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Service Quality Scale Development in the Sharing Economy: Accessing Empirical Evidence from an Application of Turkish Car Sharing Companies

Şenol GÖKMEN*, Kenan AYDIN**

Abstract

This study aims to develop a service quality scale specific to the sharing economy. In order to achieve this aim, the feedbacks obtained from the customers of Türkiye's largest car sharing companies by random methods were analyzed with qualitative and quantitative analysis methods. As a result of these studies, a 6-dimensional original service quality scale has been developed for car sharing companies. It is thought that this scale will be used as an effective service quality measurement tool for car sharing companies. Empirical study results indicate that Corporate Image, as the 6th dimension in addition to Parasuruman's 5-dimensional scale, is also effective in measuring service quality in the sharing economy. This scale will contribute to increasing service quality, which is a critical factor for customer satisfaction and business success.

Keywords: *Sharing Economy, Service Quality, Car Sharing, Car Sharing Service Quality Scale*

1. Introduction

Today's intense competition forces businesses to benefit from more innovative business models than ever before. In order to retain customers who are more impatient and expectant, businesses must find and adapt business models that create the highest competitive advantage for them. In this regard, one of the new trends that has occupied the business world recently is the sharing economy. The sharing economy concept represents a transformative economic model that prioritizes access by using technology rather than ownership (Botsman, 2010), sharing of human, physical, and intellectual

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resources (Sundararajan, 2016) and community collaboration over traditional ownership (Schor, 2016).

The concept of sharing economy has been defined in different ways by various studies: "The act and process of distributing what is ours to others for their use and the act and process of receiving or taking something from others for our use" (Belk, 2007), "Collaborative consumption made by the activities of sharing, exchanging, and rental of resources without owning the good" (Lessig, 2008), "Transactions that may be market mediated in which no transfer of ownership takes place" (Bardhi & Eckhardt, 2012), "Consumers granting each other temporary access to under-utilized physical assets, possibly for money." (Frenken & Schor 2017), "A market that is formed through an intermediating technology platform that facilitates exchange activities among a network of equivalently positioned economic actors." (Perren & Kozinets, 2018).

According to Statista (2023) total value of global sharing economy is predicted to increase to 600 billion $ by 2027 which was 113 billion in 2021. This means a compund annual growth of near 32 percent. This business model has spread to a wide range of products and services, including hospitality (e.g., Airbnb, Couchsurfing), transportation (e.g., Uber, Zipcar), marketplaces (e.g., Etsy, eBay), food services (e.g., Deliveroo, Glovo). Uber, the biggest entity of the sharing economy is currently the higgest valued start-up with 98 billion USD and Airbnb, the second one is valued at 78 billion USD (companiesmarketcap, 2023).

As in other sectors, customer satisfaction which can be created through service quality, is a critical factor for sustainable business success in sharing economy. It is well known that service quality scales developed for the field of sharing economy is not at a sufficient level. For this reason, it is aimed to develop a sector-specific service quality scale by focusing especially on the car sharing sector which is growing more rapidly today. This study aims to contribute to both the literature and the development of the car sharing industry.

This study was conducted by using both qualitative and quantitative methods. As a qualitative method, collecting opinions and experiences from customers under different headings was used. Exploratory factor analysis and confirmatory factor analysis were used as quantitative methods which allow the researchers to analyze the collected data and develop the scale.

As an output of this study, a novelty service quality scale has been developed for car sharing companies. It is thought that this scale will be used as an effective service quality measurement tool for car sharing. This scale will help increasing service quality which is a critical factor for customer satisfaction and business success.

2. Conceptual Framework

2.1 Sharing Economy Concept

Lawrence Lessing is the first user of the term "Sharing Economy" in 2008. Lessing used the term to take attention to global population growth and the urgency of resource depletion. In this context, the sharing economy was defined by Lessig (2008) as "collaborative consumption that includes activities such as sharing, exchanging and leasing goods and resources without the owner". Lessig has linked the developing technological world with understanding and internalizing the sharing economy and touching our lives as a kind of economy dimension (Joo, 2017).

The origin of the concept is actually based on the concept of sharing. Although the different business models and sharing economy practices introduced by some organizations have emerged recently, the phenomenon of sharing has existed since ancient times. The culture of tea consumption in Asia, which has existed for centuries, can be given as an example here. In order to share more tea in Asia, the smaller sizes of drinking tea glasses can be expressed as a real-life example (Belk, 2010).

Due to the inability to reach a full consensus within the scope of definitions related to the sharing economy, different definitions are put forward. For example, the sharing economy is expressed as an economic exchange between peer-to-peer sharing. The reason for this is the sharing; rather than being in a certain community, it is due to the fact that it is realized as two different parties, between the beneficiary of the shared product and service and the one who offers the product or service to the other party. At this point, people in the sharing economy ecosystem can be both those who benefit from the product or service and those who offer this product or service (Richardson, 2015).

People who share, provide a product or service directly to the buyer on the other side. Thus, an economic benefit emerges for both the people who provide this product or service and the people who benefit from this product or service. Today, with the help of progress in technology, digitalization and internet usage have increased considerably, important investors and companies have emerged that invest in this field. This situation has led to an increase in awareness, enrichment and shaping of services, providing new added values to users, creating economic benefits, and realizing the distribution of different skill sets with the help of lean and simple platforms (Chen & Chang, 2018). eBay (1995) allows sharing of second-hand items, AirBNB (2008) allows sharing of unused houses or rooms, UBER (2008) allows commercial sharing of vehicles with a driver, Lyft (2014) allows people to share their personal vehicles that are idle during the day with those in need through the system. All of the above economy initiatives have created new opportunities and generated billions of dollars of new value in its field.

Botsman (2015) makes four complementary definitions for sharing economy applications (Schneider, 2017): The first definition was made within the scope of collaborative economy. The collaborative economy is system of decentralized networks

and markets that show the value of unused assets by eliminating traditional intermediaries. Secondly, economic systems in which idle or underutilized assets or services are carried out directly between individuals for a payment or free of charge, are called sharing economy. Thirdly, the definition of collaborative consumption is the realization of activities such as renting, lending, giving gifts, bartering or sharing in traditional markets with alternative methods together with the internet. Fourth and lastly, On-Demand Services, which emerged within the scope of platforms that meet the needs of end customers directly with suppliers in order to deliver goods and services instantly, also bases the concept of sharing economy.

According to Sundararajan (2016), the sharing economy has created many different results:

1. Emergence of new markets: The concept of the sharing economy creates a platform for the sharing of products and services and provides an opportunity for the sharing of existing products, new products and services. However, it also causes the formation of markets in order to make large-scale shopping.

2. High-impact capital: The sharing economy creates new opportunities to use almost the full capacity of everything from products and skills to time and money.

3. Community-based networks rather than centralized structures: The supply of capital and labor is provided by decentralized communities rather than by private or public companies. Future purchases may be made through decentralized market players rather than centralized third-party intermediaries.

4. Decreasing the distinction between personal preference and professionalism: The sharing economy, which was previously used as a personal choice, is now unconventional, with activities such as sharing a car journey with another person, and commercialization of labor or service supply.

5. The gap between full-time employment and short-term labor is narrowing: Contract jobs that require a limited time commitment or that involve entrepreneurship are replacing many traditional full-time jobs.

It is stated that there are three different factors affecting each other in the background, as the concept of sharing economy increases awareness. The first of these is the concept of trust, which everyone should pay attention to, since everyone can access every information and make comments and evaluations on every subject in today's communication conditions. The second is the concept of technology that accelerates the whole process of information dissemination, reduces costs and directs behavior. The third one is the concepts of economic and cultural drivers that emerged with the different behaviors and approaches of the Y generation in line with the economic crises and the uncertainty of the economic outlook (Stemler, 2016).

Tussyadiah (2015) conducted a study to identify the factors that motivate users in the sharing economy. Within the scope of this study, the motivation elements related to the sharing economy related to the definition of collaborative consumption were examined. It is stated that the most important criteria motivating to prefer sharing economy solutions are sustainability, community awareness and economic benefit. The most important criteria that negatively affect the choice of using these platforms are defined under 3 headings. These are defined as trust (in terms of interpersonal and technological security), benefit (inability of users to assimilate how the platform works or have trouble using it), and economic benefit, that is, a cost advantage.

According to 2018 data, the estimated market size of the sharing economy in Türkiye is 38,3 billion €. A market size of this ratio shows that the sharing economy is accepted in Türkiye and is explained by the existence of a sharing economy finance sector that can provide added value within the country at this point. The size of the financial sector is also expressed as 11,2 billion €. (PWC Sharing Economy Report, 2018).

2.2 Service Concept

Service is generally referred to together with activities, processes and performance concepts. However, in the literature, the title of service appears with different definitions: A service is a behavior or action provided by one party to another, especially one that is intangible and does not result in the ownership of anything. Service production may or may not be linked to a physical product (Kotler et al., 1999). Service delivery is an intangible and intangible activity. Accordingly, the concept of service is intangible solutions that emerged within the scope of the needs of customers and consumers in the market (Kurtz, 2008). Services have some different features and marketing strategies according to products. The main difference of services is that they are intangible and are created by direct contact with customers (Kotler & Armstrong, 2018). Services are intangible goods. For this reason, they can be exchanged directly between the producer and the consumer, they are immovable, cannot be stored, and are almost immediately perishable (Aydin, K., 2013).

A service component can be a large or a small part of the full offering. It is possible to divide the mentioned presentations into five different classes (Kotler et al., 1999):

1. Tangible goods: Products that are not expected to provide a service, such as sugar or salt.
2. A tangible product that requires complementary service: Products that come in a package, such as a refrigerator, washing machine or computer, to include after-sales service, warranty or individual customer service contract.
3. Hybrid presentation: Situations where service and product are equally important, such as a meal in a fine restaurant.

4. Complementary products and services: A bus trip with supplementary products such as main services and refreshments can be given as an example in this context.
5. Pure service: These are the works performed within the scope of abstract services such as psychotherapy and customer representation.

Services have distinctive features that differ from each other according to products. These are the absence of physical presence, "intangibility"; the inseparability of production and consumption, "inseparability"; they are defined as "variability" and "perishability" (Mucuk, 2017). As mentioned in figure 1 distinctive features of the service is schemed by Kotler and Armstrong (2018).

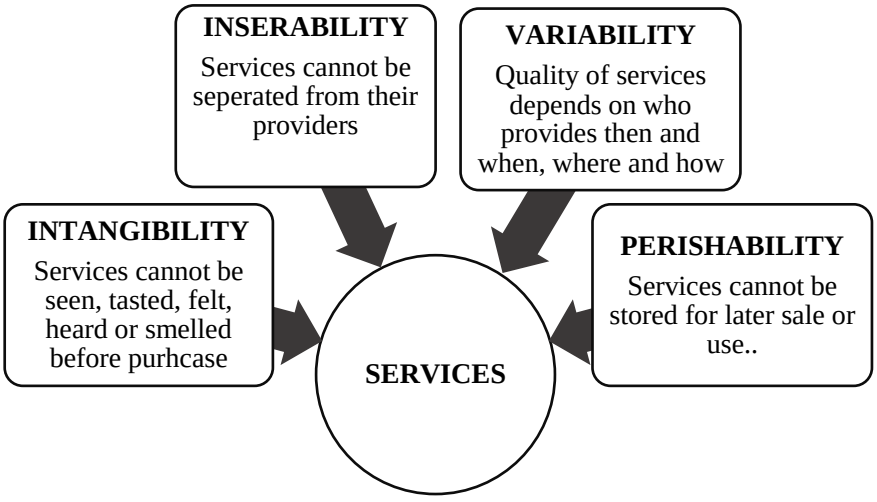

Figure 1. Distinctive Features of the Service

Kotler, P. T. ve Armstrong, G. O (2018). *Principles of marketing* (18th ed., Global Ed.). Harlow: Pearson.

