantly affected by fluctuations in energy prices as well as by changes in exchange rates. In this direction, it can be argued that both fluctuations in oil prices and increases in exchange rates have adversely affected the Turkish economy in terms of the affordability of energy security. In this context, renewable energy resources are the most important factor that significantly affects both the availability and affordability aspects of energy security for countries with insufficient resources in terms of fossil fuels. In this direction, when looking at the distribution of energy consumption in Turkey according to energy sources, according to BP (2021) data, while primary

energy consumption is 144.39 million tonnes of oil equivalent, renewables energy is 5.374 million tonnes of oil equivalent. According to these data, most of the energy consumption (approximately 97%) comes from fossil fuels. This situation possesses both an important energy security risk for Turkey and offers significant opportunities. In this respect, the most important risk is that resource diversification in terms of energy resources is limited to fossil fuels. Due to the inadequacy of resources in terms of fossil fuels in Turkey, this situation may cause an increase in foreign dependency on energy and may bring risks that may negatively affect the availability and affordability dimensions of energy security. On the other hand, the most important opportunity arising from the quite low level of renewable energy consumption is the existence of the potential to reduce the energy security risk level, thanks to increasing the share of renewable energy in energy consumption. This opportunity stems from the fact that Turkey has not yet reached the limits of its current potential in renewable energy. Moreover, another important contribution to the energy security of an increase in the consumption of renewable energy sources is positive effects on the affordability dimension of energy security, which is becoming increasingly important.

Another important factor that determines the position of Turkey in terms of energy security is the geopolitical position of Turkey, in terms of having important transition points (straits and pipelines). The strategic geographical position of Turkey between producer countries and consumer countries can provide a safe and sustainable route, which contribute to energy security by transporting the neighboring resources to Turkey and world markets through Turkey stably and securely. Turkey's this potential is contained quite significant opportunities for energy security. For example, Turkey has the opportunity to provide energy security of both its own and the countries it mediates in energy trade position by making both countries and crossing route diversification in energy imports. Thus, Turkey can both take great strides toward being a strategic energy corridor and strengthen its position in international political competition. For this purpose, projects based on a win-win relationship and provided mutual benefits are being implemented (Republic of Turkey Ministry of Energy and Natural Resources, n.d.). Some of the pipeline projects implemented for this purpose are demonstrated in Figure 1.

Briefly, some of the factors that increase Turkey's energy security risk are high dependence on imports in energy due to inadequate resources, the fact that resource diversity in energy consumption is limited to fossil fuels, risks arising from both energy price fluctuations and exchange rate fluctuations, low country diversification in energy imports, and finally environmental risks arising from the low share of renewable energy consumption in total energy consumption.



Natural Gas Pipelines and Projects:
- Russian-Turkey Natural Gas Pipeline (West Line)
- Blue Stream Gas Pipeline
- Eastern Anatolian Natural Gas Main Transmission Pipeline (Iran - Turkey)
- Baku-Tbilisi-Erzurum Natural Gas Pipeline
- Turkey-Greece Natural Gas Interconnection
- Trans-Anatolia Natural Gas Pipeline Project
- Turkish Stream Gas Pipeline

Oil Pipelines:
- Iraq-Turkey Crude Oil Pipeline
- Baku-Tbilisi-Ceyhan Crude Oil Main Export Pipeline

Figure 1. Oil and Gas Pipelines in Turkey
Source: Republic of Turkey Ministry of Energy and Natural Resources.

Literature Review

Although, there is a large empirical literature focusing on energy security, most of studies on energy security focus on:

- Focusing on the dimensions of energy security, factors affecting energy security, or the current case of countries (see. Yao & Chang, 2014; Li, Shi & Yao, 2016; Yao, Shi & Andrews-Speed, 2018; Bambawale & Sovacool, 2011; Wang & Zhou, 2017; Song, Zhang & Sun, 2019; Sovacool & Mukherjee, 2011; Zhang, 2011; Kim, Shin & Chung, 2011; Kruyt et al., 2009).
- Focusing on the economic effects of energy security through a few variables such as fuel supply, natural gas consumption, electricity availability, environmental stress (see. Balitskiy, Bilan & Strielkowski, 2014; Nepal & Paija, 2019; Varigonda, 2013; Ahmed et al., 2019; Gasparatos & Gadda, 2009).
- Focusing on the economic effects of energy price shocks, which is only one dimension of energy security (see. Alley, Asekomeh, Mobolaji, & Adeniran, 2014; Bernanke, Gertler, Watson, Sims, & Friedman, 1997; Berument, Ceylan, Dogan, The, & Journal, 2016; Doroodian & Boyd, 2003; Du, Yanan, & Wei, 2010; Elder & Serletis, 2010; Farzanegan & Markwardt, 2009; Ghalayini, 2011; Jiménez-Rodríguez & Sánchez, 2005; Kilian & Park, 2009; Sadorsky, 1999; Tang, Wu, & Zhang, 2010; D. Zhang, 2008).

However, few studies focus on energy security, which means the uninterrupted availability of energy sources at an affordable price and including the entire 4A of energy security, such as access to energy, energy consumption, carbon emissions, renewable energy, energy prices. The first of these studies is the study by Kartal (2018) and Kartal & Öztürk (2020) that was examined the relationship among political instability, energy security, and growth by using data obtained from fifteen Middle Eastern countries between the years 1996 and 2014. As a result of econometric analysis, the author stated that a long-term relationship between the variables was determined. The results from the FMOLS estimator demonstrate that while a 1% increase in energy security risk was decreased GDP per capita by 0.41%, a 1% increase in political stability was increased GDP per capita by 0.25%. In addition, according to the results obtained from the Panel Granger Causality Analysis in this study, there is a bi-directional association between energy security and GDP per capita and, a unidirectional causality relationship from energy security to political stability and from GDP per capita to political stability.

Another study, which focuses on energy security, is by Stavytsk et al. (2018). In this study, an empirical analysis was performed for 29 European countries covering the years 1997-2016 with the help of an index (the New Energy Security Index) created by the authors. According to the findings obtained as a result of the study, it was stated by the authors that the increase in GDP positively correlated with NSI, and negatively with CPI.

Fang et al. (2018) was proposed five dimensions of energy security, which availability, accessibility, affordability, acceptability, and developability, to construct China's Sustainable Energy Security (CSES) evaluation index model. Moreover, in this study, an empirical study of China's energy security is carried out with data from 2005 to 2015 by using this proposed model, and dynamic changing trends are analyzed. Based on the results obtained, the authors argue that availability and develop-ability are the most important weights in China's Sustainable Energy Security index system, where availability demonstrate a general downward trend, and develop-ability presents an inverted U-type trend, with its lowest point in 2011. In addition, the authors state that from 2008 to 2012, China's sustainable energy security had been at risk.

In a study by Le and Nguyen (2019), the relationship between energy security and growth was examined by using ten measures of energy security, which five aspects of energy security including availability, accessibility, affordability, and developability, with a data set covering 74 countries from 2002 to 2013. According to the authors, the results demonstrate that energy security increases economic growth for both all sample countries and sub-samples. In addition, according to the authors, energy insecurity is measured by the variables of energy density and carbon density, which negatively affect economic growth. The findings demonstrate that these three factors are interconnected in the economic development, energy security and climate change mitigation at the global level, so integrated policies should be followed.

Kartal (2022a) examined the relationship between energy security and growth between 1992 and 2016 in the Turkic World countries including Turkey, Azerbaijan, Kazakhstan, Turkmenistan, and Uzbekistan by using the Panel Durbin-Hausman Cointegration Test and the AMG estimator. In this study is concluded that a 1% increase

in energy security risk level in the Turkic World countries reduces the economic growth by approximately 0.95%. According to the results obtained from the AMG estimator for Turkey in the study, a 1% increase in energy security risk level in Turkey reduces the economic growth by approximately 1.98%. Another study conducted by Kartal (2022b) examined the causality relationship between energy security and economic growth for 74 countries from different income groups by using the Kónya (2006) Bootstrap Panel Causality test. In this study, it is determined that there is bidirectional causality for 22 countries, there is no causality for 18 countries, there is unidirectional causality from energy security risk level to GDP for 14 countries and from GDP to energy security risk level for 20 countries. Moreover, according to the results obtained for Turkey, there is unidirectional causality from GDP to energy security risk level. Moreover, the causality relationship between energy security and growth in Turkey between 1980 and 2018 was examined using the Hatemi-J Asymmetric Causality Test by Kartal (2022c). In this study has been determined that there is a uni-directional causality from the increase in the energy security risk level (i.e., positive shocks) to the decrease in GDP (i.e., negative shock).

In this context, when the literature on the subject is evaluated in general, it is seen that there are few studies examining the effects of energy security on economic growth by considering the 4A of energy security and the existing studies examine a narrow period. The countries/regions subject to the analysis are Middle Eastern countries, Europe, Turkic World countries, and China. All three studies involving Turkey use panel data analysis techniques. Therefore, there is no empirical study focusing specifically on Turkey. Moreover, the entire empirical methods used are methods that give symmetrical results for energy security, and there is no study examining the different effects of positive and negative shocks in energy security on economic growth. In addition, existing studies provide evidence that the energy security risk level significantly affects the economic growth of countries.

As a result of the literature review carried out, it is determined that the data regarding the existing studies on the subject are short periods, there is not a study on Turkey, the possible different effects of positive and negative shocks in energy security on economic growth are not taken into account. In this direction, this study aims to eliminate these deficiencies stated in the literature.

Data and Methodology

This manuscript investigates whether the relationship between economic growth and energy security risk level is symmetric or asymmetric in the case of Turkey between 1980 and 2018. For this purpose, empirical analysis is performed by using linear ARDL and non-linear ARDL methods. In the study, the International Energy Security Risk Index (ESRI) published by the Global Energy Institute is used as the energy security risk variable. In measuring energy security, indexes obtained by combining a large amount of data on the dimensions of energy security are frequently used. One of these indexes is the Energy Security Risk Index published by the Global Energy Institute, which is also used in this study. This index consists of 8 main themes and 28 sub-themes containing a large amount of data on the dimensions of energy security[1]. Accordingly, when the variables used in the index are examined, it is seen that the index includes many variables covering all dimensions of energy security. Therefore, the fact that the index contains data on many aspects of energy security provides that can be obtained important information about a country's energy security structure by looking at Energy Security Risk Index. Furthermore, the use of this index as an energy security risk variable in empirical analyzes to energy security can provide to be the subject of empirical analysis of all aspects of energy security. For this reason, this stud is used the International Energy Security Risk Index (ESRI) published by the Global Energy Institute as an energy security risk variable. GDP data, another variable used in the study, was obtained from the Penn World Table (2020). Empirical analysis has been conducted by using natural log transformations of variables. The factor determining the research period of the study is that the ESRI data in the relevant database for Turkey started in 1980 and ended in 2018. Therefore, the empirical analysis covers the period 1980 to 2018.