Services are distinguished from product marketing by these features and different strategies should be developed to carry out successful marketing activities in this direction. One of the most important dimensions for success in service marketing is quality, which will be examined in the next heading.

2.3 Service Quality Concept

Quality is a phenomenon that has a subjective evaluation, varies from person to person and cannot be embodied. When talking about the quality of a product, having some features and standards are the main evaluation parameters. On the other hand, while using expressions related to service quality, more abstract discourses emerge. Quality in Japanese literature; It is "zero error" (not making the same type of error to the second one).

Service quality is considered as the attitude or judgment towards the level of service. Attitudes towards service are formed as a result of perceptions. Quality is the capacity to meet and exceed consumers' expectations. Within the scope of service quality, the perception of the service is created in a certain order. The perceived superiority within the scope of the service is finalized by the consumption of the service at the user level. In the final, the customer's experience by measuring the performance, that is; How the service is received, what processes it goes through and what kind of evaluation it is during the service is verified in the perception of the customer. Finally, the results within the scope of the users' thoughts, perceptions and opinions about the service are revealed (Parasuraman, Zeithaml, & Berry, 1988).

Quality, which has a significant impact on the performance of organizations, constantly takes the attention of professionals and contributors to this direction. Users turn to businesses that offer a high level of service quality and evaluate the service quality within the scope of the comparison between the expected quality and the perceived quality. Recently, businesses have understood the positive interaction between service quality, profitability and market share and the importance of service quality in this context. Accordingly, businesses have made this concept their top priority by highlighting service quality in order to differentiate their products and services according to potential substitute products and services. The importance of service quality for businesses and customers is critical in terms of its impact on possible market share and its contribution to the return on investment (Angelova & Zekiri, 2011).

The concept of perceived service quality was first mentioned by Grönroos (1984). Based on the study here, Khan, Rahman, and Haque (2012) explain the perceived service quality within the framework of three factors with a hierarchical model:

1. Functional Quality: The interaction between service providers and their customers. Functional quality reveals the evaluation of every stage of the experiences that customers experience in line with the services they receive.
2. Technical Quality: This dimension refers to the final result that the customer will receive from the service.
3. Company Image: This dimension is the image that customers perceive as a result of functional and technical quality. This stage is the final stage regarding the perceived quality understanding of the customers against the service provider.

Perceived service quality can be expressed as the perceptions that emerge after comparing the situations and emotions that consumers expect before purchasing a product or service, and the situation and feelings regarding the service quality they encounter after purchasing a product or service. Expectations within the scope of service quality are the reflections of consumers' desires or requests for service (Esmer, 2011).

Perceived service quality is the analysis of the positive aspects of a firm or business in general and its proximity to the level of excellence. Perceived service quality is a

phenomenon that is related to satisfaction and not equivalent to satisfaction. The compatibility between the demands and requests and the results of the service received reveals the level of perceived service quality. Service quality can also be expressed as meeting undisclosed needs or exceeding expectations (Hacıefendioğlu & Koç, 2009).

As a result of their exploratory research, Parasuraman, Zeithaml and Berry (1985) obtained ten qualitative dimensions in evaluating service quality: Access, Communication, Competence, Courtesy, Credibility, Reliability, Responsiveness, Security, Tangibles, Understanding/ Knowing the Customer. In their work in 1988, these components were turned into five dimensions : Reliability, Tangibles, Responsiveness, Assurance, Empathy as defined in Table 1.

Table 1: SERVQUAL Dimensions:

Dimensions	**Definition**
Reliability	Ability to perform promised service reliably and accurately
Tangibles	The appearance of physical facilities, equipments, personnels
Responsiveness	Desire to help customers and provide prompt service
Assurance	Ability to convey trust and confidence by staff's knowledge and courtesy
Empathy	Providing attentive and individual attention to customers

The SERVQUAL is used by many researchers in different sectors. However, this measurement method has been criticized by many researchers. Criticisms are made from both theoretical and operational perspectives.

The reason why it has been criticized theoretically is that it is based on the "disconfirmation of expectations" paradigm used in literature. According to Cronin and Taylor (1994), from paradigmatic point of view SERVQUAL is flawed in that it incorrectly adopts this model of disconfirmation. Measurement of expectations, items expressed as positive and negative, and determination of basic standards for good quality are other issues that have been criticized from a theoretical perspective (Cronin & Taylor, 1994; Brown et. 1993; Teas, 1994; Smith, 1995).

Criticisms directed at the SERVQUAL scale from a operational are mostly related to its dimensions. Some researchers (Carman, 1990; White and BCom, 2000; Choi et al., 2002; Chakravarty et al., 2003) state that the five dimensions of the service quality model do not remain the same in all service experiences. Cronin and Taylor (1994) state that there is not a certain number of dimensions related to service quality, they vary according to the situations or conditions in which services are provided, the boundaries of each

dimension will vary for each sector, and a dimension that is meaningful for one sector may not be meaningful for another sector.

It should be considered natural that it is not possible to respond to each sector with the same service quality dimensions, as different sectors have different dynamics. The main motivation of this study is to examine the service quality differentiation in the car sharing sector, which is a sub-sector in service quality, which is a relatively new sector.

2.4 Corporate Image Concept

The concept of corporate image was defined by Boulding as an organizational structure with "emotional" and "functional" meanings and emerged in the 1950s (Kennedy, 1977). The corporate image is shaped by the products and services that companies or businesses provide for consumers; It is the sum of the impressions and perceptions of customers, potential target audience, competing companies, supplier institutions and organizations. (Minister, 2005). According to another definition, corporate image; It can be expressed as the perception in the mind of the consumer regarding the company that provides the product and service. It reveals the general image and prestige of the entity. It is stated that the consumption experience of the consumer is the antecedent of the perception of the corporate image against the business. Company expertise regarding product and service delivery within the scope of marketing activities is directly related to its corporate image. (Rehman & Afsar, 2012). Corporate image is a cycle in which consumers and players in the ecosystem perceive the existence or image of the business and in this context, they reveal satisfaction with the brands of the business. At this point, businesses make efforts to take very careful steps to manage and improve their corporate image. In order to maintain the prestige of businesses in today's competitive conditions, corporate image should reflect the goals, ethical principles and organizational values of businesses. (Herstein et al., 2008).

Corporate image management is defined as the actions taken by the business within the scope of the image created in the target audience. In other words, it is the thoughts that occur against the organization in the perception of the target audience after the actions taken by the business. However, corporate image management aims to create a positive perception not only above the external target audience of the enterprise, but also within the scope of the internal customers of the organization. The reason for this is that employees will reflect the corporate image that they accept positively to the target audience of the business in a similar situation (Çetin & Tekiner, 2015). Corporate image is not a phenomenon that can be managed by a single unit within the organization. What everyone does during and outside working hours, and even the way they use social media, has had an impact on corporate image. Communication possibilities at the point we have reached reveal that corporate image management should be evaluated in many dimensions and stages.

2.5 Hypothesis Development and Research Model

2.5.1 Service Quality Studies

The main methods used for measuring service quality can be classified as Benchmarking, Total Quality Index, Servqual, Servperf, Critical Incidents Method (CIT), Linjefly's Service Barometer, Group Interview Method, Statistical Methods. Each of these methods gives priority to different dimensions in the measurement of service quality (Aydin, 2005)

The SERVQUAL scale, which is most frequently used to measure service quality, is a scale to reveal the difference between expected service and perceived service. Developed by Parasuraman, Zeithamlı and Berry (1988), this scale is based on 5 basic dimensions and 22 variables to determine service quality. In terms of service performance, the SERVQUAL scale draws conclusions based on the amount of "gap" between expectations and perceptions (Aydin & Yildirim, 2012). The SERVQUAL scale has been used in many areas to measure perceived service quality. These areas appear as health (Reidenbach and Sandifer-Smallwood, 1990; Babakus and Mangold, 1992; Sohail, 2003), travel agencies (Ryan and Cliff, 1997), insurance services (Cuthbert, 1996; Tsoukatos & Rand, 2006).

Parasuraman, Zeithaml and Berry (1988) SERVQUAL study has been included in the literature as one of the basic researches in order to measure the perceived service quality, and within the scope of this study, many different studies and sub-dimensions have been evaluated in order to measure the perceived service quality. These studies can be summarized as follows:

- Within the scope of the E-SERVQUAL study conducted Yoo and Donthu (2001), 4 service quality dimensions were evaluated and these dimensions are: Ease of Use, Aesthetic Design, Process Speed, and Reliability.
- Within the scope of the SITEQUAL study conducted by Zeithaml, Parasuraman and Malhotra (2002), 6 service quality dimensions were evaluated and these dimensions are: Fulfillment, Reliability, System Availability, Confidentiality, Communication, Responsiveness.
- Within the scope of the E-S-QUAL study conducted by Parasuraman, Zeithaml and Malhotra (2006), 4 service quality dimensions were evaluated and these dimensions are System Compliance, Competence, Confidentiality, and Fulfillment.
- Within the scope of the E-TRANSQUAL study conducted by Bauer, Falk and Hammerschmidt (2006), 5 dimensions of service quality were evaluated and these dimensions are: Usability, Usefulness of Content, Sufficiency of Information, Accessibility, Interaction.
- Within the scope of the SSTQUAL study conducted by Lin and Hsieh (2011), 7 service quality dimensions were evaluated and these dimensions are:

Convenience, Customization, Design, Pleasure, Functionality, Assurance, and Security.

- Within the scope of the E-SELFQUAL study conducted by Ding, Hu and Sheng (2011), 4 service quality dimensions were evaluated and these dimensions are: Perceived Control, Ease of Service, Service Realization (Reliability), and Customer Service.

2.5.2 Relationship Between Service Quality and Corporate Image

Babic-Hodovic, Arslanagic-Kalajdzic and Imsirpasic (2017) defined the perceived functional quality and technical quality dimensions on a model within the scope of their study with mobile service providers and examined the relationship between perceived functional and technical quality and perceived corporate image. As a result of this study, they analyzed that the perceived corporate image of the mobile service provider, which is the subject of the research, partially affects the perceived functional service quality, and that the physical characteristics and assurance dimensions are two important dimensions in this effect. However, within the scope of the proposed perceived technical service quality dimensions, it has been revealed within the scope of this study that the perceived corporate image of the mobile service provider is positively affected by the perceived technical service quality. In another hypothesis, it has been revealed that corporate image plays a mediating role in the effect of perceived functional and technical service quality on general quality evaluations.

Wu (2013) examined the relationships between dimensions of service quality, service quality, perceived value, corporate image, customer satisfaction, and behavioral intentions. In addition, this study aimed to reveal whether perceived value plays a moderator role between service quality and customer satisfaction. In this context, they confirmed their hypothesis that higher service quality perception will positively affect corporate image in the results of the study. This result is also consistent with Gummesson and Grönroos (1988)'s study that corporate image is a fundamental parameter in the overall evaluation of service and organization. The hypotheses regarding the positive effects of perceived value and corporate image on customer satisfaction were also confirmed within the scope of this study as outlined in figure 2.

Research Model

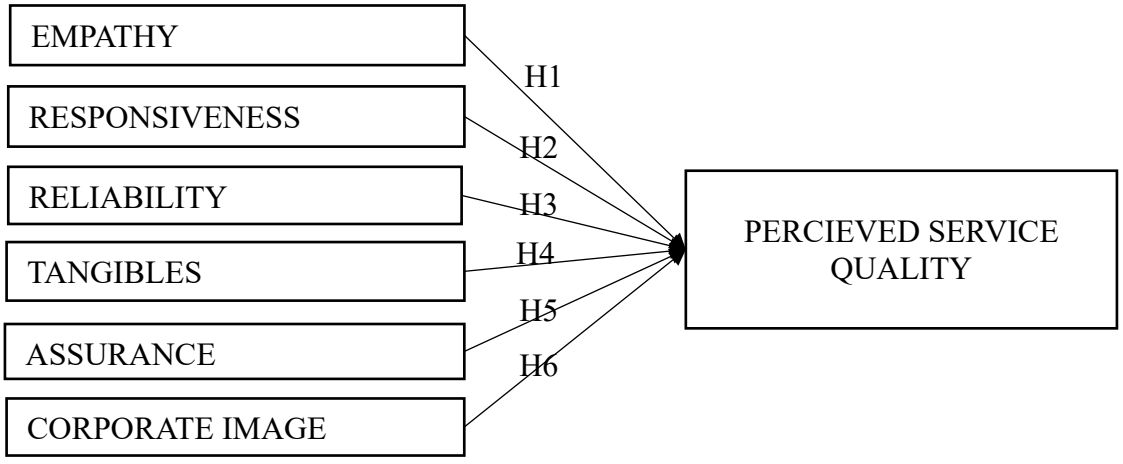

Figure 2: Service Quality Scale Model Proposal in Car Sharing

Hypothesis:

H1: There is a significant relationship between Empathy and Perceived Quality

H2: There is a significant relationship between Responsiveness and Perceived Quality

H3: There is a significant relationship between Reliability and Perceived Quality

H4: There is a significant relationship between Tangibles and Perceived Quality

H5: There is a significant relationship between Assurance and Perceived Quality

H6: There is a significant relationship between Corporate Image and Perceived Quality

3. Data and Methodology

In order to properly achieve the outlined study objectives, the present study leverages on online survey method was used as data collection tool. The application of the questionnaire was carried out using one of the ready-made online questionnaire applications used in the market. An online survey was sent via SMS to randomly selected people from the customer database of the car sharing company operating in Türkiye. Respondents were able to access the online survey via SMS via a link. The feedbacks from the randomly selected target audience were collected and evaluated. The answers of 814 participants who adequately participated in the survey were used in the research. The data obtained from the respondents were analyzed using different multivariate analysis methods.

In the first part of the questionnaire, which consists of four parts, there are questions that allow the demographic characteristics of the customers to be defined. These questions consist of expressions prepared in nominal and ordinal scales. In the second part of the questionnaire, there are statements about customer quality expectation measured on a 5-point Likert scale. In the measurement of these variables, a 5-point Likert scale was used (1: Strongly Disagree – 5: Strongly Agree).

In order to develop a service quality scale in the car sharing sector, the following preliminary studies were conducted:

- A quality expression pool was created by gathering all the feedback (complaints, suggestions, demands, focus group studies…) from customers of a company operating in this sector in Türkiye. More than 5.000 customer feedbacks were used to create this quality expression pool, and a total of 124 quality expressions were created.
- The quality statements were analyzed by industry experts and the expressions that could have the same meaning were singularized and reduced to 74 expressions.
- Grammar and meaning checks were made by experts to ensure that quality statements could be understood by everyone in the same way.
- Service quality scales with high validity and reliability used in the literature were examined in detail and these 65 statements were rearranged. The number of quality statements was reduced to 90 by combining the statements that were thought to measure the same quality indicator as shown by previous studies.
- With a pilot study, these quality statements were applied to a target audience of approximately 400 people to measure the perceived service quality on a 5-point Likert scale. The results of 280 people from the target group who participated in the study were evaluated.
- With this survey study, it was determined that some variables did not have sufficient correlations with other variables and these variables were excluded from the analysis.
- According to the results of the pilot study, 28 customer quality statements were gathered under 6 factors. These factors were determined as Responsiveness, Empathy, Reliability, Assurance, Physical Characteristics and Corporate Image.
- With the feedback obtained from the pilot study, the survey was finalized and sent to more than 1,000 randomly selected real customers via email. These customers use the car sharing application to meet their personel mobility needs, not for corporate use. From the participation in the survey application, 814 responses suitable for use were evaluated.
- Results of 814 people were entered into Exploratory Factor Analysis.
- Confirmatory Factor Analysis was applied.

- Structural Equation Modeling and the relationships between the factors were examined as rendered in figure 3.

Before testing the hypotheses in the research model, descriptive statistical analyzes such as frequency distributions, arithmetic mean and standard deviation, factor analysis and reliability tests were conducted.

9.6% of the survey participants are female and 90.4% are male. The fact that the gender variable is not evenly distributed indicates the fact that the vast majority of customers in the car sharing sector are men.

43.5% of the respondents are younger than 25 years old, 47.7% are between 25-35 years old, 7.7% are between 35-45 years old, 1.2% are 45 years old and over. The average age of respondents is 27. This situation shows that the customer base that uses car sharing services in Türkiye as well as in the world is a very young age.

It is seen that 23.6% of the respondents are High School and Before, 19.6% are University Students, 41.3% are University Graduates, 6.5% are Master's Graduates, and 0.3% are Doctoral Graduates. The majority of the participants have a university or higher education level. This situation can be interpreted as innovative business models such as the sharing economy are more preferred by those with higher education levels. At the same time, it can be concluded that this part of the society is more willing to use such innovative and paid services because it is more comfortable economically than other parts of the society.

When the marital status of the respondents is examined, we can see that 75% of the respondents are single and 25% are married. This situation coincides with the conclusion that the average age of the people using this business model is very young. It has been determined that most of the private sector employees with university degrees prefer car sharing services in Türkiye. 78% of the respondents do not own any vehicle, 12% have their own vehicle, 2% have a rental vehicle that they can use, and 7% have a company vehicle for their own use. This information shows us that the people who use car sharing services do not have any vehicles for their personal use.

When the purpose of using the shared car service is examined, 54% of the respondents use the shared car service for instant short-term transportation, 11.7% for entertainment purposes, 18.7% for transportation to work-school, 11.1% for long-term transportation. It is concluded that they use this service to meet their distance transportation needs. In general, it can be seen that the car sharing service is used for short-term transportation.

3.1 Empirical Results and Discussion

Exploratory and confirmatory factor analyzes were applied to test whether the data structurally overlapped with the theoretical framework. In addition, the scales were questioned with validity and reliability analyzes. Methodologically, in the first stage, exploratory factor analysis was applied with the varimax rotation method. Kaiser-

Mayer-Olkin (KMO) sample adequacy test and Barlett Sphericity test were used to investigate the suitability of the data for factor analysis. The KMO value is found to be 0.96, and it is concluded that the sample size is sufficient and appropriate for the data set. Since $p<0.05$ is found in the Barlet Sphericity test, it is concluded that there is a significant and sufficient correlation between the variables for factor analysis (Hair et al., 2014). In line with these analyzes, the sample was suitable for factor analysis.

According to Hair(2014), the factor load limit value is 0.45. The factor loads of all the variables included in the analysis are above 0.5. In order to ensure the internal consistency of the scales, Cronbach's Alpha values should be above 0.70 (Şencan, 2005; Hair et al., 2014). In the analysis, it is observed that all Cronbach's Alpha values are above 0.70, and it is determined that the internal consistency of the factors is ensured. The cumulative variance explained is greater than 50%. (Cumulative variance explained 74%)

Table 2: Results of Exploratory Factor and Confirmatory Factor Analysis

Factor	Variable	EFA Factor Load	CFA SE Factor Load	SE	% Explained Variance	Validity and Reliability
Responsiveness	CVP1	0.861	0.912	0.036	12.388	CA=0,948 AVE=0,721 CR=0,947
	CVP2	0.835	0.924	0.037		
	CVP3	0.826	0.922	0.035		
	CVP4	0.805	0.864	0.034		
	CVP5	0.777	0.846	0.033		
	CVP6	0.741	0.673	0.041		
	CVP7	0.674	0.773	0.039		
Empathy	EMP1	0.750	0.786	0.038	2.178	CA=0,915 AVE=0,598 CR=0,912
	EMP2	0.718	0.739	0.035		
	EMP4	0.717	0.812	0.031		
	EMP5	0.710	0.825	0.035		
	EMP3	0.644	0.683	0.039		
	EMP7	0.648	0.742	0.035		
	EMP6	0.656	0.815	0.035		
Reliability	ETK2	0.782	0.818	0.035	1.542	CA=0,948 AVE=0,621 CR=0,891
	ETK3	0.765	0.842	0.037		
	ETK1	0.755	0.787	0.034		
	ETK4	0.720	0.769	0.032		
	ETK5	0.661	0.718	0.044		
Assurance	GVNC3	0.808	0.697	0.036	1.499	CA=0,742 AVE=0,504 CR=0,752
	GVNC1	0.771	0.780	0.035		
	GVNC2	0.494	0.646	0.032		
Tangibles	FZKSL1	0.854	0.706	0.040	1.382	

	FZKSL2	0.818	0.838	0.034		CA=0,845 AVE=0,788 CR=0,878
	FZKLS3	0.631	0.810	0.046		
Corporate Image	IMAJ1	0.875	0.926	0.043	1.083	CA=0,858 AVE=0,691 CR=0,869
	IMAJ2	0.844	0.703	0.048		
	IMAJ3	0.708	0.849	0.039		

- There is no need to remove any item from the model. (All factor loads are greater than 0.5.)
- Convergent and discriminant validity is provided for all factors. (AVE>0.50 CR>0.70)

When Table 2 is examined, it is accepted that the SCR and AVE values are at an acceptable level, the validity and reliability of the factors are at a sufficient level.

After the EFA, which aims to test the structure of the data obtained within the scope of the research, CFA was applied to determine the compatibility of the data with the research model.

- All goodness of fit values obtained as a result of confirmatory factor analysis show that the model provides acceptable fit standards.
- Good fit of the model is also shown as proof of the validity of the scale in the model.