In the study, while the linear relationship between economic growth and energy security is examined by the Autoregressive Distributed Lag (ARDL) Bound Test approach proposed by Pesaran et al. (2001), the non-linear relationship between the variables is examined with the Non-linear Autoregressive Distributed Lag (NARDL) Bound Test approach, which is an extended version of the ARDL method and proposed by Shin et al. (2014). The significant advantage of the ARDL bound test is that it can be used even if the variables are integrated

[1] For details on Energy Security Risk Index Variables, see Global Energy Institute (2018: 71-75).

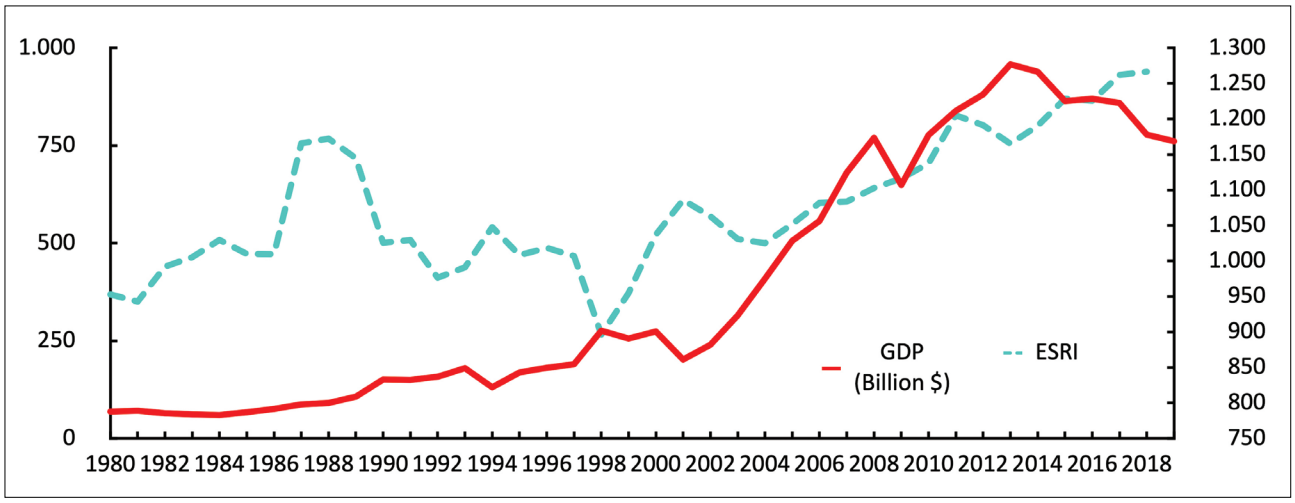


Figure 2. Energy Security Risk Index and GDP in Turkey (1980-2016)
Source: World Bank (2021); Global Energy Institute (2020).

to different degrees, i.e., irrespective of whether the regressors are I(0) or I(1). Thus, significant flexibility is provided in the analysis of the long-term relationship between the variables. On the other hand, many macroeconomic variables are non-linear, as also stated by Shin et al. (2014). Therefore, the NARDL approach, which allows to detection of different effects of negative and positive shocks in the independent variable on the dependent variable, provides an extra contribution according to ARDL. Thus, the obtained results allow different and important inferences for policymakers.

In obtaining ARDL and NARDL methods procedures have been followed methodological representation given by Ullah et al (2021). Accordingly, the linear model for the cointegration relationship between economic growth and energy security is denoted in Eq. (1):

$$\ln gdp_t = \varphi_0 + \varphi_1 \ln esri_t + \varepsilon_t \qquad (1)$$

where lngdp, lnesri, and ε_t represent economic growth, energy security risk index and residual term, respectively. The linear model is given in Eq. (1) is transformed into non-linear model as denoted in Eq. (2):

$$\ln gdp_t = \varphi_0 + \varphi_1 \ln esri_t + \varepsilon_t \qquad (2)$$

where φ_i, $\ln esri_t^+$ and $\ln esri_t^-$ represent long-term coefficients vector, the partial sum of positive changes in lnesri and the partial sum of negative changes in lnesri, respectively. Accordingly, the partial sums of positive and negative changes in lnesri can be also denoted as:

$$\ln esri_t^+ = \sum_{i=1}^{j} \Delta \ln esri_t^+ = \sum_{i=1}^{j} \max(\Delta \ln esri_j, 0) \qquad (3)$$

$$\ln esri_t^- = \sum_{i=1}^{j} \Delta \ln esri_t^- = \sum_{i=1}^{j} \max(\Delta \ln esri_j, 0) \qquad (4)$$

The NARDL model is obtained by rearranging Eq. (2) as recommended by Pesaran et al. (2001) and Shin et al. (2014). Accordingly, the asymmetric ARDL model obtained is denoted in Eq.(5):

$$\Delta \ln gdp_t = \varsigma_0 + \varsigma_1 \ln gdp_{t-1} + \varsigma_2^+ \ln esri_{t-1}^+ + \varsigma_3^- \ln esri_{t-1}^- + \sum_{i=1}^{p} \phi_{1i} \Delta \ln gdp_{t-i} + \sum_{i=0}^{q} \phi_{2i}^+ \Delta \ln esri_{t-i}^+ + \sum_{i=0}^{m} \phi_{3i}^- \Delta \ln esri_{t-i}^- + \varepsilon_t \qquad (5)$$

where p, q, m is represented lag orders. In Equation (5), the long-term positive and negative effects (i.e., φ_1 for positive shocks and φ_2 for negative shocks) in ESRI on GDP given in Equation (2) are denoted to:

$$\varphi_{\ln esri^+} = -\varsigma_2^+ / \varsigma_1 \quad and \quad \varphi_{\ln esri^-} = -\varsigma_3^- / \varsigma_1 \qquad (6)$$

On the other hand, the short-term positive and negative effects in ESRI on GDP are denoted to:

$$\ln esri^+ = \sum_{i=0}^{q} \phi_{2i}^+ \quad \text{and} \quad \ln esri^- = \sum_{i=0}^{q} \phi_{3i}^- \qquad (7)$$

The next part of the study performed empirical application, and the empirical process proceeds as follows: Before performing ARDL and NARDL tests, it is necessary to determine the integration degrees of the variables. Because according to the model specification both ARDL and NARDL, the variables should not be integrated in the second order. In this direction, in the empirical analysis, firstly, the ADF unit root test and the KPSS stationarity test are performed to determine the

integration degrees of the variables. Then, ARDL and NARDL bound tests are performed to investigate the long-term relationship between the variables. Afterward, some diagnostic tests are performed on the validity of the obtained results and the model. Accordingly, it is being tested whether the variables have a normal distribution with the Jarque-Bera normality test; whether there is autocorrelation in the model with the Breusch-Godfrey LM Test; whether there is a problem of heteroskedasticity in the model with the ARCH test; the stability of model specification with the Ramsey Reset Test, CUSUM, and CUSUMSQ tests; and whether long-term and short-term asymmetric relationship hold between variables with Wald Test. Finally, coefficient estimation for both the short-term and the long-term is performed by using the NARDL model.

Empirical Results

Since variables should not be integrated in the second order in both ARDL and NARDL models, the empirical analysis should begin by checking this precondition. Therefore, variables have been analyzed using both the Augmented Dickey–Fuller (ADF) unit-root test and the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) stationarity test. In this context, according to the ADF unit-root test results, while the null hypothesis (variables have a unit-root) cannot be rejected at the level in both the constant model and the constant and trend model (see, Table 2), it is rejected at the first difference (see, Table 3).

On the other hand, according to the KPSS stationarity test results, while the null hypothesis (variables have stationary) is rejected at the level in both the constant model and the constant and trend model (see, Table 2), it cannot be rejected at the first difference (see, Table 3). Therefore, both test results indicate that while variables have a unit root at the level, they are stationary when the first differences of the variables are taken.

Results validate that both variables are I(1), and allow for the application of ARDL and NARDL methodology. Accordingly, the ARDL and NARDL Bound Test results performed are given in Table 4. The model given in Equation 1, which was designed to determine the long-term linear relationship between the variables, has been estimated by the ARDL method. Since the F-statistics value is lower than corresponding the upper and lower bounds, it has been concluded that there is no linear relationship between economic growth and energy security in the long-term.

On the other hand, the model given in Equation 5, which was designed to determine the long-term non-linear relationship between the variables, has been estimated by the non-linear ARDL method. Since the

Table 2. Unit Root Test Results (Level)

Variables		Constant		Constant and Trend	
		ADF	KPSS	ADF	KPSS
lngdp		0.372	3.724***	-1.366	0.660***
lnesri		-1.385	1.964***	-2.192	0.455***
Critical Values	%1:	-3.590	0.718	-4.194	0.212
	%5:	-2.925	0.473	-3.515	0.149
	%10	-2.594	0.353	-3.185	0.122

Note: The optimal lags length has been determined by the max 3 lag and SIC for the ADF unit root tests. Long-term consistent variance estimation method has been determined by Bartlett method for KPSS unit root tests. ***, **, * indicates statistical significance at 1%, 5% and 10%.

Table 3. Unit Root Test Results (First Difference)

Variables		Constant		Constant and Trend	
		ADF	KPSS	ADF	KPSS
Δlngdp		-6.355***	0.145	-6.454***	0.080
Δlnesri		-5.741***	0.066	-5.663***	0.050
Critical Values	%1:	-3.596	0.718	-4.203	0.212
	%5:	-2.927	0.473	-3.519	0.149
	%10:	-2.595	0.353	-3.187	0.122

Note: The optimal lags length has been determined by the max 3 lag and SIC for the ADF unit root tests. Long-term consistent variance estimation method has been determined by Bartlett method for KPSS unit root tests. ***, **, * indicates statistical significance at 1%, 5% and 10%.

Table 4. ARDL and NARDL Cointegration Test Results

Model	F-Stat.	Critical Values						Decision
		1%		5%		10%		
		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	
ARDL (1.0)	1.735	10.150	11.230	7.135	7.980	5.915	6.630	Accepted
NARDL (4.1.4)	9.298***	7.643	9.063	5.457	6.570	4.517	5.480	Rejected

Note: The optimal lag length was determined by the AIC information criterion. ***, **, * indicates statistical significance at 1%, 5% and 10%.

Table 5. Non-linear ARDL Test Results

Variable	Coefficient	Std, Error	t-Statistic	*p*-value
lngdp(-1)	-1.117	0.221	-5.046	0.000
$lnesri^{(+)}_{t-1}$	-0.673	0.284	-2.372	0.027
$lnesri^{(-)}_{t-1}$	1.918	0.421	4.555	0.000
$\Delta lngdp_{t-1}$	0.431	0.189	2.278	0.033
$\Delta lngdp_{t-2}$	0.319	0.182	1.753	0.094
$\Delta lngdp_{t-3}$	0.288	0.165	1.742	0.096
$\Delta lnesri^{(+)}$	-0.003	0.299	-0.012	0.991
$\Delta lnesri^{(-)}$	0.442	0.315	1.404	0.175
$\Delta lnesri^{(-)}_{t-1}$	-0.740	0.452	-1.636	0.117
$\Delta lnesri^{(-)}_{t-2}$	-0.767	0.381	-2.012	0.057
$\Delta lnesri^{(-)}_{t-3}$	-0.776	0.323	-2.407	0.025
c	14.142	2.787	5.075	0.000
trend	0.094	0.018	5.221	0.000
R^2	0.995			
Adj R^2	0.993			
D-W	2.219			
F-statistics	1,215.812			0.000
Jarque-Bera normality	2.101			0.350

Note: The optimal lag length was determined by the AIC information criterion.