Table 3: Model Goodness of Fit Values

Fit Indexes	**Measurement Value**	**Goodness of Fit Criterion**	**Explanation**
x2/sd	2.743	≤2**; ≤5*	Acceptable Fit
GFI	0,025	≥0.9**0; ≥0.80*	Good Fit
AGFI	0,908	≥0.90**; ≥0.80*	Good Fit
CFI	0,965	≥0.90**	Good Fit
NFI	0,946	≥0.90**	Good Fit
RMSEA	0,046	≤0,08**	Good Fit
**good fit, *acceptable fit			

Based on the results of the analysis, it is appropriate to accept all hypotheses:

H1: There is a significant relationship between Empathy and Perceived Quality

H2: There is a significant relationship between Responsiveness and Perceived Quality

H3: There is a significant relationship between Reliability and Perceived Quality

H4: There is a significant relationship between Tangibles and Perceived Quality

H5: There is a significant relationship between Assurance and Perceived Quality

H6: There is a significant relationship between Corporate Image and Perceived Quality

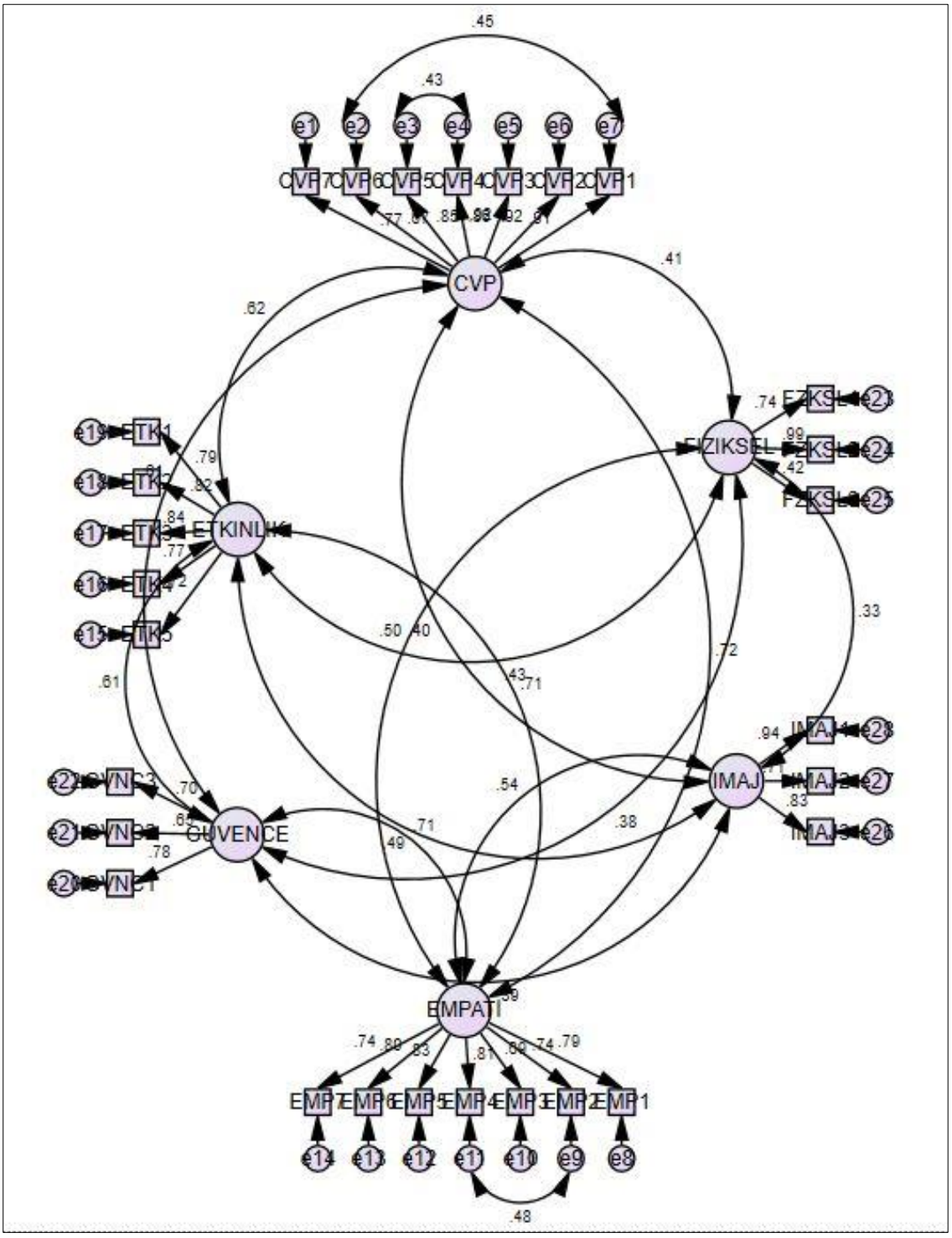

Figure 3. Structural Equation Modeling

4. Discussion

The study results indicate that Corporate Image, as the 6th dimension in addition to Parasuruman's 5-dimensional scale, is also effective in measuring service quality in the sharing economy. This result is supported by previous studies: Corporate image from the perspective of consumer behavior covers the holistic view of the customers in terms of emotions, feelings, and experiences toward the experience.(Brunner, 2008). This conception of corporate image includes psychological factors that appeal to consumers' personality and create a sense of belonging to the brand. (Burlison & Oe,2018). In this manner, corporate image refers to customers' perceptions, including both their actual facts and the inferences they make (Johnson & Zinkhan, 2015).

In addition, it was concluded that Responsiveness, which is one of the service quality dimensions, is the most effective service quality dimension on Service Quality, and Empathy is the second important service quality dimension. Other dimensions in order of importance are: Reliability, Assurance, Physical Assets, Corporate Image. This result clearly shows that especially highly educated users of the car sharing sector demand that they be successful in finding an interlocutor and understanding their own needs and empathizing while using the service.

With this study, considering that there is not enough research in the field of sharing economy, which is a relatively new sector, a research was carried out for the measurement of service quality.

Within the scope of the research, a service quality scale specific to the car sharing sector was developed by using the results of the qualitative and quantitative researches carried out with the real customers of one of the largest car sharing companies in Türkiye by random sampling method.

For this reason, we can say that car sharing companies should provide a high level of customer service based on customer experience. By creating customer experience maps, car sharing companies should plan the customer's experience in advance and meet customer expectations at a high level.

Car sharing companies that make these preparations will be able to differentiate themselves from the competition and ensure sustainable success by keeping the customer perceived service quality at a high level.

5. Conclusion and Policy Implications

In conclusion, the formulation of a service quality scale tailored to the sharing economy represents a pivotal stride towards comprehending and enhancing the caliber of services rendered within this distinctive milieu. The sharing economy, with its unique challenges and distinct characteristics, necessitates a customized methodology for assessing service

quality. Through the process of delineating pertinent dimensions, formulating precise items, engaging in expert evaluations, conducting pilot testing, and ultimately validating the scale, scholars are able to construct a dependable and sound instrument for evaluating the caliber of services within the realm of the sharing economy. The utilization of this scale may be employed by service providers, platforms, and policymakers alike in order to discern and pinpoint areas necessitating refinement, thereby augmenting the comprehensive service experience. The ongoing pursuit of scholarly investigation in this particular domain is of utmost importance in order to continuously enhance and propel our comprehension of service quality within the realm of the sharing economy.

Furthermore, based on the outcomes of the present study, the following policy suggestions are rendered:

In today's intensely competitive environment, customers are more impatient and have higher expectations than ever before. Considering this situation, which is also supported by research results, mobility companies operating in the field of sharing economy should be accessible and serviceable at all times. It is important to clarify customer expectations with the help of detailed customer experience mapping studies and turn them into ready-made scenarios that can be presented to the customer. In this way, not only customer expectations are met, but also it is possible to provide services beyond their expectations. Effectiveness which is ensuring that the service is provided as promised and on time is the third important dimension in customer quality perception after the other two dimensions mentioned above. For this reason, companies operating in the car sharing sector must clearly draw the boundaries of the services, supply these services as promised, and communicate these activities correctly with the customer. Since car sharing industry applications are self-service online services, customers must define their credit cards in these systems before starting to use them. As the customer uses this service, payment is automatically collected from the customer's defined credit card. Since the customer gives the service company the right to make automatic collections, it is critical that the trust factor is not damaged. If this trust is damaged, the customer quickly removes his personal information as well as his credit card information from the system and leaves the system. It must be ensured that the condition and hardware features of the cars offered to customers in the system meet customer expectations. Rapid deterioration of the condition of vehicles, which is common in car sharing applications, is one of the important reasons for customer churn in this sector. Corporate Image is another important issue that car sharing companies should work on due to its positive effects on the customer's perception of quality. Car sharing companies that perfect their services by focusing on all these 6 factors will be able to differentiate themselves from intense competition and develop long-term relationships with their customers and be successful in this innovative area.

Among the limitations of this study, it can be counted that the research will only be carried out on the example of car sharing companies and there are limitations in generalizing the scale. Therefore, it is recommended to carry out similar studies in the future.

REFERENCES

AYDIN, K. (2005). Hizmet işletmelerinde servqual yöntemi ile hizmet kalitesinin ölçümü ve Kocaeli'ndeki seyahat işletmelerinden Efe Tur uygulaması. Journal of Social Policy Conferences, 0(50), 1101-1130.

AYDIN, K. (2013). Perakende yönetiminin temelleri, İstanbul: Nobel Yayıncılık.

AYDIN, K. & YILDIRIM, S. (2012). Hizmet sektöründe servperf ölçeği ile hizmet kalitesinin belirlenmesi sağlik hizmetleri sektöründe bir uygulama, Ekonomi ve Yönetim Araştırmaları Dergisi, 1(2), 33-52.

BABIC-HODOVIC V., ARSLANAGIC-KALAJDZIC, M. ve IMSIRPASIC, A. (2017). Perceived quality and corporate image in mobile services: The role of technical and functional quality. South East European Journal of Economics and Business, Sciendo, 12(1).

BAKAN, Ö. (2005). Kurumsal imaj. Konya: Tablet Kitabevi.

BARDHI, FLUERA, and GIANA M. ECKHARDT (2012), "Access-Based Consumption: The Case of Car Sharing," Journal of Consumer Research, 39 (4), 881–98.

BAUER, H., FALK, T. ve HAMMERSCHMIDT, M. (2006). eTransQual: A transaction process-based approach for capturing service quality in online shopping. Journal of Business Research. 59, 866-875.

BELK, R. W. (2010). Sharing. Journal of Consumer Research 36(5), 715–734.

BOTSMAN, R. (2010). What's Mine is Yours: The Rise of Collaborative Consumption. New York: Harper Collins Press

BROWN, T. J., G. A. CHURCHİLL ve J. P. PETER, (1993), "Improving the Measurement of Service Quality", Journal of Retailing, Volume 69, Number 1.

BRUNNER, T. A., STÖCKLIN, M., & OPWIS, K. (2008). Satisfaction, image and loyalty: New versus experienced customers. European Journal of Marketing, 42(9/10), 1095–1105.

BURLISON, J., & OE, H. (2018). A discussion framework of store image and patronage: A literature review. International Journal of Retail & Distribution Management, 46(7), 705– 724

CARMAN, J. M., (1990), "Consumer Perceptions of Service Quality: An Assessment of the SERVQUAL Dimensions", Journal of Retailing, Volume 66,

CHAKRAVARTY, S., R. FEINBERG ve E. RHEE, (2003), "Relationships and Individuals'Bank Switching Behavior", Journal of Economic Psychology, Volume 30.

CHEN, C. C. & CHANG, Y. C. (2018). What drives purchase intention on Airbnb? Perspectives of consumer reviews, information quality and media richness. Telematics and Informatics, 38, 1512-1523.

CHOI, K., W. CHO, S. LEE, H. LEE ve C. KIM, (2002), "The Relationship Among Quality, Value, Satisfaction and Behavioral Intention in Healt Care Provider Choice: A South Korean Study", Journal of Business Research, Volume 5738.

Companiesmarketcap, Date: 11.06.2023, https://companiesmarketcap.com/

ÇETIN, S. & TEKINER, M. (2015). Kurumsal imajın temel belirleyicileri: emniyet teşkilatı örneklemi iç paydaş anketi. Yönetim ve Ekonomi Araştırmaları Dergisi, Cilt 13(1), 418-440.

DAGGER, T.S. and SWEENY, J.C. (2006). The effect of service evaluations on behavioral intentions and quality of life, Journal of Service Research, 9(1), 3-18.