F-statistics value is higher than corresponding the upper and lower bounds, it has been concluded that there is a non-linear relationship between economic growth and energy security in the long-term, unlike the linear ARDL model. Accordingly, the non-linear ARDL estimation results are given in Table 5.

Although an asymmetric relationship between economic growth and energy security has been identified in the long-term by using NARDL Bound Test, more evidence is needed to confirm the asymmetries, both in the long-term and the short-term. For this purpose, the Wald test is frequently used in the literature. Accordingly, the results of the Wald test performed in this study are given in Table 6. According to the results obtained, the null hypothesis indicating that there are no asymmetries in both the long-term (at 1% significance level) and the short-term (at 10% significance level) is rejected. Accordingly, it was concluded that the relationship between economic growth and energy security is asymmetric in both the short-term and the long-term.

Some diagnostic check tests have been made for the validity of the results obtained, and the results are given in Table 7. Accordingly, it is concluded that there is no autocorrelation in the model with the Breusch-Godfrey LM Test, there is no problem of heteroskedasticity in the model with the ARCH test, and model specifications are

Table 6. Wald Tests

Null Hypothesis	F-Statistic	*p*-value	Results
No long-term asymmetry	23.904***	0.000	Rejected
No short-term asymmetry	1.741*	0.096	Rejected

Note: ***, **, * indicates statistical significance at 1%, 5% and 10%.

Table 7. Diagnostic Check Tests

Diagnostic tests	χ_1^2	χ_2^2	χ_3^2	χ_4^2
Breusch-Godfrey LM Test	1.504	0.729	1.087	0.821
	(0.234)	(0.496)	(0.380)	(0.530)
ARCH Test	1.775	0.972	0.737	0.733
	(0.192	(0.391)	(0.539)	(0.578)
Ramsey Reset Test	1.663	1.316	0.844	1.436
	(0.112)	(0.292)	(0.488)	(0.265)

Note: Values in parentheses denote probability values.

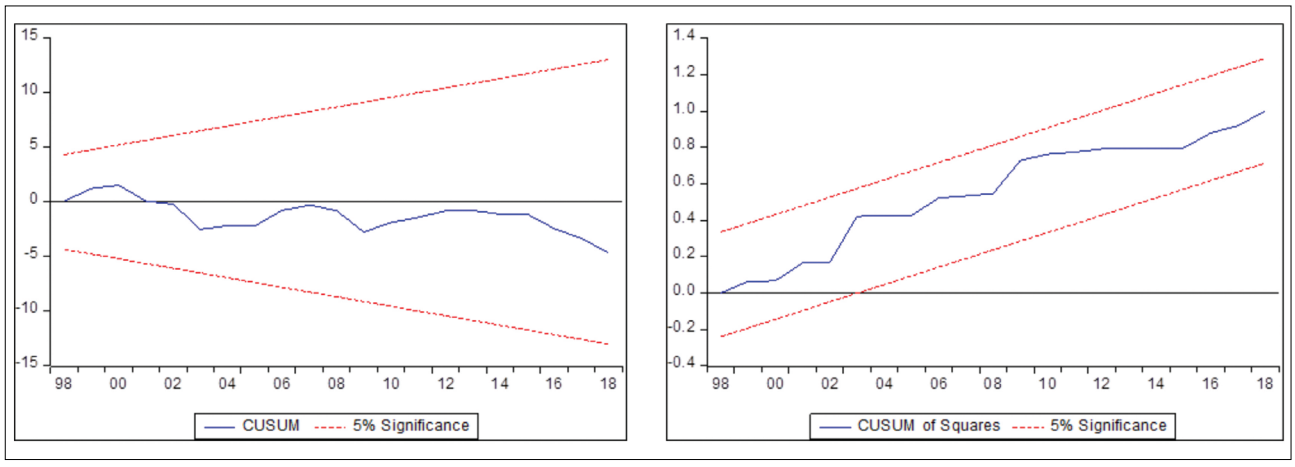


Figure 3. CUSUM and CUSUMSQ

stable with the Ramsey Reset Test. Moreover, according to CUSUM and CUSUMSQ test results given in Figure 3, the model is stable.

After confirming the validity of the results of the model specifications, both the long-term and short-term coefficient results of the NARDL model for Turkey are given in Table 8. According to the long-term NARDL coefficient estimation results, a 1% increase in energy security risk level (that is, a negative situation in energy security) decreases economic growth by approximately 0.60%, while a 1% decrease in energy security circus level (that is, a positive situation in energy security) increases economic growth by approximately 1.72%. In other words, there is an inverse relationship between energy security

Table 8. The Long-term and Short-term Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	*p*-value
$lnesri^{(+)}$	-0.603	0.262	-2.299	0.032
$lnesri^{(-)}$	1.718	0.140	12.264	0.000
$\Delta lnesri^{(+)}$	-0.025	0.300	-0.083	0.935
$\Delta lnesri^{(-)}$	0.175	0.325	0.537	0.596
ECT_{t-1}	-0.764	0.280	-2.728	0.011

risk levels and economic growth in the long-term. Moreover, negative shifts in energy security risk levels have a stronger effect than positive shifts.

According to the results obtained from the short-term analysis, the coefficient of the Error Correction Model (ECT) is negative and significant at the 1% significance level, and the results confirm that the model running. In this direction, while approximately 76.4% of a short-term deviation disappears in a single period, it converges to a long-term equilibrium level in 1.3 periods. Similar to the long-term, there is an inverse relationship between energy security risk levels and economic growth in the short-term. However, the short-term results are statistically insignificant, contrary to the long-term results.

Results and Discussion

This study has examined whether the relationship between economic growth and energy security risk level is symmetric or asymmetric in Turkey between 1980 and 2018 by using linear and non-linear ARDL methods. The findings indicate that the relationship between economic growth and energy security risk level is not symmetric but asymmetric. Accordingly, it has been concluded that a 1% increase in energy security risk levels decreases economic growth by approximately 0.60%. In other words, the factors that increase energy security risk levels in Turkey cause economic contraction. Considering the fact that the dependence of production processes on energy is high in modern economies, it can be argued that the increased risks in terms of access to energy increase the risks in production processes and cause economic contraction with this link. On the other hand, another result obtained from the NARDL test indicates that a 1% decrease in energy security risk level increases economic growth by approximately 1.72%. This result implies that the factors that reduce the energy security risk level also activate economic growth. Considering that energy is one of the most considerable inputs of the modern production process, it can be argued that the reduction of risks in energy security encourages economic growth by arising a series of positive (direct and/or indirect) effects that facilitate the production process. Accordingly, economic growth is affected by both increases and decreases in the level of energy security risk. Moreover, it is quite notable that the effect of a downward shift in energy security risk levels (in other words, increased energy security) on economic growth has a stronger effect than an upward shift in energy security risk levels (in other words, decreased energy security). As a result, reducing the energy security risk level in the Turkish economy will both directly contribute to economic growth and prevent economic contractions risk due to the increase in the energy security risk level. Therefore, it can be argued that ensuring energy security is quite a considerable issue in the Turkish economy, and policymakers should produce policies in this direction. In this context, factors that negatively affect or are likely to affect energy security in Turkey should be determined, and policies should be developed to eliminate these risk factors.

When Turkey is evaluated in terms of energy security risk factors, it is seen that there is a high foreign dependence on energy and, the considerable risks arising from this dependence. These risk factors negatively affect energy security, especially affordability and accessibility dimensions of energy security. Accordingly, while fossil fuels constitute a large part of energy consumption, Russia, Iran, and Azerbaijan have a much place in energy import. In this context, dependence on Russia in energy needs to be re-examined with the recent Russia-Ukraine War by considering Russia's use of energy trump card against EU countries. Moreover, the negative effects of the increase in global energy prices after the start of the war on the affordability dimension of energy security and its reflections on the Turkish economy demonstrate the importance of the affordability dimension for the Turkish economy. Furthermore, the realization of energy imports in foreign currency directly negatively affects affordable access to energy and the current foreign exchange reserves, as in the last currency crisis in Turkey. In this respect, foreign dependence on energy is quite a big risk in terms of both revealing the risk of access to energy in the deterioration of bilateral relations with countries that have a significant share in energy imports and cause to adversely affected by increases in energy price and exchange rate.

The elimination of foreign dependence on energy is possible by either discovering new fossil energy sources within borders or by substituting instead of fossil fuels with alternative energy sources, such as renewable energy sources and nuclear energy. In this context, it can be argued that Turkey's future in energy security lies in renewable energy resources. It should be particularly noted that renewable energy has become more attractive in recent years since unit costs in renewable energy production have decreased considerably in recent years and require quite low fixed costs after installation, and it does not harm the environment with zero carbon emissions. In this context, renewable energy has the potential to positively affect all aspects of the 4A of energy

security in Turkey, and it is also important for sustainable development and growth. Accordingly, renewable energy in Turkey contributes to the dimension of availability in terms of reducing foreign dependence on energy, to the dimension of affordability in terms of protecting it from the negative effects of increases in energy prices and exchange rates, to the dimension of accessibility in terms of protecting it against the negativities of energy cuts caused by problems in energy importing countries and transition countries, and to the dimension of acceptability in terms of being eco-friendly contrary to the polluting effects of fossil fuels. In this direction, the attractiveness of renewable energy investments can be increased by giving significant incentives and some special privileges. Moreover, renewable energy investments may be also performed directly by the government.

With this, one of the most striking factors for Turkey in the context of energy security is that Turkey is in a strategic position with a high potential to be an energy corridor both regionally and globally. If Turkey can effectively use this strategic position, it can minimize the negative impacts of both energy import dependence and fluctuations in energy prices arising from this dependence. Thus, significant support can be provided to two of the policies expressed in three main axes for Turkey's energy security, including dependence on energy imports arising from inadequate in terms of energy resources, risks arising from energy price fluctuations in connection with the dependence on energy imports, and environmental risks arising from the low share of renewable energy consumption in total energy consumption. However, Turkey's becoming a major energy corridor is not what will be accomplished in a short time. For this, strategic steps should be taken by carefully analyzing the international balances. In this sense, it can be argued that while the increase in energy prices after the Russia-Ukraine War damages the affordability dimension of energy security in both Turkey and globally, on the other hand, this war may create considerable opportunities for Turkey. In this direction, when looking at alternative regions to Russia, especially for EU countries, Turkey is at a key point in accessing the energy resources of both the Turkic World countries and the Middle East countries. In this direction, international support, including oil and natural gas exploration activities in the Eastern Mediterranean, can be provided by well using the current conjuncture, and significant energy investments can be accomplished. Thus, Turkey can both ensure its own energy security and become a major global actor in energy. Furthermore, strong historical and cultural ties with the countries of the Turkic World have the potential to significantly support policies to be formed based on energy under common interests. The cooperation to be formed in this direction by bringing together the geopolitical position of Turkey and the energy resources of the Turkic World can reflect positively on the energy security of all stakeholders. In this context, the Organization of Turkic States can play a more considerable role in the realization of important projects in the energy context by also taking advantage of the current conjuncture. Thus, the possibility of the emergence of potential energy security risks can be reduced, and the negative impact on economic growth can be prevented by keeping the energy security risk level at reasonable levels. At the same time, a positive effect on economic growth can be achieved by reducing the energy security risk level, as supported by the empirical results. Finally, the energy-saving and energy efficiency policies in energy security are quite important, especially in countries dependent on imports in energy such as Turkey. Creating national awareness in this direction by looking at energy security from the perspective of national security may significantly support uninterrupted access to affordable energy as compatible with its environmental effects. In this direction, a series of suggestions can be made such as giving practices starting from primary schools for the most optimal use of energy resources, promoting public transportation, widespread use of electric cars, and even encouraging the use of energy-saving LED light bulbs, etc.

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Motivation of Freelance Employees in the Gig Economy in Turkey

Serpil ÇİĞDEM[1]

ABSTRACT

In the current industrial and organizational psychology literature, predominantly salaried, paid, permanent and full-time workers in a given workplace and in a given time period are represented. However, in recent years, it has been observed that new forms of self-employment have emerged on digital labor platforms and their numbers have increased gradually.

This article explores the push/pull motivations for working in the gig economy, drawing on previous research on entrepreneurial motivation, a field associated with self-employment. In this study, mixed method was used as data collection technique. In the quantitative stage of the research, a questionnaire was conducted with 117 people, and in the qualitative stage, semi-structured interviews were conducted with 12 people. Survey data in the SPSS 20.0 program, qualitative data were analyzed descriptively. As a result, it was understood that the most prominent motivation factors of freelancers are independence, success motivation and flexibility. The gig economy offers workers the opportunity to work flexibly by allowing them to organize their own work schedules and control their labor processes, as opposed to optimistic portrayals of a flexible economy. In addition, it is seen that freelancers feel free from friendship relations and feel excluded and isolated from other people.

Keywords: Gig Economy, Motivation, Freelance Work.

JEL Classification Codes: L14; L86; L26

INTRODUCTION

While most of the research published in the industrial and organizational psychology literature consists of paid, salaried, core workforce, highly educated, highly skilled, professional workers and managers (Dobre, 2013; Ramlall, 2004), with the rise of the gig economy in recent years (De stefano, 2015), it is seen that publications on alternative work arrangements have started to take place in the literature.

In the last decade of the 20th century, alternative, non-traditional, contract, freelance, conditional, single-use, temporary, non-standard and telework have become increasingly common. Standard workers who go to the location of a company at certain hours with long career prospects are added to many non-standard workers who accept different jobs, connect to companies differently and make careers with a different appearance (Gonnelly and Gallagher, 2004). Labour markets are undergoing a dramatic transformation, with temporary jobs mediated by online platforms replacing standard employment (Kässi and Lehdonvirta, 2018). As the world of work changes, so do theories. Because existing theories run the risk of becoming much less practical as the world of work changes. Barley (2016) states that today bureaucracies are decreasing and organizations are transforming into new forms, and these new forms are not suitable to be explained with old theories. Thus, while traditional theories are successful in understanding average general levels of employee motivation and interpersonal changes in different contexts, they fail to provide sufficient explanation for understanding the motivation process and change in a single individual. In the organizational context, it focuses on the behaviors that are at the center of the task of organizing (Ashford, Caza and Raid, 2018). Because psychological work experience theories have been developed by considering them in a different period. Many of them are based on the experience of traditional 1950s employees who travel to where their companies are located on a daily basis to fully meet their expectations to pursue a career at a specific time each day. However, an important working class of today is not included in this way of working (Ashford, George and Blatt, 2007). To develop individual-centered motivation theories in the gig economy, it is necessary to correctly analyze individual behaviors and experiences by explaining the structural conditions of such studies.

According to the English dictionary, freelancer is defined as a person who does not work for a fixed employer. Freelance work is accepted as a self-employed form (Fudge, 2003). This article focusing on the motivational factors of freelancers in the gig economy draws on previous research (see: Callahan, Shumpert and Mast, 2002; Sapienza, Korsgaard and Forbes, 2003; Burke, 2011;

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Burtch, Garnahan and Greenwood, 2018; Clinton, Totterdell and Wood, 2006), a field associated with self-employment. Although the types of self-employment vary (Pedersini and Coletti, 2009), certain self-employment groups and specifically defined perspectives are positioned within the entrepreneurship paradigm (Szaban, 2018; Ohlsson, 2004; Parker, 2004). There is also an entrepreneurship literature where self-employed are not classified as workers, but rather as owner managers who are not employed because they are self-employed (Burke, 2011: 2; Bögenhold, Klinglmair and Kandutsch, 2017). It can take many forms from self-employed entrepreneurs and "one-person" business owners to consultants and contractors in industries. New technology is changing the nature of work in many industries, fueling the growth of the gig economy. The distinctive features of the gig economy are that there are many different ways of working and business models in the gig economy. What most have in common is that they rely on intermediary digital platforms or apps to connect the self-employed with the business. Gig economy companies often operate in industries that have historically been based on self-employed entrepreneurial workforces (Abraham, Haltiwanger, Sandusky and Spletzer, 2019; House of Commons Work and Pensions Committee, 2016).

The gig economy includes both jobs that are traded via platforms but delivered locally and therefore require the employee to be physically at the place where the job is performed, as well as jobs that are processed and delivered remotely via platforms. Local gig jobs include food delivery, courier, shipping and manual labor. In contrast, in remote gig work, the freelancer and the employer usually contract for a short-term job through digital platforms such as Amazon Mechanical Turk (MTurk), Fiverr, Freelancer.com, and Upwork. These jobs consist of the remote provision of a wide variety of digital services, from data entry to software programming. (Huws, Spencer and Joyce, 2016; Lepanjuuri et al., 2018). In Turkey, there are also very successful local examples: For example, people can find many independent painters, repairmen, cleaners, plumbers, etc. on Armut.com. In addition to independent sellers who make a difference to large e-commerce companies by selling on GittiGidiyor, we should not forget the independent graphic designers who do business on Idemama.com. Bionluk.com is a community-driven libertarian work platform where talented freelancers meet with businesses and startups that suit them. All this is a strong economy of freelancers (Ahi, 2016). Freelance employees come together through various platforms and create a culture of solidarity among themselves. "Dünyada Mekan" is a solidarity space for white-collar freelancers in our country (https://dunyadamekan.wordpress.com/).

In entrepreneurship literature, freelancers are often categorized as a small, underperforming version of the entrepreneurial self-employed because in the modern dynamic economy, forms of work such as portfolio work, temporary and conditional employment contracts, self-employment and outsourcing are closely related to freelance work (For example, see Handy (1984) but they tend to appear miniature in research (Üçbaşaran et al., 2001; Zahra, 2007 and Welter, 2011).

Typically, low-skilled freelancers are pushed into self-employment. It would not be wrong to say that they are forced into entrepreneurship under bad conditions. On the other hand, entrepreneurial opportunities for skilled workers are attractive and people are pulled to entrepreneurship (Mkubukeli and Cronje, 2018). While one group of researchers explains that people are forced into the gig economy due to unemployment or their inability to find suitable jobs for their qualifications (Dawson, Henley and Latreille, 2009; Nies and Pedersini, 2003), the other group argues that this is not true. Entrepreneurship is particularly attractive to the younger generation. Entrepreneurship is highly advantageous for individuals who value flexibility, entrepreneurship and control over the business (CIPD, 2017).

The research problem that forms the basis of this study explores which motivational factors are the most distinguishing for freelancers to work in the gig economy. Research on freelancing in the literature is usually based on a case study methodology in which semi-structured interviews with freelance employees are made (Karsson and Wranne, 2019). But in this article, mixed method research design was used as a data collection technique. It is aimed to provide a deeper and holistic perspective on the research question by using qualitative and quantitative techniques together (Baki and Gökçek, 2012: 2; Sandelowski, 2000: 246). This method has been chosen considering that only quantitative and qualitative methods will not be sufficient to reveal the professional reality of freelance work in Turkey. This method provides an opportunity to verify that the results are consistent by comparing the findings from both different methods. It provides the opportunity to see the illuminating aspect of both approaches by using qualitative and quantitative research methods (Bryman, 20: 9).

The article includes the findings of a survey conducted from online platforms with 117 freelancers working in the gig economy and the findings of face-to-face interviews with 12 freelancers. In the quantitative phase, the characteristics of freelancers and the most prominent motivational factors that attract/push to work in the gig economy were investigated. At the qualitative stage, semi-structured interviews were conducted with freelancers and their motivational experiences for working in the gig economy were analyzed in depth. Because self-employment is considered type of self-employment, previous research on the closely related field of entrepreneurial motivation contributed to the study.

As a result, it is understood that the most prominent motivation factors of freelance workers are freedom, success motivation and flexibility. On the other hand, it has been observed that working in isolation at home isolates the individual.

Table 1. Structural Dimensions of Difference

	Traditional Work	Gig Work
Financial instability and Job Insecurity	Low	High
Autonomy	Low	High
Uncertainty in Career Processes	Low	High
Work Transitions	Low	High
Physical Division and Relational Challenges	Low	High

Source: Ashford, S. J., Caza, B. B. and Reid, E. M. (2018). From surviving to thriving in the gig economy: A Research Agenda for Individuals in the New World of Work. *Research in Organizational Behavior*, *38*, p.27

CONCEPTUAL FRAMEWORK

The nature of work is changing. Today, as technology and automation eliminate or change many jobs, the labor market is transforming in parallel (Worldbank, 2018). The recent rise of the gig economy has created a series of opportunities for freelancers to find short-term jobs, which they define as gigs, and for employers to find workers on demand (Kuhn, 2016). However, Spreitzer et al. (2017: 480) state that we should not expect temporary jobs in the gig economy to be experienced like other contract jobs.

The gig economy is a model that enables money exchange between freelancer and companies through digital labour platforms that facilitate the effective use of short-term and task-based payment method between service providers and customers. In the gig economy, freelancer serve multiple clients at varying hours from their home or co-working spaces, rather than working full-time in a single employer's workplace (Kuhn, 2016).

The psychological experience of the work and the life experience of individuals are shaped differently in the gig economy. Ashford, Caza, and Reid (2018) discuss these structural differences from five angles. The first of these is the issue of financial instability and job insecurity. The second structural difference was handled on the basis of freedom and autonomy. Then, the differences in career processes were examined and the issue of job transitions and physical division/relational difficulties was discussed.

These five structural characteristics reflect the ultimate and important vital reality for gig economy workers as well. The issue of financial instability and job insecurity for workers in the gig economy already stems from the nature of freelancing (see: Burchell, Ladipo and Wilkinson, 2002). Because, in the nature of a typical freelance work, there are jobs that are carried out in discontinuous and intermittent periods instead of permanent and continuous jobs (Burke et al. 2008). The defining feature of freelance work is short-term contracts for which the employer is not responsible (Burke, 2011). Therefore, this is the most important feature of self-employment.