DING, D. X., HU, P. J-H. & SHENG, O. R. L, 2011. e-SELFQUAL: A scale for measuring online self-service quality. Journal of Business Research, 64(5), 508-515.

ESMER, S. (2011). Liman işletmelerinde hizmet pazarlaması pazarlama iletişimi. Ankara: Detay Yayıncılık.

FRENKEN, KOEN, and JULIET, Schor (2017), "Putting the Sharing Economy into Perspective," Environmental Innovation and Societal Transitions, 23 (June), 3–10.

GRÖNROOS, C. (1984). A service quality model and its marketing implication. European Journal of Marketing, 18(4), 36-44.

HACIEFENDIOĞLU, Ş. & KOÇ, Ü. (2009). Hizmet kalitesi algılamalarının müşteri bağlılığına etkisi ve fast-food sektöründe bir araştırma. Kocaeli Üniversitesi Sosyal Bilimler Enstitüsü Dergisi (18), 146-167.

HAIR, J.F., BLACK, W.C., BABIN, B.J. and ANDERSON, R.E. (2014) Multivariate Data Analysis. 7th Edition, Pearson Education, Upper Saddle River.

HERSTEIN, R., MITKI, Y. & JAFFE, E.D. (2008). Communicating a new corporate image during privatization: the case of El Al airlines. Corporate Communications: An International Journal, 13(4), 380-393.

JOHNSON, M., & ZINKHAN, G. M. (2015). Defining and measuring company image. In B. J. Dunlap (Ed.), Proceedings of the 1990 Academy of Marketing Science (AMS) Annual Conference (pp. 346–350). Springer.

JOO, J. H. (2017). Motives for participating in sharing economy: Intentions to use car sharing services. Journal of Distribution Science, 15(2), 21–26.

KHAN, A. H., RAHMAN, M.S. & HAQUE, Md. M. (2012). A conceptual study on the relationship between service quality towards customer satisfaction, Canadian Center of Science and Education, Asian Social Science, 8, 13.

KENNEDY, S.H. (1977). Nurturing corporate images. European Journal of Marketing. 11(3), 119–164.

KLONGTHONG, W., THAVORN, J., WATCHARADAMRONGKUN, S. ve NGAMKROECKJOTI, C. (2020). Determination of factors in cultural dimensions and SERVQUAL model affecting the corporate image of pharmacy retail stores. The Journal of Asian Finance, Economics and Business. 7(10)

KOTLER, P., ARMSTRONG, G., WONG, V. & SAUNDERS, J. (1999). Principles of marketing, (Second European Edition), New Jersey: Prentice Hall.

KOTLER, P. T. & ARMSTRONG, G. O (2018). Principles of marketing (18th ed., Global Ed.). Harlow: Pearson.

KURTZ D. L. (2008). Controlled burn: The gendering of stress and burnout in modern policing. Feminist Criminology, 3(3), 216-238.

LESSIG, L. (2008). Remix: Making art and commerce thrive in the hybrid economy. New York: Penguin Press.

LIN, J-S. C. & HSIEH, P-L. (2011). Assessing the Self-service Technology Encounters: Development and Validation of SSTQUAL Scale. Journal of Retailing. 87, 194-206.

MUCUK, İ. (2017). Pazarlama ilkeleri (20. Baskı), İstanbul: Türkmen Kitabevi.

PARASURAMAN, A., ZEITHAML, V. A. & BERRY, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. Journal of Retailing, 64(1), 12–40.

PARASURAMAN, A., ZEITHAML, V. A. & MALHOTRA, A. (2005). ES-QUAL a Multiple-Item Scale for Assessing Electronic Service Quality. Journal of Service Research, 7, 213-233.

PERREN, REBECCA, and Robert V. KOZINETS (2018), "Lateral Exchange Markets: How Social Platforms Operate in a Networked Economy," Journal of Marketing, 82 (1), 20–36.

REHMAN, M & AFSAR, B. (2012). Relationship among corporate image, intangible perceived quality, choosing, habit and customer loyalty. Management & Marketing, 1 (24).

RICHARDSON, L. (2015). Performing the sharing economy. Geoforum. 67: 121-129.

SCHNEIDER, H. (2017). Creative destruction and the sharing economy: Uber as disruptive innovation. Cheltenham, UK: Edward Elgar Publishing Limited.

SCHOR, Juliet (2016), "Debating the Sharing Economy," Journal of Self-Governance and Management Economics 4(3): 7–22.

SMITH, A. M., (1995), "Measuring Service Quality: is SERVQUAL Now Redundant?", Journal of Marketing Management, Volume 11.

Statista, (Jan, 2023), Value of the Global Sharing Economy 2021. Date: 06.11.2023, https://www.statista.com/statistics/830986/value-of-the-global-sharing-economy/

STEMLER, A. (2016). Betwixt and between: regulating the shared economy. Fordham Urban Law Journal, 43(2), 32-70.

SUNDARARAJAN, Arun (2016), The Sharing Economy: The End of Employment and the Rise of Crowd-Based Capitalism. Cambridge, MA: MIT Press

TEAS, R. K., (1994), "Expectations as a Comparison Standard in Measuring Service Quality: An Assessment of Reassessment", Journal of Marketing, Volume 58, January.

TUSSYADIAH, I. P. (2015). An exploratory study on drivers and deterrents of collaborative consumption in travel, Information & Communication Technologies In Tourism, 127, 819–832.

WHITE, L. ve M. G. BCOM, (2000), "Customer Determinants of Perceived Service Quality in a Business to Business Context: A Study Within the Health Services Industry", Visionary Marketing fort he 21st Century: facing the Challenge.

WU, H-C. (2013). An empirical study of the effects of service quality, perceived value, corporate image, and customer satisfaction on behavioral intentions in the Taiwan quick service restaurant industry, Journal of Quality Assurance in Hospitality & Tourism, 14(4), 364-390.

YOO, B. & DONTHU, N. (2001). Developing and Validating a Multidimensional Consumer-Based Brand Equity Scale. Journal of Business Research, 52, 1-14.

ZEITHAML, V. A., PARASURAMAN, A. & MALHOTRA, A. (2002) Service Quality Delivery through Web Sites: A Critical Review of Extant Knowledge. Journal of the Academy of Marketing Science, 30, 362-375.Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science, 5*(1). 14-37.

Appendix: Demographic Variables and Service Quality Expressions Used in the Study

#	Demographic Variables
1	Gender
2	Age
3	Income Level
4	Education level
5	Marital status
6	Job
7	Car Ownership
8	Purpose of Shared Car Usage

#	Service Quality Expressions
1	Customer service is willing to resolve issues.
2	Customer service responds to my requests quickly and accurately.
3	Customer service communicates with me clearly and simply.
4	Company staffs have the knowledge to answer my questions.
5	The behavior of company staffs give trust.
6	When there is a problem, the company is closely interested in solving the problem.
7	To be able to reach to company staffs is fast and easy.
8	The equipments of the cars are sufficient.
9	The interior equipments of the vehicles are comfortable.
10	Cars are sufficient as a brand-model.
11	The firm understands my specific needs.
12	The app provides me a personalized experience.
13	The application offers the user different options that will make his life easier.
14	The firm protects my interests.
15	The application offers the possibility to update on the reservation.
16	The application informs me about the functions and equipments of the vehicles.
17	The application always meets my expectations.
18	The application allows me to quickly rent a car.
19	The application loads fast and works immediately.
20	The application is always available for action.
21	The application is easy to use.
22	The application is fluent and works without any connection problems.
23	The application does not charge me without my knowledge.
24	The application gives me the information for what purpose my personal info will be used.
25	The amounts charged from me are clear and related my usage.
26	I have a good impression for the company.
27	The company has a good image in the minds of its consumers.
28	The company's image is better than its competitors.

Declarations

Availability of data and materials

The data for this present study are sourced from structured questionnaire. The current data specific data can be made available upon request

Conflict of Interest statement
No potential conflicts of interest at any level of this study
Ethical Statement
Not applicable to the study (N/A)
Number the figure
three
Number tables
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Authors' contributions

All authors have read and approved the final version

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Code availability: All codes for the analysis are available in STATA and E-views statistical software

Consent to Participate: Not Applicable

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Many thanks in advance look forward to your favourable response

Yours truly,

Authors

Ranking Economic Fragility in the Fragile Five Countries: A Multi-Criteria Analysis Using TOPSIS and VIKOR

Deniz ALTUN*

Abstract

The integration of the global economy and increasing capital mobility has significantly impacted emerging markets, especially following the 2008 global financial crisis. This study evaluates the economic performances of the countries identified as the "Fragile Five" -Turkey, Brazil, India, Indonesia, and South Africa- using Multi-Criteria Decision Making (MCDM) methods such as TOPSIS and VIKOR. The analysis incorporates six macroeconomic indicators as criteria: current account balance (as a percentage of GDP), inflation rate (consumer prices), GDP growth rate (annual percentage), unemployment rate (as a percentage of total labor force), external debt-to-GDP ratio, and total reserves (including gold, in current US dollars). Through this evaluation, the fragility rankings of the Fragile Five countries are determined. The findings are assessed in terms of strategies that these countries could implement to reduce economic vulnerability and provide guidance for investors.

Keywords: *Fragile Five, Economic Performance, Decision Making, TOPSIS, VIKOR*

1. Introduction

The integration of the global economy and increased capital mobility have had a significant impact on emerging markets. Particularly after the 2008 global financial crisis, many developing countries have been profoundly affected by global financial fluctuations and have become more vulnerable to external shocks. The "Fragile Five" countries -Turkey, Brazil, India, Indonesia, and South Africa- were first identified in 2013 by James K. Lord, an analyst from the U.S.-based bank Morgan Stanley. These countries drew attention from investors due to the high-risk factors embedded in their economic structures. Macroeconomic imbalances in indicators such as current account deficits,

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inflation, unemployment rates, and external debt have led to the depreciation of their local currencies (Dinçsoy and Çan, 2016; Sezal, 2023).

The main aim of this study is to conduct a comparative analysis of the macroeconomic vulnerability levels of the countries referred to as the Fragile Five -Turkey, Brazil, India, Indonesia, and South Africa-. In this context, the economic performances of the mentioned countries were evaluated using annual data, and a comparative ranking among them was established. Thus, the study seeks to contribute to the concept of vulnerability both theoretically and practically.

The Fragile Five countries have increased their dependency on foreign capital to sustain economic growth and have faced challenges in maintaining macroeconomic stability. Rising external financing needs and sensitivity to global market fluctuations are the primary factors contributing to their economic vulnerabilities. Among the most commonly used indicators to measure the fragility of emerging market economies are the current account deficit, inflation rate, unemployment rate, external debt-to-GDP ratio, and total reserves (Akkuş and Topuz, 2019).

This study provides two main contributions to the literature. First, it presents a detailed analysis of the economic vulnerabilities of the Fragile Five between the years 2014 and 2022 using multi-criteria decision-making (MCDM) methods. Second, by applying both the TOPSIS and VIKOR methods to the same dataset, it enables a comparison between the analytical perspectives of these two techniques.