One of the other structural differences is the approach to the concepts of freedom and autonomy. In the studies reviewed in the literature, concepts such as autonomy, independence, control over working conditions, and being your own boss are frequently used in defining freelance work (Stanworth and Stanworth, 1995; Clinton, Totterdell and Wood, 2006). On the other hand, in studies based on precariousness approach, it is emphasized that autonomy is only a showpiece, portfolio employees feel obliged to work in line with the instructions of customers / employers (Stanworth and Stanworth, 1995). In the study conducted by Hunter (2015), all freelance journalists have a similar view on autonomy and state that they do not have full autonomy in business processes. In addition, freelance journalists have stated that they will have to adjust or change their reports in any way when they have a special instruction from the funders.

There is no guarantee of long-term employment in a single organization in the gig economy. It is often based on short-term contracts which guarantee employment in temporary jobs or project-based but leave future jobs and relationships uncertain. Instead of being dependent on a particular employer, workers work for a variety of clients. There is a transition and mobility between jobs (Broughton et al., 2018).

While the gig economy enables a system that allows people to earn money from various interests (Lepanjuuri et al., 2018), it is also the source of the birth of a self-directed workforce (Arthur 1994). While working in multiple jobs becomes the "new normal" (Waldorf, 2016), many gig workers have multiple job identities rather than focusing on a single job or role.

And also; The transition from organizational work to gig work begins with an anxious period. Because career success needs to be redefined with the transition to portfolio career. Since all the different jobs done for different employers in the portfolio career add success to one's career, it is necessary to develop professional networks and to create a safety net that will provide financial support (Clinton, Peter and Wood, 2006). Because during the portfolio career process, individuals work independently from an employer (Mallon, 1998), undertake different tasks and do jobs for different customers (Handy, 1994). Gig employees have to create a business activity portfolio for themselves and transfer their skills and knowledge to various individuals and organizations (Platman, 2004).

Finally, doing the job alone in the gig economy and working separately from those who work in this way physically cause the gig workers to feel like strangers (Kunda et al., 2002). As a workforce that is decentralized, lacking in regular human relations, and without permanent employment, gig economy workers experience a psychological experience in stark contrast to the optimistic portrayals of a resilient economy that empowers them to control their own destinies. They seem to suffer compared to traditional workers. Gig workers feel unfriendly, excluded, and isolated from other people (Glavin, Bierman and Schieman, 2019).

LITERATURE REVIEW

Entrepreneurial motivations are often defined as fitting into "push" or "pull" categories (Dawson and Henley, 2012, Amit and Muller, 1995, Ojiaku, Nkamnebe & Nwaizugbo,2018). Push motivation is based on the individual's choice by being forced or pushed due to the surrounding conditions. The pull motivation model focuses on the motivation sources that arise from the person's environment and attract the person (Kirkwood, 2009). The pull side of the theory of motivation will attract and encourage entrepreneurial activity. Push motivation refers to the internal aspects and emotional characteristics of the individual. Pull motivation is related to external factors arising from the subjective perception of the situation (Nosková and Peráček, 2019).

The individual motivation plays a key role in recognizing and creating an opportunity. However, the expectations of individuals are the most important factor that determines the entrepreneurial motivation factors (Prokopenko et.all, 2020). When we examine the literature on entrepreneurial motivation, firstly, the desire for independence is cited as the number one motivating factor for most people to become an entrepreneur. Especially desire for independence is primarily classified as a pull factor (Hughes, 2003; Eijdenberg and Masurel, 2013; Shane, Locke and Collins, 2003; Naffziger, Hornsby and Kuratko,1994; Marlow, 1997; Stephan, hard and Drews, 2015). . Entrepreneurial tendencies of individuals with motivation to be successful can be high. The need for achievement expresses a strong desire to do things better (Prokopenko et all, 2020). The literature particularly emphasizes the importance of internal control. That is, believing in one's actions means giving less importance to chance. Entrepreneurs believe that their actions will have an impact on the final result (Gerry, Dan, Jerry, 2005).

Few studies have asked why individuals choose to be self-employed. The results of the research are based on the findings that individuals prefer self-employment voluntarily for reasons such as independence, job satisfaction and/or higher income expectation, and are pushed to be self-employed because there is no other attractive profession. The motivations behind the decision to become self-employed largely provide the opportunity to explore entrepreneurial opportunities.

The pull motivation factors in the studies on entrepreneurship motivation in the literature are shown in table1.

Tablo 1: Pull Factors of Entrepreneurial Motivation

Drews, C., Stephan, U., Hart, M., & Mickiewicz, T. (2015). Understanding Motivations for Entrepreneurship: A Review of Recent Research Evidence (No. 212). Department for Business Innovation & Skills	• Achievement, challenge & learning • Independence & autonomy • Income security & financial success • Recognition & status • Family & Roles • Dissatisfaction • Community & social motivations
Shane, S., Locke, E. A., & Collins, C. J. (2003). Entrepreneurial motivation. Human Resource Management Review, 13(2), 257–279	• Need for achievement, I • locus of control • Desire for indepence • egoistic passion • Drive • Goal Setting • self-efficacy
Gódány, Z., Machová, R., Mura, L., & Zsigmond, T. (2021). Entrepreneurship motivation in the 21st century in terms of pull and push factors. *TEM J. Technol. Educ. Manag. Inform*, *10*, 334-342.	Greatest motivation factor is; • the desire for independence, • self-realization and, • utilization of own skills and abilities
Krueger, N.F., Reilly, M.D., and Carsrud, A.L. (2000), Competing models of entrepreneurial intentions. Journal of Business Venturing 15: 411-432.	• Self-expression, • Independence, • Status or material advantage.

A Canadian survey shows that the majority of individuals prefer self-employment with the desire to work independently. Only a small minority have turned to self-employment due to barriers in the labor market. According to the Canadian Statistical Institute's 1995 Employment Regulations Survey (Statistics Canada, 1997: 35–6) which asked respondents 'the main reason' for self-employment the top three reasons for turning to work were the desire for independence (41.8% of answers), involvement in a family business (17.1% of answers), and lack of other suitable jobs (12.0%).

They conducted a study aimed at determining what are the most distinguishing motivational factors to work in the gig economy in the IT and Business consulting industry. The study shows that the most prominent motivational factors driving work in the gig economy are independence and development. And also; it has been found that monetary rewards are not motivating in themselves, but are a necessity for working. Motivational factors seem to arise from intrinsic motivations such as high need for achievement, desire for independence, internal locus of control and high self-efficacy (Karlsson and Wranne, 2019).

According to the findings obtained from the result of the survey conducted with 300 freelance journalists in Turkey by Çiğdem (2020:219) with 300 freelance journalists in Turkey, more than half of the participants state that they prefer to work freelance because it provides freedom and autonomy. Especially, 61% of them emphasize the entrepreneurial features and emphasized that freelancing provides the opportunity to turn opportunities into money.

The concept of freelance, by its nature, becomes widespread in parallel with the development of the idea of "enterprise". In fact, comments on the 'status' of freelance work are the product of social and individual comments (Cohen and Mallon, 1999:330). The increase in the tendency to evaluate the concepts such as "entrepreneurship" or "entrepreneurship" is accepted as a direct result of the dominance of contemporary discourse (Du Gay, Salaman and Rees, 1996: 268). Thus, while 'portfolio work' has positive connotations, 'temporary' is full of negative connotations. Therefore, comments on new work statuses such as 'freelance' also carry aspects of social identity (Storey, Salaman and Platman, 2005: 1034).

On the other hand, according to the 'push' hypothesis, the expected returns from entrepreneurship become more attractive as rising unemployment levels reduce the probability of finding paid employment and push people to become self-employed. As a matter of fact, self-employment can be seen as a kind of informal employment activity in many developing economies (Dawson, Henley and Latreille, 2009: 1).

Another literature in economics focuses on the importance of demographic factors in the background of self-employment decision. For example, the study by Rees and Shah (1986) deals with whether the preference for freelance work is affected by the expected income difference between self-employment and employment. The article reveals that earnings have a positive effect on employees' choices towards self-employment. At the same time, it is seen that the variables of education and age are the determining factors in the choice of self-employment (Rees and Shah, 1986:95).

However, almost all cross-sectional studies reveal that positive factors are of paramount importance in self-employment motivation. Dawson, Henley, and Latreille (2009:28) found little direct evidence for 'forced' entrepreneurship in their research; The vast majority choose to freelance for positive reasons.

Research reveals that more skilled workers with higher levels of social capital are able to leverage entrepreneurial skills to create voluntary and desirable work arrangements (Spreitzer et al., 2017). On the other hand, we see that low-skilled workers are pushed into temporary work arrangements due to economic conditions or the inability to find a full-time job (Keith, Harms and Tay, 2019: 289).

I find these studies useful to understand the motivations of individuals to participate in the gig economy. Burke et al. (2008) state that typical self-employment jobs consist of discontinuous short-term rather than permanent jobs. This model also reflects the contingent nature of freelancing.

In recent years, new flexible working forms, under the guise of "entrepreneurship", have been embellished with the concepts of autonomy and freedom, making them attractive. Freelancing is one of them. In the studies examined in the literature, it is seen that concepts such as autonomy, independence, and control over working conditions are frequently emphasized as the factors that attract the individual to freelance work, while in some studies it is stated that the factor that pushes the individual to freelance work is unemployment (Mallon, 1998; Cohen and Mallon, 1999; Stanworth and Stanworth, 1995; Clinton, Totterdell and Wood, 2006).

METHODOLOGY

Research Questions and Method

This article seeks answers to the following research question:

What are motivation factors that push/pull freelancers to work in the gig economy?

The research is built on previous research on entrepreneurial motivation, a field closely related to self-employment. Since entrepreneurs and freelancers are seen as a form of self-employment, push and pull motivation factors serve as a model for understanding freelance work motivation factors.

Sequential explanatory mixed method design

was used as data collection technique in the study (Ivankova, Creswell and Stick, 2006). This method was choosen because it is considered that only the quantitative and qualitative methods are not enough to analyze the motivational factors and processes of gig economy employees in Turkey. This method provides the opportunity to verify the consistency of the results by comparing the findings of both different methods (Leech and Onwuegbuzie, 2009). In the quantitative stage, a situation analysis was made and a general data was obtained about the status of gig employees. In the qualitative phase to be carried out afterwards, interviews were conducted with semi-structured questions that give the participants the freedom to express their views and experiences. Qualitative data were collected to reproduce quantitative data and to obtain richer data within the framework of the findings obtained at the quantitative stage**.**

Quantitative Data Stage

Survey method was used to collect data in the quantitative phase of the study. During the preparation of the questionnaire questions to be used for data collection within the scope of the research, the literature on gig economy and entrepreneurial motivation was examined in depth. At the same time, the data obtained by the author from previous studies on gig economy were re-analyzed, compiling the responses of the participants on motivation and contributing to the preparation of the questionnaire.