The aim of this study is to comparatively analyze the economic performances of the Fragile Five countries: Turkey, Brazil, India, Indonesia, and South Africa. To achieve this objective, the economic vulnerabilities of these countries will be ranked using Multi-Criteria Decision-Making (MCDM) methods, specifically TOPSIS and VIKOR. The TOPSIS method enables ranking by normalizing criteria in the dataset based on positive ideal and negative ideal values and calculating the distances of decision points from these values. VIKOR, on the other hand, offers compromise solutions for solving multi-criteria problems and is used to rank alternatives by balancing the conflicts between various criteria. In this study, macroeconomic indicators such as the current account balance, inflation rate, unemployment rate, external debt-to-GDP ratio, and total reserves provided in the dataset will be used to calculate TOPSIS and VIKOR values for each country, thereby enabling a comparison of their levels of vulnerability. These indicators were selected because they reflect both the internal economic dynamics and the resilience of countries against global shocks. Previous studies (e.g., Akkuş & Topuz, 2019; Dinçsoy & Çan, 2016) have also employed these indicators as measures of vulnerability.

The TOPSIS method defines positive ideal (best) and negative ideal (worst) values for each criterion, calculates the distances of analyzed countries to these values, and ranks their performances accordingly.

In evaluating a problem, the best outcome is sought for each criterion. However, maximizing all criteria simultaneously is usually impossible. For instance, when assessing a country's economic performance, different goals such as low unemployment rates, controlled inflation, and a strong current account balance might arise. However, in some cases, reducing unemployment might lead to higher inflation. The VIKOR method addresses such conflicts by balancing these trade-offs, considering the distances of each criterion to its best and worst values. It provides a compromise-based ranking by weighing all criteria and establishing a balance between conflicting objectives to identify the most appropriate solution.

The selected methods, TOPSIS (Hwang & Yoon, 1981) and VIKOR (Opricovic & Tzeng, 2004) are widely used in multi-criteria decision-making approaches. While TOPSIS is based on the distance of an alternative from ideal and anti-ideal solutions, VIKOR offers a more flexible evaluation by proposing a compromise-based ranking. Using both methods together allows for a more holistic approach to the multidimensional nature of economic vulnerability.

However, limiting economic vulnerability solely to macroeconomic indicators is not sufficient. Structural factors such as a country's level of technological development, quality of human capital, infrastructure capacity, political stability, dependency on natural resources, and sensitivity to commodity price fluctuations also directly affect vulnerability. Therefore, while the indicators used in this study provide a framework, more comprehensive analyses should also consider structural elements.

This study's contribution to the literature lies in being one of the few studies that analyze the economic performances of the Fragile Five countries using annual data and multi-criteria decision-making methods. By focusing on the indicators used to determine the economic vulnerabilities of these countries and employing the TOPSIS and VIKOR methods, the study aims to shed light on Turkey's position within the Fragile Five classification. This analysis reveals how the economic vulnerabilities of the Fragile Five countries are influenced by the selected factors and lays a foundation for potential recommendations to reduce these vulnerabilities. Moreover, such analyses serve as an example of how macroeconomic indicators can be utilized for cross-country comparisons. It is particularly intended to provide a valuable roadmap for emerging countries that are sensitive to economic fragility.

2. Literature Review

In 2015, Önder, Taş, and Hepşen evaluated the economic performances of the Fragile Five countries following the 2008–2009 Global Financial Crisis using the Analytic Network Process and TOPSIS methods. Their study ranked the economic performances of the Fragile Five countries by considering macroeconomic indicators such as current account deficit and unemployment rate (Önder, Taş, & Hepşen, 2015).

In 2016, Dinçsoy and Çan examined the effects of the U.S. Federal Reserve's (FED) quantitative easing policies and bond purchasing programs on these countries. Their study assessed the financial vulnerability of the Fragile Five based on macroeconomic indicators (Dinçsoy and Çan, 2016).

In 2019, Chadwick investigated the dependence of the Fragile Five and other emerging markets on U.S. monetary policies. Using time-varying copula models, the study analyzed the Fragile Five's reliance on U.S. monetary policies and the effects of this dependence on their economic vulnerabilities (Chadwick, 2019). The same year, Akkuş and Topuz analyzed the trends in unemployment rates in the Fragile Five countries, finding that unemployment did not fall below its natural rate in these countries and that economic shocks had lasting impacts on unemployment (Akkuş and Topuz, 2019).

In 2020, Demirkale and Özarı used the TOPSIS method to compare the economic and financial performances of the Fragile Five countries with the MINT (Mexico, Indonesia, Nigeria, and Turkey) countries. Their evaluation included criteria such as inflation, interest rates, and exchange rates (Demirkale and Özarı, 2020).

In 2022, Baykal and Turgan analyzed the impact of foreign direct investment (FDI) on the exports and GDP of the Fragile Five countries. Their study assessed how FDI influenced economic growth and foreign trade, shedding light on the Fragile Five's vulnerability to global financial fluctuations (Baykal and Turgan, 2022). In the same year, Yiğiter and Sarı conducted a study focused on financial vulnerability and key economic indicators specific to Turkey. Their analysis examined financial fragility using indicators such as the BIST 100 Index and exchange rates (Yiğiter and Sarı, 2022).

In their 2022 study, Kovacı and Şen evaluated the monetary policies implemented by central banks in the Fragile Five countries during the post-COVID-19 period. In particular, the policy responses of Turkey and India were analyzed comparatively. The study concluded that Turkey's aggressive interest rate cuts and loss of reserves increased its vulnerability. In this context, the pandemic's impact on macroeconomic indicators contributed a timely update to the literature.

In 2023, Sezal conducted a study on the credit volumes of the Fragile Five countries. The research analyzed the Credit-to-GDP ratios of Brazil, India, Indonesia, South Africa, and Turkey, providing insights into their economic vulnerabilities (Sezal, 2023).

In a 2024 study, İltaş and Güzel examined the relationship between Turkey's CDS premiums and exchange rate volatility. Their findings showed that rising CDS premiums exerted pressure on the Turkish Lira and deepened financial fragility. These results provide a contemporary perspective on why Turkey is considered among the more vulnerable economies.

The studies summarized above have addressed the economic vulnerabilities of the Fragile Five countries using different indicators and methods. However, most of these

studies employed only a single multi-criteria decision-making method or were limited to specific years. In this context, the present study makes a significant contribution to the literature in terms of both the analysis period (2014–2022) and the methodological diversity (using both TOPSIS and VIKOR).

Furthermore, while many existing studies predominantly focus on Turkey, this study stands out by analyzing all five countries in a comprehensive and comparative manner. In this respect, it helps fill a gap in the research and emphasizes the need for more comparative analyses at the international level.

Additionally, to better reflect the recent literature, future versions of this study could consider more recent works related to vulnerability indicators. Especially due to the structural changes in macroeconomic indicators triggered by the pandemic, there is now a foundation for identifying new indicators of vulnerability.

3. Data and Method

This study employs a range of macroeconomic indicators to evaluate the economic performance of the Fragile Five countries: Turkey, Brazil, India, Indonesia, and South Africa. The dataset is based on annual data and includes critical indicators of economic fragility, such as current account balance, inflation rate, unemployment rate, external debt ratio, and total reserves. These indicators were selected to analyze the macroeconomic fragility levels of these countries and to rank their vulnerabilities using the TOPSIS method. Additionally, an alternative performance analysis was conducted using the VIKOR method.

The six selected indicators reflect both financial and real-sector dimensions and provide insights into critical areas of economic stability such as external financing dependency, internal demand stability, price level control, labor market health, and resilience to external shocks. Therefore, indicators like current account balance (% of GDP), inflation rate, unemployment rate, external debt-to-GDP ratio, GDP growth rate, and total reserves are among the most frequently used measures in the literature to assess economic vulnerability in developing countries (Akkuş & Topuz, 2019; Demirkale & Özarı, 2020).

The selection of indicators in this study was guided by their ability to reflect each country's level of external dependence, financial stability, and overall economic resilience. While indicators like current account balance and external debt ratio are considered factors that may increase a country's economic fragility, total reserves are regarded as a safeguard representing resilience against external shocks. The influence of each criterion on economic performance is outlined as follows:

Current Account Balance (% of GDP): The current account balance reflects the sum of a country's trade surplus or deficit, along with service and transfer payments. Expressed

as a percentage of GDP, it indicates the country's dependence on external financing. A negative current account balance (deficit) suggests increased external dependence, which heightens vulnerability, while positive values imply greater economic strength. Therefore, a higher current account balance is considered a factor reducing fragility.

Inflation Rate: Inflation measures the annual rate of increase in price levels within a country. High inflation rates lead to macroeconomic instability and erosion of purchasing power. In this study, high inflation rates are treated as a negative economic indicator, while lower inflation rates signify a more stable economy.

Unemployment Rate: The unemployment rate reflects economic stagnation or the inability of the labor market to generate adequate employment opportunities. High unemployment rates indicate the presence of economic issues and the risk of social instability. For this reason, the unemployment rate is included as a critical indicator of economic fragility.

External Debt-to-GDP Ratio: The ratio of external debt to GDP shows a country's level of borrowing in foreign currencies. Higher ratios imply increasing debt burdens, making the country more sensitive to global market fluctuations. Thus, a high external debt ratio is considered a factor contributing to economic fragility.

Total Reserves (billion USD): Total reserves, which include foreign exchange and gold reserves, are seen as a safeguard that enhances a country's ability to service external debt and withstand external shocks. A high level of reserves reduces vulnerability during crises and is, therefore, regarded as having a positive impact.

These data were evaluated using both the TOPSIS and VIKOR methods to determine the position of each country, with a particular focus on Turkey, within the Fragile Five classification. TOPSIS is one of the Multi-Criteria Decision-Making (MCDM) methods, and its analysis involves steps such as normalizing the criteria, identifying ideal solutions, and measuring the proximity to the ideal solution. VIKOR, on the other hand, is a method developed to solve decision-making problems and evaluates the differences between the best solution and other alternatives.

TOPSIS, developed by Hwang and Yoon (1981), ranks alternatives based on their proximity to the ideal solution. The VIKOR method, introduced by Opricovic and Tzeng (2004), is notable for offering compromise solutions and balancing conflicting objectives in the decision-making process. These methods are widely used in disciplines ranging from engineering to social sciences due to their applicability in comparative analyses of multidimensional decision problems.

The combined use of TOPSIS and VIKOR enhances the robustness of the analysis and allows the vulnerability levels to be tested from different decision-making perspectives. This contributes to a more in-depth methodological analysis within the study.

3.1. TOPSIS Method

TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) method enables ranking of alternatives based on their proximity to the ideal solution in decision analysis processes. This method's goal, each criterion's best (positive ideal) and worst (negative ideal) values determining and alternatives' these values to distances by calculating final ranking to make TOPSIS analysis in followed steps are as follows:

1- Criteria Normalization Process: Data set's criteria different units in measured being due, comparable to make normalization process is done. Normalization, each criterion's specific range in value taking provides, and calculations unit differences from unaffected state becomes. Normalization process for below formula is used:

$$N_{ij} = \frac{X_{ij}}{\sqrt{\sum_{i=1}^{m} X_{ij}^2}}$$

Here, X_{ij}, each country's related criterion's value, N_{ij} represents normalized value.

2- Positive Ideal and Negative Ideal Solution Values Determined: This process, each criterion for positive ideal and negative ideal reference points determined becomes. Ideal solution (A^+) best value represents, while negative ideal solution (A^-) worst value represents. For example, current account deficit like negative impact creating criteria in, low values ideal accepted being, total reserves in high values ideal as determined is done.