Since it was not possible to determine the main mass, the "Snowball Sampling" method, one of the unlikely sampling methods, was preferred to reach gig workers. Snowball Sampling is one of the frequently used methods when it is not possible to determine the main mass (Fellegi, 2010). The people interviewed with the snowball sampling became the source person for the next interviews (Yazıcıoğlu and Erdoğan, 2004). The snowball sampling method is extensively used where a population is unknown. It also helps to enter environments where it is difficult for conventional approaches to be successful (Atkinson and Flint, 2001:2). Snowball sampling is useful, especially when a frame is not available or impossible to create. For example; when a research is desired on drug users in a region, it is not possible to find a list of drug users in that region. In this method, the sampling process starts with the random selection of an individual in the defined population. This determined individual is the first unit included in the sampling. It is investigated whether there is an individual that is known in the same universe definition as that individual. If available, that individual is reached. Thus, the second unit to be included in the sample is determined. This process is continued until an arbitrarily determined large sample is created (Özmen et all, 2019:16).

Snowball sampling method does not aim to generalize the results obtained from a particular sample to the population (Griffiths et al., 1993:16199). It is an appropriate approach for scattered and small groups (Ritchie, Lewis and Elam, 2006).

I explore two distinctions that may be helpful when examining workers in the gig economy: viewing gig work as one's primary income (or not) and viewing gig work as a job (or not). Such distinctions highlight the heterogeneous nature of the gig economy and can guide future theory and research on the gig economy.

With the snowball sampling method, new participants were reached through their acquaintances or their network. Various communities established for freelancers on social networks such as Linkedin, Facebook, Instagram, etc. were followed, suitable people were examined and a questionnaire sample was sent to these people by contacting them. And also; A questionnaire link was also sent to the people contacted through the "Ofissizler Platform" established for freelance employees. Survey questions were turned into an online survey via google form and the prepared questionnaire was sent via e-mail.

Table 2: Characteristics of Participants

Code	Task	Interview Time	Gender / Age
G1	Web Designer	02/03/2020	Male / 37
G2	Project Manager	02/03/2020	Men / 21
G3	Author	27/02/2020	Male / 41
G4	Advisor	25/02/2020	Women / 38
G5	Graphicer	19/02/2020	Male / 19
G6	Journalist	19/02/2020	Male / 25
G7	Translator	15/02/2020	Women / 36
G8	Software programmer	15/02/2020	Male / 26
G9	Photographer	15/02/2020	Male / 29
G10	Editor	07/02/2020	Women / 32
G11	Life Coach	07/02/2020	Women / 39
G12	Journalist	19/01/2020	Women/28

The survey process started in November 2019 and ended in March 2020. The collection of data with the survey was completed in 5 months. Questionnaires were applied to 117 people. SPSS package program was used in the analysis of the data obtained and the data were analyzed with frequency and percentage techniques.

Qualitative Data Stage

The interviewed participants consist of people working freelance in various fields in the gig economy. In the interviews, a semi-structured interview approach was used in order to obtain sufficient data. The interview questions were formed based on the data obtained from the literature review and the quantitative phase. At the same time, the interviewees were given the opportunity to talk freely about their experience and thoughts. Some of the interviews that took place under favorable conditions were recorded to facilitate future analysis.

Descriptive analysis method was used to analyze the 12 interviews conducted by the researcher. In order to make the data set more visual, a framework for data analysis based on the research questions and the conceptual framework of the research was created. According to this framework, it was determined under themes which the data would be organized and presented. Each interview was read many times and the data were used as an excerpt under previously determined themes (Yıldırım and Şimşek, 2013). The data were coded conceptually, taking into account the themes created before the interviews. Then, themes based on the common points between the concepts were determined. The codes under the determined themes are explained and interpreted in relation to each other. In order to reveal the original thoughts of the participants on the subject, direct quotations were included.

FINDINGS

This section includes data collection tools and quantitative and qualitative research results of data obtained from data sources.

Quantitative Findings

In the quantitative stage, a situation analysis of the demographic characteristics and motivation factors of gig employees was made.

Demographic Features

The survey process was completed successfully with 117 participants. 53.8% of the participants are women and 46.2% are men. 82% of them are between the ages of 18-35, while 15.4% are between the ages of 36-45. The rate of participants over the age of 45 is 2.6%. 43.6% of the participants have a bachelor's degree, 40% have an associate degree, and 5.1% have a graduate degree. 11.3% of them have high school and below education level. 76.9% of them are single, 23.1% are married.

Freelance Employment Situations

While 84.6% of the participants define themselves as freelancers, 3.7% do not see them as freelancers. 11.7% of them partially accept that they are freelancers. While 83.8% of the participants use digital labor platforms to find gig jobs, 16.2% stated that they do not use digital labor platforms. Bionluk.com is the most preferred platform among digital labor platforms (33.3%). In second place, freelancer.com is the most used platform with 29.6%. Participants can find jobs using different labor platforms at the same time**.** While 42% of the participants are engaged in graphic design, 17% are freelance photographers those who work as translators also have a ratio of 11%. While 33.3% of freelancers have been in the gig economy for less than 12 months, the rate of those working for 1-3 years is 43.6%. The rate of those who have 10 years or more freelance experience is low at 7.7%. Participants were asked where they work. 61.5% of the participants answered this question as "at home". While 15% marked the option where the job required, 12.8% stated that they worked in a cafe. Gig jobs can be done online or offline.

Motivation Situations

First of all, 79.5% of the respondents stated that they were happy at working freelance, while 20.5% were indecisive. This result is consistent with the question of whether working in the gig economy is a choice or a necessity. Because it was determined that 74.4% of the participants voluntarily preferred to work gig, while 5.1% were found to work freelance out of necessity. 20.5% of them were undecided.

Participants were asked a question to measure what their motivation to enter the gig economy was. In this question, they were asked to mark the 3 strongest options among the reasons for preferring gig work. According to the answers given by the participants; Freedom (56.4%), flexible working program (51.3%), desire to learn and develop continuously (56.4%), motivation to be successful (38.2) factors have a significant share in the motivation to enter the gig economy. While it is understood that the high-income factor does not have a large share in entering the gig economy, it has been observed that unemployment, which is one of the driving motivation factors, has a very small effect. It was determined that attractive motivation factors rather than driving factors played an active role in the entry of the participants to the gig economy.

And also; participants were asked the question, "Do you really feel independent when doing gig jobs?". While 82.4% of the participants answered yes to this question, 14.7% stated that they were undecided. To the question of "would you quit freelance work if you found a permanent job", 60% of the participants answered no, 28.6% maybe. 11.4% stated that they would leave.

Finally, the participants were asked what their emotional and psychological difficulties they faced while working in the gig economy were. 30% of the participants stated that there is a lack of social interaction and the feeling of loneliness it creates. One of the difficulties faced by gig workers is uncertainty and the related feeling of stress (29.4%). Insecurity (26.5%) and the need for financial support (23%) are also the difficulties that the participants frequently experience.

Qualitative Findings

In this section, the data obtained from the interviews were analyzed with the descriptive analysis technique.

İlk önce görüşmelerden kaydedilen veriler yazıya döküldü. Görüşme kaydedilmemişse, görüşme ile eş zamanlı olarak notlar alınmış ve görüşmeden hemen sonra notlar genişletilmiştir. Analiz, araştırmacının transkriptleri veya notları bağımsız olarak ve tekrar tekrar okumasıyla ve eşzamanlı olarak notlar alarak ve ilginç kelimeleri veya cümleleri vurgulayarak başladı. Veriler bundan böyle birlikte analiz edildi. Bundan sonra veriler, verilerin farklı kategorilere ayrıldığı tematik bir yaklaşım kullanılarak birlikte analiz edildi. Kategoriler analizle eşzamanlı ve tümevarımsal olarak üretildi, toplanan verilerden kategorilerin ve temaların ortaya çıkmasına izin verilirken, literatür taramasında tartışılan motivasyon faktörleri de göz önünde bulunduruldu. Her kategori için ilgi çekici alıntılar, sonuçların çıkarılmasını ve doğrulanmasını kolaylaştıran ayrı bir tabloda toplandı. Bu temalar, analizin yapılandırılmasına yardımcı oldu. Analizin tümdengelim unsuru, literatür taramasında sunulan faktörleri inceleyen önceki araştırmalardan ilham alınarak gerçekleştirilmiştir. Ayrıca, dürüst ve doğru konuşma teşviklerini artırmak için görüşmecilerin anonimliği sağlanmıştır.

They are discussed under two subtitles as push and pull motivation factors.

Pull Motivation Factors

The reasons for freelancing of the interviewees are explained mainly under the titles of autonomy and flexibility, desire for success and self-development, relationships with financial freedom, and networking.

Indepence and Flexibility

The gig economy, in particular, provides flexibility to workers, giving them freedom in how to spend every hour and minute of the day. The gig workers interviewed were asked why they made this choice and to what extent it was a voluntary choice. In the interviews, all participants, without exception, emphasized the importance of independent work and frequently referred to the concepts of flexibility and freedom. It is in line with the entrepreneurial values and behaviors explained on entrepreneurial motivation by Shane, Locle and Collins (2003:270). For them, independence entails taking responsibility for using one's own judgment rather than blindly following the claims of others. It also includes taking responsibility for one's own life rather than living on the efforts of others.

From the aspect of independence for interviewed gig workers; It is emphasized that the free and active lifestyle is adopted in business life and there is no obligation to wake up early in the morning and go to work, and one can decide which job, when, how and where to do it and the wage rate. Although the interviewees underline the concepts of flexibility and indepence, they express this in different ways. While some interviewees (G6, G8, G11) underline that they do not have to do the job they do not want to do and that they choose the projects they will do, some (G1, G3G, G4) say that they set their working time and hours according to their own preferences. Some state that their decisions are effective in the whole process (G9, G12, G7). The statement made by one of the interviewees for independence summarizes all opinions:

> *G9: "We can say that freelance work is a way of life for me. I don't see this as working. It is a part of my life and I manage it the way I want it. I do the job with love, not because I feel obliged. Because I manage the business and I work when I want, I don't work when I don't. This is more important than anything else. Even than money."*

One of the potential benefits of self-employment is being the boss of your own business. This offers individuals the opportunity to work independently. In corporate organizations, what job the worker will do, where, how and when he will do it depend on the instructions of certain managers. However, self-employment offers opportunities for individuals to create and organize their own study program and to set their own agendas. The work schedule is organized according to the decisions of the employees and the demands of the customers. The worker does not have to accept a job that he does not like if his conditions are suitable (Conen et al., 2016).

Often, freedom is cited as a reason to work in the gig economy. Because this is the main determinant of how the work is experienced. The interviewees consider themselves responsible for the eventual success or failure of all jobs and careers. Taking an active role in the entire process, from design to delivery, can create a sense of ownership.

On the other hand, being independent and autonomous does not always reflect a real situation. It appears that most gig employees have a dependent employment relationship that is hidden or misclassified. In the interviews, it was understood that some of the participants work more independently than many, but the fact that the majority of them are free and autonomous is merely an illusion. Depending on the circumstances, the instructions of customers/employers can have a significant impact on the business processes of gig employees. At the same time, although the participants indicate that they are not controlled by a manager, it is possible to create a digital control

mechanism for high-level monitoring and measurement of the work performed on digital platforms thanks to the many features of ICTs.

The interviewees stated that freelancing offers a free working environment in many ways, but they could not bypass the customer's demands and special instructions. (G7) explained the reason for this as," …. *Because they evaluate and score me in return for my work. This affects my next customer portfolio"*. And (G12) stated that, *"We are scored by the client after completing the job. This is important for us. Because if it makes a negative score, it decreases my probability of getting work on the platforms. That's why the customer's wishes are very important."*

In the gig economy, a particularly significant share of digital control appears to be in the form of 'algorithmic management' determined by platform-based rating and reputation systems. Algorithmic management is an extension of 'customer management' strategies that enable to position customers as an agent. In this system, customers, rather than managers, are people who should be satisfied, and their comments or ratings on digital platforms leave an impression of gig workers and become an element of pressure for them (Fuller and Smith, 1991).

Gig workers are scored by their clients after tasks are completed. Employees with the best scores and the most experience tend to get more jobs due to the algorithmic ranking of the customers in the search results because workers with high scores rank high in searches on platforms (Rosenblat and Stark, 2016). Digital platforms create opportunities to remotely control workers by establishing new monitoring systems. Because it is now possible to observe the labor process by establishing monitoring and control mechanisms. For example, the frequency of keyboard touches and mouse movements of the workers are monitored and snapshots are made from their screens (Rosenblat and Stark, 2016). Therefore, capitalism, faced with any threat, does not refrain from developing new forms of production and appropriate control mechanisms in order to survive.

> *G2: "When you work freelance, you feel freedom at first. This was very attractive to me. But over time I realized that we were not completely free. First of all, we feel the pressure to prepare content suitable for their demands in order to find customers. While doing online business on digital platforms, we may have to work non-stop. Because the system follows you instantly. It takes a picture of the screen and it's hard to explain if you're not there at the moment. Because there is no person in front of you that you can tell your problem at that moment. "*

And also; from time to time, gig workers have to compromise themselves in order to agree on a project with customers on digital platforms. There has been a tremendous increase in the gig economy in recent years. The increase in the number of workers seeking work in digital labor platforms triggers competition. It is not easy for a gig worker to get projects that meet all his wishes. The projects he wants may not arrive on time, or he may come while the gig worker has other projects on hand. In some cases, gig workers may have to undertake projects that are not suitable for their qualifications in order to support themselves and their families. Therefore, the freedom to make decisions about the projects a gig worker will work seems to be more of a perception than a practical reality. However, this can still be seen as a motivating factor.

As a result, we cannot deny that gig workers are in many ways more independent than corporate workers, although there are many obstacles that limit the free working environment of gig economy workers. Gig workers are up to their individual decisions on which digital platforms and what kind of projects they will work on. Although some control systems have been established regarding working hours, they determine the time they will sit in front of the computer. Although there is a partial adherence to customers' instructions and wishes, procedures and rules dictated by a single manager are not included in the gig economy. These features inherent in freelancing are the most important motivational factors for gig workers. Because having the opportunity to choose offers them an experience of freedom.

Desire for Success and Continuous Learning

Gig economy is a dynamic market. It is extremely important for people to improve themselves and learn new things in order to find a job in the gig economy. Many gig workers seem to enjoy learning new things in order to keep abreast of new developments and decide on their own career path.

The entrepreneurial motivation theory explains that people who need high success are constantly looking for improvements and ways to do things better. Here, the person has a high motivation to be successful and an internal locus of control (Williams and Curtis, 2007). People with an internal locus of control believe that the results of their lives stem from their own efforts (Spillan and Brazier, 2003).

Interviewees (G2) and (G5) stated that they enjoyed doing research and learning new things. *(G2) "…Because it is necessary to learn new techniques anyway. Everything is changing very quickly. When I get a project, I want to do it in the best way as possible. it is your label at the same time",* (G5)*, "…In this way I get easier projects in the market. Because I offer new techniques and it attracts the customer".*

It can be said that gig workers also have an internal locus of control. They believe their future is determined by the choices they make. Someone with an internal locus of control sees himself the source of your failures and successes. Hence, he forces himself more and more to achieve success in life. The gig worker is motivated because he will be at the center of the praise that comes from a successful job.

It has been understood that one of the factors that motivate the interviewees is that they receive the reward of their success individually because the interviewees stated that while they were working in a full-time institution, her/his job was not seen. (G3) stated that "… *While my works were applauded, even my name did not pass. However, the good works I do by working freelance are written to my portfolio. Why should I let other people use this? If you do your job well, you are not looking for a job anyway. Customers find you "*. Similarly (G6) and (G9) stated that they worked hard to do their best. Because, according to (G6) "*When there is good work, there are customers anyway. I also receive the awards for my work myself. This motivates me more. I want to do better and be the best in the market "*.

Gig workers want to be proud of their work and to be recognized for their achievements. This is one of the most important factors that motivate them. They don't need someone to force them to be efficient and productive. So they have a strong need not only for financial gain but also for success. They set difficult goals for themselves and take the time to try it out. At the same time, they have a strong desire to achieve these goals and solve problems on their own, are enthusiastic, passionate, forward-looking and seek self-improvement.

These people with a high need for success are generally entrepreneurially motivated and have relatively high success rates (Littunen 2000). As a province, McClelland (1961) linked the need for success to entrepreneurial behavior. This need creates a strong desire to do things well or better than others. People who need success are likely to plan ahead, enjoy taking personal responsibility, and prefer fast and specific feedback about their actions (Barbara- Sánchez and Atienza-Sahuquillo, 2012). Therefore, we understand that gig employees also have entrepreneurial motivation. Almost all of the interviewees stated that they use their talents for themselves rather than for an institution. Often what drives their own development is in the business itself. Therefore, they stated that by doing the work as they want, they have opportunities to do better and that the motivation to do the best job creates a dynamic process. Because gig workers find that doing the same thing is boring, they experience the feeling of success at a higher level of undertaking challenging and variable projects.

Financial Instruments

Financial freedom can be considered as one of the factors affecting people's motivation to enter the gig economy; However, it has been understood that this is not seen as an important motivation tool. Because all of the interviewees emphasized the flexibility and autonomy provided by gig work, while financial issues differed among the interviewees.

According to the literature, while financial motivation tools are secondary to the tendency of individuals to tend towards the gig economy, desire to succeed and autonomy are the leading factors that motivate gig workers (Williams and Curtis, 2007). This is a result that also occurs within the scope of the present study. It is observed that women and young gig workers interviewed tend to work freelance in order to earn income. However, the reasons why these people also enter the gig economy lie behind the flexible working opportunities and free working environment provided by gig work.

> *G12: "… my wife's earnings provide our livelihood. But I work freelance to earn additional income. I can work because the working hours are flexible. Otherwise I could not work. My daughter is 2 years old "*

> *G1: "It is nice not to be dependent on a person's salary. I can do projects for various clients at the same time, and when one of them ends up I don't lose all my income. That's why you're less addicted. In fact, there is no addiction. This makes me feel better".*

Autonomy requires gig workers to perform the work, establish routines, and apply these routines when no one is held responsible for doing it (Ashford et al., 2007). This also means that he will bear the consequences of his choices. Thus, gig workers are solely responsible for their own short and long term economic survival. However, employees' exposure to high responsibility is not always beneficial for welfare (Schmitt, Hartog and Belschak, 2015). Gig workers' wage experiences; The type of job depends on a number of factors such as how experienced the experienced people are, how well their online profiles are developing, and whether they are dependent on this income as their main source of income. If the income that gig workers earn is only from such jobs, that is, people who have no other income than the income from gig jobs to survive are experiencing tension. However, gig workers have been found to be more comfortable if gig jobs are not the only resource workers have to rely on to survive. The effects of uncertainty are low, especially for those who have multiple sources of income, both online and offline. Because even though there is no money to come from a project in the gig economy, income from other jobs reduces anxiety.

And also; If the gig economy creates alternative working environments and income-generating opportunities for freelance workers, it seems that the wage earned in the gig economy is not satisfactory enough (Berg, et al., 2018). Most of the interviewees (G1, G2, G3, G7, G8, G9, G10, G12) stated that it would be difficult to make the payments required for living on time if they earn their main income from gig jobs. For example, (*G3) stated that.. "I make my whole life by working freelance. Sometimes I worry about whether I will be able to pay my bills. Because the payments for my work may not be on time. Or the client does not like the job and may not pay at all.* In particular, some interviewees (G8, G10, G5) emphasized that the income they earned by working freelance was not enough to plan their future.

G8: "Wages are low in this market. I work for more than one client at the same time. But this does not mean that I earn a lot. Because I can not get my fee on time. Uncertainty sometimes causes me to do many things in my life on time."

However, in the gig economy, this continuity and routine are fragmented. The routine has been replaced by unpredictability and uncertainty. This process, defined as flexibility, experiences the worker as insecurity. Therefore, he experiences tension (Çerkezoğlu and Göztepe, 2010). The indication of this tension and fear in the relationship experienced is precariousness and uncertainty.

G7: "I cannot afford to live on income only from what I get from gig jobs. Either you will get a lot of projects - which is not easy - or you will also work on some jobs offline. I have to pay my bills on time. However, I do not have regular income from gig jobs."

G2: "I can't always find a project. There are too many people in this market now. The work we do has also become cheaper. So it's not easy to live with just gig jobs. I lived while I was single, but now I have a child. Sometimes I can't get a job for weeks. I'm investing time and money on internet connectivity, electricity, and more. I need to check if there is a job for me on digital platforms. I'm always online ".

In short, it is unclear for gig workers whether monetary elements are perceived as a motivation, or whether they are highly valued. Therefore, it may be misleading to say that financial freedom is a motivational tool by evaluating only these expressions. Although gig workers do not see the financial side as a motivational tool in itself, it is clear that money is still an important part of the job. Thus, we can say that money is a factor that workers value, but is not a motivation in itself. This is also in line with the entrepreneurial motivation literature where financial incentives are considered to be of secondary importance only (Amit et al., 2001).

Relationships and Connections

Relationships shape individuals' work experiences. Interpersonal relationships in the workplace are particularly important for the well-being of employees (Haar et al., 2009). While workers who are working in traditional organizations probably have a stable set of relationships, gig workers build relationships fluently by forming a social network, including other gig workers with similar skills, potential customers, supporters, and employers (Petriglieri, Ashford and Wrzesniewski, 2018).

The changing nature of the gig economy, and unstable emotions it causes make it necessary to have the ability to create a social support system that can both meet the demand of the workplace and provide stable feelings of personal connection (Petriglieri, Ashford and Wrzesniewski, 2018). Interpersonal relationships in offices help employees manage their negative emotions and concerns. Office environments have interpersonal or group-based relationships that enable employees to manage situations that trigger anxiety (Kahn, 2001). Because organizations are often the source of people's emotional work experiences. However, in the gig economy, it is not easy to manage these processes for home workers. First of all, having a specific work identity is problematic, especially for organizations with coded roles and for freelancers operating outside of established professions. Gig economy is a business world where "workplace" is no longer synonymous with office building or factory floor (Barley, 2016).