3- Each Alternative's Ideal Solution Proximity Measuring and Final Ranking Done: Ideal solution's distance calculated by, each country's economic performance ranking done becomes.

$$D_i^+ = \sqrt{\sum_{j=1}^{n} \left(N_{ij} - A_j^+\right)^2}$$

$$D_i^- = \sqrt{\sum_{j=1}^{n} \left(N_{ij} - A_j^-\right)^2}$$

Here, D_i^+ represents the distance to the positive ideal solution, and D_i^- represents the distance to the negative ideal solution. Finally, the TOPSIS score (C_i) for each country is calculated using the following formula:

$$C_i = \frac{D_i^-}{D_i^+ + D_i^-}$$

This score indicates the degree of closeness of a country to the ideal solution. Countries with higher TOPSIS scores are closer to the ideal solution and are considered to carry lower risk in terms of fragility (Tsou, 2008).

3.2. VIKOR Method

The VIKOR (Multi-criteria Optimization and Compromise Solution) method is a decision-making technique developed to find the best alternative solution among multiple criteria. This method allows for minimizing the differences among alternatives and providing a solution based on the decision-maker's preferences. Within the scope of this study, the VIKOR method was evaluated in addition to the TOPSIS method, and the rankings obtained from both methods were compared. The following steps were followed in the VIKOR method:

1- Decision Matrix: For a multi-criteria decision-making (MCDM) problem with m alternatives and n criteria, the scores of the alternatives for each criterion are structured into a decision matrix, denoted as $[f_{ij}]_{m\times n}$.

$$[f_{ij}]_{m\times n} = \text{Alternatives} \begin{matrix} \\ \\ \\ \\ \end{matrix} \overset{\text{Criteria}}{\begin{bmatrix} f_{11} & f_{12} & \cdots & f_{1n} \\ f_{21} & f_{22} & \cdots & f_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ f_{m1} & f_{m2} & \cdots & f_{mn} \end{bmatrix}}$$

2- Best and Worst Criterion Values: Let $i = 1,2,\dots,m$ ve $j = 1,2,\dots,n$, for each criterion, the best $(f_j{}^*)$ and worst $(f_j{}^-)$ values are calculated. These calculations depend on whether the criterion is benefit-oriented or cost-oriented:

$$f_j^* = \begin{cases} \max\limits_i f_{ij}, & \text{if } j \text{ is a benefit-oriented criterion} \\ \min\limits_i f_{ij}, & \text{if } j \text{ is a cost-oriented criterion} \end{cases}$$

$$f_j^- = \begin{cases} \min\limits_i f_{ij}, & \text{if } j \text{ is a benefit-oriented criterion} \\ \max\limits_i f_{ij}, & \text{if } j \text{ is a cost-oriented criterion} \end{cases}$$

3- Normalized Decision Matrix: Since the scores in the decision matrix may be in different units, the decision matrix is normalized to allow for proper evaluation. The normalized decision matrix is represented as $[r_{ij}]_{m\times n}$.

$$r_{ij} = \frac{f_j^* - f_{ij}}{f_j^* - f_j^-}$$

4- Weight Vector: The importance of the criteria is represented by the weight vector $[w_j]_{1\times n}$. If all criteria are of equal importance, the weights can be evenly distributed as $1/n$.

5- Weighted Normalized Decision Matrix: The weighted normalized decision matrix $[v_{ij}]_{m\times n}$ is calculated by incorporating the criterion weights into the normalized decision matrix using the formula:

$$v_{ij} = r_{ij}.w_j$$

6- Group Scores: The average group score S_i and the worst group score R_i are calculated for each alternative.

$$S_i = \sum_{j=1}^{n} v_{ij}$$

$$R_i = \max_j v_{ij}$$

7- Compromise Solution: First, the best S^*, R^* and worst S^-, R^- values for the average group score and the worst group score are calculated.

$$S^* = \min_i S_i$$

$$S^- = \max_i S_i$$

$$R^* = \min_i R_i$$

$$R^- = \max_i R_i$$

The scores Q_i for the compromise solution are combined using a parameter $0 \leq q \leq 1$. Calculations related to the average group score are performed with the coefficient q, which represents maximum group utility, while calculations related to the worst group score are performed with the coefficient $1 - q$, which represents minimum regret.

$$Q_i = q.\frac{S_i - S^*}{S^- - S^*} + (1 - q).\frac{R_i - R^*}{R^- - R^*}$$

The calculated values S_i, R_i, Q_i are ranked in ascending order, and solutions are determined based on two conditions:

Condition 1 (Acceptable Advantage): If the difference between the scores of the first two alternatives A^1, A^2 in the ranked Q_i values satisfies $Q(A^2) - Q(A^1) \geq 1/(m-1)$ then the alternative A^1 is acceptable.

Condition 2 (Acceptable Stability): If the lowest scores in the ranked S_i ve R_i values correspond to the first-ranked Q_i value for alternative A^1, then this alternative is a stable solution for reaching the compromise decision (Opricovic & Tzeng, 2004).

4. Findings and Discussion

The analysis conducted using the TOPSIS method on the economic performances of the Fragile Five countries has allowed for the annual ranking of their economic performances during the 2014-2022 period. Table 1 shows the TOPSIS analysis values obtained from the data of the five countries for the years 2014-2022, sourced from the World Bank.

	Brazil	*India*	*Indonesia*	*South Africa*	*Turkiye*
2014	0,5368	0,8725	0,5934	0,1469	0,4913
2015	0,4246	0,9198	0,6372	0,3077	0,5912
2016	0,3933	0,9070	0,6299	0,2360	0,4484
2017	0,6304	0,8959	0,6507	0,3233	0,4039
2018	0,6261	0,8956	0,6517	0,3763	0,3181
2019	0,4527	0,7091	0,5570	0,3143	0,4612
2020	0,4908	0,6248	0,5849	0,5032	0,3587
2021	0,3503	0,5725	0,5408	0,5656	0,3460
2022	0,6053	0,7418	0,7069	0,4842	0,2968

Table 1: Annual TOPSIS Values for the Economic Performances of the Fragile Five Countries

Source: The World Bank - 08.11.2024

The overall ranking and performance changes graph obtained from the analysis using the TOPSIS method are presented in Table 2.

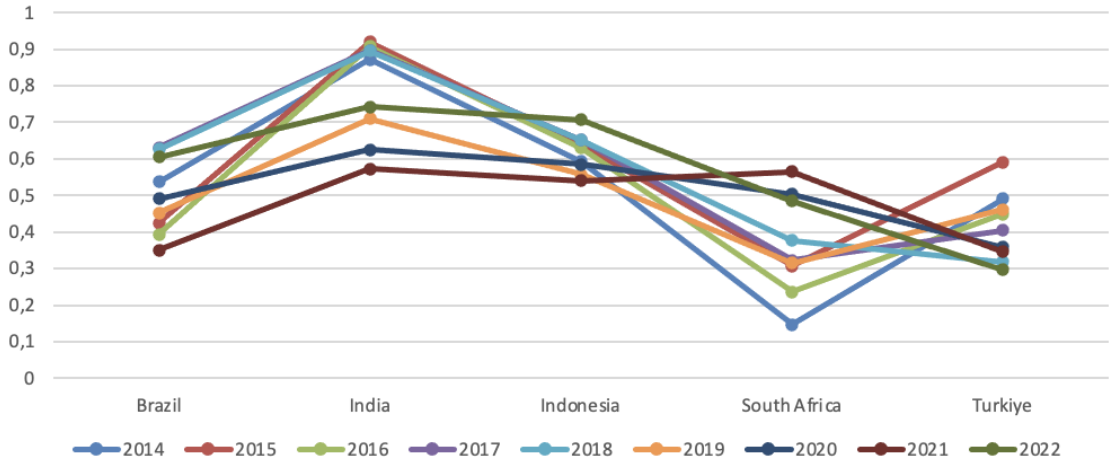

Table 2: Annual Changes in the Economic Performances of the Fragile Five Countries (TOPSIS)

According to these results, India has generally been the best-performing country throughout the analysis period. It has shown a more advantageous position compared to other countries in terms of current account balance, inflation, and unemployment rate.

India's consistently high rankings in the analyses conducted using the TOPSIS and VIKOR methods can be explained by its low current account deficit rates (2–3%), high growth rates (5–7%), and low unemployment levels (5–6%). Additionally, the strong structure of its reserves has made the country more resilient to external shocks. These findings are similarly reflected in the studies conducted by Demirkale and Özarı (2020) and Önder, Taş, and Hepşen (2015).

South Africa and Turkey have typically had lower TOPSIS scores in the analysis, standing out as the more vulnerable countries in terms of fragility. Indonesia has usually ranked in the middle, occasionally showing performance close to India. Brazil, despite showing recoveries in certain years, has not achieved consistent improvement throughout the analysis.

In 2014, India had by far the highest TOPSIS score, while Turkey and South Africa scored significantly lower. This indicates that India's macroeconomic fragility was relatively lower compared to the other countries. In 2020 and 2021, significant differences were observed among the countries. Particularly, Turkey and Brazil experienced notable declines in performance. In 2022, India once again ranked at the top, while Turkey's performance fell to one of its lowest levels during the analysis period.

Considering the influence of the criteria on performance, countries with high current account deficits tended to have lower performance in the TOPSIS rankings. This was especially evident in Turkey and South Africa. High inflation rates significantly reduced the rankings of the countries, with Turkey exhibiting poor performance in this regard.

Turkey's low performance in the analysis can be explained by unfavorable macroeconomic indicators observed after 2018, such as rising inflation (over 20%), declining reserves, and increasing external debt ratios. İltaş and Güzel (2024) demonstrated a positive relationship between Turkey's CDS premium and exchange rate, showing that this dynamic has heightened financial fragility. This provides empirical support for Turkey's consistently high vulnerability scores in the VIKOR analysis.

Additionally, the study conducted by Kovacı and Şen (2022) revealed the impact of Turkey's central bank policies on economic vulnerability in the post-COVID-19 period. Policy actions such as aggressive interest rate cuts and reserve losses were particularly reflected in the VIKOR analysis as high vulnerability scores during 2020–2021. In this context, the findings of the study align with the literature emphasizing the negative effects of the pandemic on economic performance.

The unemployment rate was a critical factor for South Africa, as this criterion was decisive in its consistently low performance.

India's overall strong performance can be attributed to its more stable economic policies compared to the other Fragile Five countries. Maintaining relatively low levels of current account deficits and keeping unemployment rates under control distinguished India from the others. Turkey, due to sharp increases in inflation rates, typically ranked lower in the economic performance rankings. Similarly, South Africa remained among the more fragile countries due to its high unemployment rates. The rankings of Brazil and Indonesia were often influenced by the sustainability of their economic policies and the magnitude of their external financing needs.

This study also focuses on the differences that arise from applying the TOPSIS and VIKOR methods. Table 3 shows the VIKOR analysis values obtained from the data of the five countries for the years 2014–2022, sourced from the World Bank.

	Brazil	*India*	*Indonesia*	*South Africa*	*Turkiye*
2014	0,6952	0	0,5830	1	0,9218
2015	0,8856	0	0,6485	1	0,8988
2016	0,8025	0	0,5391	1	0,9095
2017	0,6527	0	0,5431	1	0,9662
2018	0,6867	0	0,6648	1	0,8889
2019	0,7429	0	0,4744	1	0,9283
2020	0,1900	0,4655	0,3730	0,9163	1
2021	0,9290	0	0,7955	0,9495	1
2022	0,5031	0	0,4508	0,9489	1

Table 3: Annual VIKOR Values for the Economic Performances of the Fragile Five Countries

Source: The World Bank - 08.11.2024

Considering the values obtained through the VIKOR method, the overall ranking and performance changes graph for each country is presented in Table 4.