While the absence of an organization is seen as a major advantage for self-employment for gig workers, many overlook the benefits of organizational employment. Because the participants unconsciously drew attention to the lack of organizational orientation and support while explaining their gig work experiences. Some of the interviewees (G3, G11, G7, G9, G11) stated that not having someone to tell them what to do led to an increase in their stress levels. For example (G3) stated that "…. *Sometimes I get confused about where to start. I want to get an opinion from someone about things. And (G11) stated that "… if I get the start wrong, I waste a lot of time. I feel the need to ask someone. Most of the time, I call my friends on the phone and get their opinions".* Another interviewee explained her views on this issue as follows:

G7: "Working at home has both good and bad sides. There are people in an office where I can exchange information and have a coffee after leaving the office. Working at home alone overwhelms me. There is no one you can get an opinion on. Or there is no one you can chat with between work. Sometimes I work in pajamas all day. I stay home for days."

Physical distance between gig workers creates relational difficulties for workers as they often lack career counselors or role models and therefore miss opportunities for practical skills development (Grugulis and Stoyanova, 2011). And also; Because of its autonomy, temporality, and financial instability, workers in the gig economy can feel the feeling of loneliness more intensely by experiencing a deep sense of isolation. These conditions disrupt the formation and continuity of personal and family relationships (Rowlands and Handy, 2012). At the same time, these workers risk losing their sense of professional identity. Such employees may question their identities as they enter and leave different roles at home and work in isolation at home with homewear. This can lead to problems while managing their relationships.

G11: "Sometimes I work without taking off my pajamas. I make my conversations on the phone. It is not easy to be a life coach in pajamas. "

G8: "Sometimes I feel so lazy at home. Sometimes it feels like it's not very positive that his bed and job are in the same place. I can choose to postpone my work and sleep.

G5: "I don't have a colleague. Out-of-home relationships are also important. Employees in the office can establish different bonds with each other. After work, they sit down, have coffee and can discuss different topics."

On the other hand, the gig economy also makes it possible to establish strong connections and become known in the market and create an effective portfolio. It is extremely important for all independent workers in the gig economy to expand their personal social network and build strong connections. Because in order to find a job in the gig economy, the gig worker himself has to manage the relations with the customers. Therefore, since strong relationships and connections established in the gig economy are important, gig workers have to make extra effort to stabilize their relationships by establishing direct relationships with customers. This is not only limited to the relationship between customers and the gig worker, but also includes relationships between various platforms, institutions, other gig workers. The frequency, quality and stability of relationships that gig workers establish with customers also affect their recognition in the market. In order to find new jobs, it is necessary to be in constant contact with prestigious and reputable customers / institutions and to ensure customer satisfaction. It is deemed necessary for the customer to be satisfied as it depends on his orientation. In the gig economy, individuals are on the scene and have to get ahead of other gig workers and gain prestigious customers in order to develop a positive brand image of themselves. Gig worker motivates himself to become an entrepreneur. Acting like a micro cosmic business; It should develop a strategy, market itself, develop "products", position itself as a brand, and understand the market for itself. Individuals develop self-discipline to support their personal strategies (Knights and Morgan, 1991).

Almost all of the interviewees emphasized that the people they work with are references for their future work.

G10: "The people I do business with are a reference for my future work. Their comments about me will make me permanent in this market. I do business with the awareness of this. "

G5: "Every client I work with has sent someone else to me. Work comes to you for your effort anyway.. "

In addition, it is seen that the interviewees also make special efforts to ensure the stability of business relations in the sector.

G10: "… Managing relationships also takes a lot of effort"

G7: "Sometimes the effort I put to satisfying customers outweighs the effort I put into the business. The stronger and more stable relationships you build in this market, the more money you will earn. It does not mean that I sit at home, just do business. You have to make your social networks strong".

In the gig economy, the constant change of jobs, and therefore customers, adds dynamism to the relational processes of gig workers, while they are aware of being observed by others because they are in front of the stage. That's why gig workers often feel pressured to create their own brands.

Gig workers need to quickly and effectively manage relationships with customers, ensure continuity of relationships, and make an effort to build new relationships. Most of the interviewees emphasized the necessity of networking both through online platforms and by participating in various activities taking place in offline environments. He also stated that they follow the developments in the sector in order to continuously add new people to their networks and maintain their existing relationships, and that they are in contact with the authorities working in their fields.

Push Motivation Factors

Push factors in entrepreneurial motivation are seen as "necessity" factors. It is negative motivations that push a person to work for their own account. Unemployment is the key factor driving individuals to prepare an entrepreneurial career (Cobb-Clark, 2015). Self-employment has become an economic policy that increases employment, which is supported by governments, especially as women, elderly and young people are more involved in the labor market (Startienė, Remeikienė and Dumčiuvienė, 2010). Hessels et al. (2008) defined this type of entrepreneurship as "compulsory entrepreneurship", while Thurik et al. (2008) uses the term "refugee entrepreneurship".

Unemployment

While only three of the interviewees (G4, G11, G12) consider unemployment as one of their reasons to enter the gig economy, it is seen that the majority voluntarily enter the gig economy. Interviewees stated that it is more motivating to take care of themselves rather than working in jobs that are not suitable for their qualifications in the market. And also, many of them prefer to work as a freelancer to work in a job they do not want. Some interviewees (G3, G5, G7, G8) stated that they were confident in their qualifications and they could find a permanent job if they wanted, but they didn't want to waste their energy doing jobs they didn't like. So freelancing work in society is seen as equivalent to unemployment by some segments. However, the interviewees do not agree with this view (G2, G6, G9). For example, (G9) stated that "*when they ask what I do, I say I'm working freelance. So they say I am unemployed. I say no, I have my own business. I do not accept the definition of unemployed".*

The lack of employment opportunities and career prospects is one of the most important factors for a person to turn to self-employment. At the point where a person becomes unemployed, the options are to find another job or work for his own account. On the other hand,

when the worker feels unhappy with the current job, company, position or job role, they tend to control their lives on their own (Cromie and Hayes 1991). Although the interviewees refer to the issue of unemployment at certain points, they argue that freelance work is a new way of working. They are willing to work full time if they find a satisfactory job; but they reject job opportunities that offer them a work environment that is below their potential.

CONCLUSION AND EVALUATION

This article has focused on freelancer in the gig economy, and purpose has been to obtain an understanding of motivational factors of gig workers. Survey was conducted with 117 freelancers and they were asked what are the reasons that push/pull freelance work. When we look at the demographic characteristics of the sample group, we see that women (53.8) are predominantly in the 18-35 age range (82%). 43.6% of the participants have a bachelor's degree, 40% have an associate degree, 76.9% are single and 84.6% define themselves as freelancers. Therefore, the participants constitute a young and educated sample group that adopts the freelance working culture. 79.5% of the respondents stated that they were happy at working freelance. This result is consistent with the question of whether working in the gig economy is a choice or a necessity. It was determined that 74.4% of the participants voluntarily preferred to work gig. Freedom (56.4%), flexible working program (51.3%), desire to learn and develop continuously (56.4%), motivation to be successful (38.2) factors have a significant share in the motivation to enter the gig economy.

In the qualitative phase of the research, although there are apparently differences in motivation among individual participants, motivational factors such as "desire to succeed, desire to be one's own boss and avoidance of control were mentioned by most of the participants.

Freedom and flexibility motivation factors correspond to the gig economy employees to choose their job and manage their working time individually. Gig workers do not have a supervisor that gives instructions on how to do the job. Therefore, the self-motivation tendency of the gig worker coincides with the entrepreneurial motivation, since no one else will be responsible for the actions of a self-employed person. According to the results obtained from the interviews, although gig workers emphasize their independence in many issues, it has been observed that there are some factors that limit the independence of gig workers. In particular, the evaluations made by customers on digital platforms for gig workers and the online control mechanisms that make workers dependent on the screen for online work are factors that prevent their independence from being completely under control. However, the fact that the gig worker is in a decisive position on work preferences proves the existence of a sense of independence. It is difficult to deny the importance of this for gig workers. Because independence in choosing projects highly affects the perception that they work independently.

The motivation for success and development meet the need to learn new things, constantly improve skills and take on challenges. Lifelong learning is necessary not only in entrepreneurial activities, but also in all activities in the rapidly changing world. The ability to plan and organize is one of the key elements for workers to be successful in the gig economy.

The motivation to network and build relationships is an important part of being a gig worker and is often a mandatory need. All of the participants drew attention to the importance of establishing stable relationships in doing business in the gig economy. Because the quality of the work done by the gig worker and customer satisfaction affect the quality and continuity of the next jobs. In addition, it is observed that gig workers are isolated and lonely due to the fact that gig work is performed alone on the computer. Therefore, gig workers need to make a special effort outside of work to establish connections and establish solid relationships. However, it is difficult to determine if gig workers are motivated on their own. Different variables are involved in the process.

The financial situation has been found to be a requirement for work, not motivation per se. Motivation factors stemmed from natural motivations such as the high need for success and the desire for independence.

The interviewees only mentioned the unemployment situation as the "push factor". Unemployment is one of the major factors driving workers into the gig economy. Participants indicate that there are alternative job opportunities; however, he stated that he did not satisfy them. Therefore, they pointed out that freelance work is more motivating than working in such jobs.

The gig economy has grown and insecure work has indeed become the new normal. This represents a major power shift in favor of employers in terms of reducing labor costs through flexibility. The arguments that are part of a precariat defined by precarious work are substantial. Since this study deals with freelance work by making use of the entrepreneurship literature, the dimension of insecurity is not given much space.

LIMITATIONS OF RESEARCH

Due to the characteristics of the gig economy and freelance work, the research has some limitations. Freelancing is a form of self-employment that inherently contains the characteristics of freedom and insecurity. Studies that deal with the subject of freelance work in terms of employment relations generally emphasize that freelance workers are exposed to negative conditions while those that deal with entrepreneurship approach see them as entrepreneurs. In this study, while we analyze the motivation factors of freelancers, the entrepreneurial motivation literature was used. Since the sample of this research consists of well-educated and qualified

freelancers, we can say that individuals see freelancing as an opportunity rather than a necessity and participate in the gig economy voluntarily. Most of the interviewees generally emphasize the attractive aspects of freelancing, such as being independent. Entrepreneurship is becoming attractive among freelancers worldwide. Therefore, when the motivation factors of freelancers are analyzed based on the entrepreneurship motivation theory, it can be said that the sample group serves the purpose of the research correctly. The findings seems to be consistent with the entrepreneurial motivation literature. Research on the gig economy is rather limited. Therefore, a starting point is needed as research on the motivational factors of freelancers is also limited. While the entrepreneur and the self-employed enter the field of self-employment with many similarities, the entrepreneurial motivation literature has been recognized as a suitable start for research in the field of motivation in the gig economy. But the gig economy is growing and insecurity is becoming the new normal. This represents a major power shift in favor of employers in terms of reducing labor costs through flexibility. The arguments that are part of a precariat defined by precarious work are substantial. However, since this study prioritizes the entrepreneurial aspect of freelance work, it does not include the insecurity dimension.

Another limiting factor is sample size. It is quite difficult to reach such employees as they are not registered anywhere and are self-employed. A much larger sample could have further strengthened the findings, but this was not possible due to time constraints. In-depth research from different perspectives is needed to develop in this field. I hope this research inspires further research. I believe this article is only the first but important step towards a new research trajectory focused on the entrepreneurial motivations of freelancers.

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