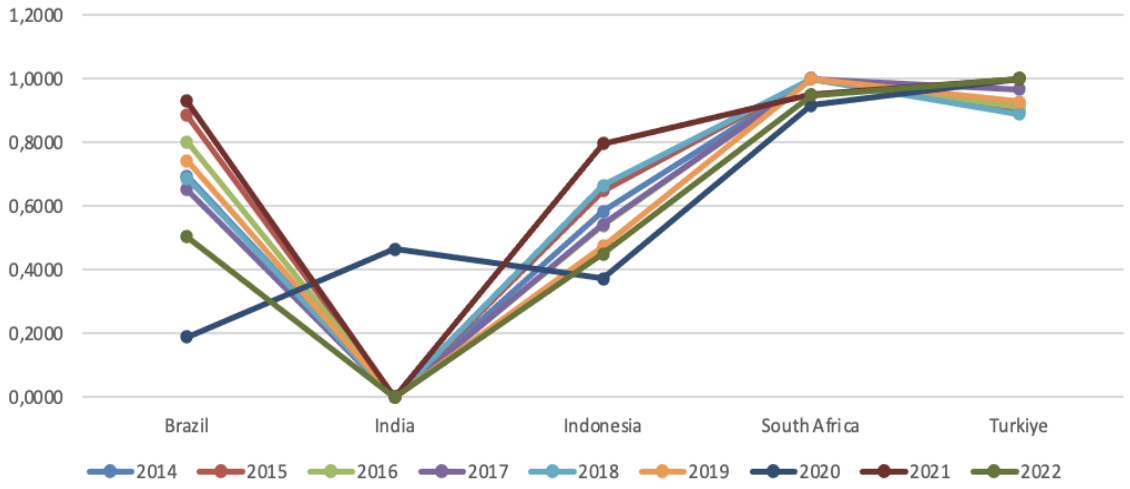

Table 4: Annual Changes in the Economic Performances of the Fragile Five Countries (VIKOR)

According to the data in the table, India's scores were recorded as 0 for all years (except 2020). This suggests that India was selected as the ideal reference country in the VIKOR analysis or had the best values. Under the VIKOR criteria, India demonstrated the best overall economic performance throughout the analysis period.

The findings obtained within the scope of this study also support the emphasis on dependency on U.S. monetary policies highlighted by Chadwick (2019). According to Chadwick, countries like Turkey that are highly dependent on these policies experience increased volatility in macroeconomic indicators and higher levels of vulnerability.

Brazil's VIKOR scores fluctuated over the years, reflecting inconsistent performance in its economic indicators. Indonesia's VIKOR scores ranged between 0.3730 and 0.7955. While Indonesia showed its best performance in 2021, its scores were lower in 2020 and 2022. Compared to other countries, Indonesia's economic performance exhibited a more stable improvement trend.

South Africa's scores were generally 1 or very close to 1. This indicates that South Africa was frequently in a disadvantaged position in the VIKOR analysis and was among the worst-performing countries. Specifically, the scores ranging from 0.9163 to 0.9495 from 2020 onward suggest difficulties in improving performance, likely due to the impact of the pandemic.

Turkey's scores were generally high, reaching the maximum value of 1, especially from 2020 onward. This highlights Turkey as the most fragile and weakest-performing country under the VIKOR assessment. Even during the 2014–2019 period, Turkey's high scores reflect the fragile structure of its economy.

From 2020 onward, notable differences emerged in the performances of the countries. These results indicate that the stable economic policies implemented by India to reduce economic fragility could serve as a model for other countries. For Turkey and South Africa, however, more comprehensive and sustainable policies are needed to mitigate economic vulnerabilities.

Overall, the rankings obtained through both the TOPSIS and VIKOR methods clearly reveal not only the general differences in performance but also which specific indicators each country performs poorly in. In this regard, the analysis results contribute to identifying priority areas for policymakers.

5. Conclusion and Recommendations

In the study, the economic performances of the Fragile Five countries were analyzed in detail using the TOPSIS and VIKOR methods.

TOPSIS considers each country's proximity to the positive ideal solution while simultaneously evaluating its distance from the negative ideal solution. This method provides a comprehensive assessment of each country's economic performance. With this method, the performance rankings between countries appear relatively more balanced and consistent across the years. As a result of these analyses, India's superiority has consistently been evident, while Turkey and South Africa have generally remained at the bottom of the rankings.

This result is also consistent with studies in the literature, such as those by Önder, Taş, and Hepşen (2015) and Demirkale and Özarı (2020). These studies indicate that India has maintained economic stability, while Turkey has shown weak performance, particularly in indicators such as inflation and current account balance. Chadwick (2019) emphasizes that Turkey's high dependence on U.S. monetary policies increases its financial vulnerability.

VIKOR focuses specifically on the worst criteria, providing decision-makers the ability to identify the most fragile country and which criteria contribute the most to weaknesses. With this method, more pronounced fluctuations in the fragility levels of countries such as Brazil and Indonesia have been observed.

Turkey and South Africa have consistently ranked among the most fragile countries in both the TOPSIS and VIKOR methods. High inflation rates and a persistent current account deficit in Turkey have increased economic fragility, while the consistently high unemployment rate in South Africa has negatively affected its economic performance. In 2020 and 2021, according to TOPSIS results, South Africa's performance showed slight improvement, while the VIKOR analysis during the same period indicated that South Africa maintained its high fragility score. This demonstrates that VIKOR focuses more on the worst values and is more sensitive to the criteria in which countries perform poorly.

During the 2020–2021 period, the impact of the COVID-19 pandemic led to significant deterioration in economic indicators across all Fragile Five countries. In Turkey, the inflation rate exceeding 20% loss of reserves, and the increase in external debt heightened the level of vulnerability. In South Africa, a sharp decline in economic growth and high unemployment became more apparent in the VIKOR scores. These findings are supported by the study of post-pandemic central bank policies conducted by Kovacı & Şen (2022).

Brazil and Indonesia generally ranked at moderate levels in both methods. However, Brazil achieved lower fragility scores in some years (e.g., 2020) in the VIKOR analysis, which can be attributed to the method's emphasis on worse conditions.

For the Fragile Five countries, especially Turkey and South Africa, sustainable and effective macroeconomic policies can be developed to reduce economic fragility. Controlling inflation and reducing unemployment rates should be prioritized. South Africa has been one of the most fragile countries due to its persistently high unemployment rates. Similarly, a high current account deficit has caused Turkey's fragility score to rise, and a similar effect has been observed in South Africa. For countries with high current account deficits, policies supporting exports can be implemented to reduce the need for external financing and to increase foreign exchange reserves.

In this context, it is critically important for Turkey to strengthen its reserve structure, enhance predictability in monetary policy, and improve the investment climate. The study conducted by Baykal & Turgan (2022) also demonstrates the positive effects of foreign direct investment inflows on GDP and exports.

Foreign direct investments (FDI) can play a critical role in reducing economic fragility. Legal and economic reforms can be made to improve the investment environment and enhance investor confidence.

Relying on only a few sectors for exports and economic growth makes these countries more vulnerable to global fluctuations. Transitioning to a more diverse economic structure can help reduce fragility. Long-term development strategies can be developed to ensure economic stability and mitigate vulnerabilities. Investments in education, infrastructure, and technology can be particularly increased.

Among the limitations of this study is the reliance on only six macroeconomic indicators. The exclusion of more structural factors -such as political stability, institutional quality, financial system depth, and environmental risks- from the vulnerability analysis restricts the scope of the study. Additionally, the use of annual data limits the ability to analyze the effects of short-term shocks."

Future studies could incorporate financial vulnerability indicators such as CDS spreads, portfolio investments, and exchange rate volatility. Moreover, it is recommended to conduct comparative analyses using additional methods like Grey Relational Analysis, AHP, and Entropy alongside TOPSIS and VIKOR. Such analyses would be beneficial in testing the robustness of cross-country rankings.

These recommendations can help the Fragile Five countries create a sustainable growth model to reduce their current levels of economic fragility and build a more resilient structure against global financial fluctuations.

REFERENCES

AKKUŞ, Ö., & TOPUZ, S. G. (2019). İşsizlik histerisinin geçerliliği: gelişmekte olan en kırılgan beşli. *Sosyoekonomi*, 27(39), 69-80. https://doi.org/10.17233/sosyoekonomi.2019.01.04

BAYKAL, M. M., & TURGAN, E. (2022). Macroeconomic Effects of Foreign Direct Investments on Fragile Five Countries. *İstanbul Gelişim Üniversitesi Sosyal Bilimler Dergisi*, 9(1), 153-165. https://dx.doi.org/10.17336/igusbd.766173

CHADWICK, M. G. (2019). Dependence of the "Fragile Five" and "Troubled Ten" emerging market financial systems on US monetary policy and monetary policy

uncertainty. *Research in International Business and Finance*, 49, 251-268. https://doi.org/10.1016/j.ribaf.2019.04.002

DEMIRKALE, Ö., & ÖZARI, Ç. (2020). Assesstment of Macroeconomic and Financial Performance of Fragile Five and MINT Countries Using TOPSIS Method. *Florya Chronicles of Political Economy*, 6(2), 171-192. https://doi.org/10.17932/IAU.FCPE.2015.010/fcpe_v06i2004

DINÇSOY, M. O., & ÇAN, H. (2016). Kırılganlık Göstergeleri ve Kırılgan Beşli Ülkeleri Üzerine Bir İnceleme. *The Journal of Academic Social Science*, 22(22), 199-217. https://doi.org/10.16992/ASOS.1013

İLTAŞ, Y., & GÜZEL, F. (2024). The Nexus between CDS Premiums and Exchange Rates: Evidence from BRICS Countries and Türkiye. *Ekonomi Politika ve Finans Araştırmaları Dergisi*, *9*(4), 796-*811. https://doi.org/10.30784/epfad.1583969*

KOVACI, S., & ŞEN, S. (2022). Central Bank Policies of Fragile Five Countries in the Covid-19 Process Covid-19 Sürecinde Kırılgan Beşli Ülkelerin Merkez Bankası Politikaları. https://doi.org/10.19168/jyasar.1002021

OPRICOVIC, S., & TZENG, G. H. (2004). Compromise solution by MCDM methods: A comparative analysis of VIKOR and TOPSIS. *European Journal of Operational Research*, 156(2), 445-455. https://doi.org/10.1016/S0377-2217(03)00020-1

ÖNDER, E., TAŞ, N., & HEPSEN, A. (2015). Economic performance evaluation of Fragile 5 Countries after the Great Recession of 2008-2009 using analytic network process and TOPSIS methods. *Journal of Applied Finance & Banking*, 5(1), 1-17.

SEZAL, L. (2023). A study on bank credit volumes of fragile five countries. *Hitit Journal of Social Sciences*, 16(1), 209-222. https://doi.org/10.17218/hititsbd.1241803

TSOU, C. S. (2008), Multi-Objective Inventory Planning Using MOPSO and TOPSIS, *Expert Systems with Applications*, 35, ss.136-142. https://doi.org/10.1016/j.eswa.2007.06.009

YIĞITER, Ş. Y., & SARI, S. S. (2022). Türkiye Özelinde Finansal Kırılganlık ve Temel Ekonomik Göstergeler. *Muhasebe Enstitüsü Dergisi*, (67), 1-13. https://doi.org/10.26650/MED.1121035