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A RESEARCH ON THE USE OF THE RENTAL ELECTRIC SCOOTER

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Abstract

Recently, the number of rental electric scooters has been increasing in Türkiye. While the scooter was previously kind of a toy used only by children, it is now used as a means of transport for short distance journeys. It was aimed to obtain more information about the rental scooter, which has become quite fashionable in recent years in this study. In this direction, it is planned to behaviourally analyse the intention of consumers to use rental electric scooters. For this purpose, 307 consumers were reached by using online survey method. The data collected were analysed with SPSS Amos 24 software. Through this research; no definite relationship was found between consumers' performance expectancy, effort expectancy, price value and facilitating conditions and behavioural intention, while a positive relationship was found between social influenceand behavioural intention and perceived risk and behavioural intention.

Keywords: Electric Scooter, Behavioural Intention, Consumer Behaviour

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INTRODUCTION

Two-wheeled vehicles, which entered our lives as a play vehicle for children years ago, have become an electric two-wheeled means of transport today. The scooter rental system, which was first used in America in 2017, is called the shared e-scooter system (Gössling, 2020). After the USA, this system has started to spread rapidly to other countries of the world, including Türkiye, due to factors such as convenience, cheapness, ease and environmental protection. Ina study conducted by Boston Consulting Group (BCG) in 2019, it is mentioned that the market share of electric scooter (e-scooter) use will reach 40/50 billion US dollars by 2025(BCG, 2019).

In the world, the use of two-wheeled, lightweight and small-sized electric vehicles for short-distance transport is called micro mobility (Eccarius & Lu, 2020). It is observed that micro mobility has become more used due to facilitating conditions such as being economical, facilitating transportation, providing the opportunity to move faster, saving time by getting rid of traffic density. The fact that scooters can be easily rented using mobile applications and can be easily found at many points makes their use attractive.

In order to rent an e-scooter, consumers must first have a smart mobile device and an application. Scooter users enter the rental scooter application from their smart mobile devices and see if there is an e-scooter for rent near their current location. After finding a suitable scooter, the scooter is registered with the mobile application and the scooter is started to be used. In addition, these people complete the transaction by paying the travel (distance) fee via the mobile application, and scooter points can be detected by GPS tracking of the payment system usage time and the drop-off point. In addition, if there is no scooter drop-off point where the user ends up using the scooter, the use of the scooter is completed by leaving the scooter in a suitable place.

According to the data of Gemius research company, it was concluded that 4.4 million people visited the scooter applications of only 3 companies between 14 March and 14 April 2022 in Turkey. It was determined that the people using the application are generally in the 25-34 age range (Gemius Turkey, 2022).

In addition to positive opinions, it is necessary to know that there is also a segment that thinks this means of transport is risky. It is obvious that there are negative sides such as the lack of clear rules in traffic, the lack of a separate road they can go in traffic, and the high speed limit. Accordingly, this study aims to measure the relationship between consumers' performance expectancy, effort expectancy, price value, social influence, price value and facilitating conditions and behavioural intentions in order to getmore knowledge about the intention to rent an e-scooter.

Although e-scooter rental applications are increasing in the world and in Turkey, situations such as the fact that countries are in the transition stage to this system and its effect is not known exactly, suggests that the contribution of this study to the literature is important. Due to the increasing use of electric scooters day by day and the lack of sufficient studies on this subject in our country, it is a field that needs to be examined academically. Thus, in this study, some uncertainties were tried to be shed light on.

1. Literature Review

Renting electric scooter has become widespread in the world including Türkiye as well. This micro mobility is defined by the International Transport Federation as transport by human-powered electric vehicles with a speed limit of 45 km / h up to 350 kg and, if available, the power supply can be gradually reduced (OECD/ITF, 2020).

While in previous years, children and/or adults used vehicles for hobby and/or sports purposes such as bicycles, in 2017, firstly used in USA (Gössling, 2020; Nacto, 2018). The use of electric scooters for hire in Türkiye started in 2019. Looking at 2022, it is seen that 4.4 million people logged in to the scooter application in a period of only 1 month (Gemius, 2022). In the researches, they think that it is an effective alternative in providing transportation from one place to another for people who do not have a car or do not want or do not use it, who want to easily reach public transportation vehicles, or who do not want to use public transportation (Caspi et al., 2020; Jacques, 2019).Inthe study conducted by Almanna et al. in 2021 in Saudi Arabia, it was concluded that people who called a vehicle from mobile applications were more willing to use electric scooters, and people wanted to rent electric scooters from shopping malls or entertainment centres. In addition, regarding the use of electric scooters by the participants; It is seen that they are concerned about the lack of infrastructure, weather and safety problems (Almannaa et al., 2021). Theyconcluded that people in the state of Texas in the USA need a good bicycle path infrastructure for electric scooter application and that students are generally willing to use this application. For this reason, it is thought that it would be appropriate to work on the infrastructure problem of companies and expand the electric scooter application in regions where students live heavily (Caspi et al., 2020). In the study conducted by Nikiforiadis et al. in Greece in 2021, it was concluded that people who use electric scooters prefer this vehicle instead of using public transport or walking. On the other hand, it is seen that people who use bicycles or motorcycles are not willing to use electric scooters. In addition, considering the effect of gender on usage, it is seen that men are more willing to use electric scooters (Nikiforiadis et al., 2021).

The study of consumers in 2021 in Italy focused on the time and place of use of electric scooters. Most people use the electric scooter for short trips, usually in the afternoon on weekdays. In parallel with the literature, the places where it is used in the morning are mostly the places where university students are. It is also seen that it is used in places close to public transportation stations such as trains and subways. In other words, it is possible to say that people benefit from the electric scooter service to gain speed and provide easy access to public transportation (Chicco and Diana, 2022). Inthe study conducted in 2023 in Australia, Belgium, Czech Republic, Norway, Czech Republic, Norway and Sweden by online survey method, some of the participants said that they violated the rules by travelling on the pedestrian pavement even though they were not allowed to do so. Therefore, it is seen that pedestrians living in four countries other than Australia find electric scooter users annoying. It is also understood that people who do not use electric scooters think that the use of electric scooters is extremely risky (Sucha et al., 2023).

Research in Norway also focused on whether the use of electric scooters could replace public transport. As a result of the study, it was seen that electric scooters and public transportation vehicles were rivals on the one hand and complemented each other on the other. As in the case of Italy (Chicco & Diana, 2022), the majority of people use electric scooters to reach the public transport system (Aarhaug et al., 2023). Inanother study conducted in 2022 in Lisbon, Portugal, the environmental, social and economic

dimensions of users were evaluated. As a result of the study, although it is accepted that the use of electric scooters is beneficial, it has been seen that safety problems worry users. It was concluded that safety should be improved and benefit should be maximized (Felix et al., 2023). Inshort, it is seen that the subject of electric scooter is handled in many different aspects in the world. When the studies conducted in Turkiye are examined;

In the study conducted by Bolen and Çeliker in 2021, the Value Based Adoption Model was used and it was understood from the analysis results that consumers using scooters saw this service as a useful and enjoyable means of transportation. In the study conducted by Bozkurt and Celiker in 2021, the effect of consumers' perceived benefit and innovativeness on the intention to use electric scooters was investigated. According to the research, it has been revealed that the perceived benefit of consumers using electric scooters in Türkiye is more effective than consumer innovativeness (Bozkurt et al., 2021). Inthe study conducted by Ozelturkay et al. (2022), it was determined that people who use electric scooters use them for entertainment purposes and feel psychological benefit while using them. In addition, it was concluded that legislation or rules should be regulated for scooter use. Respondents felt that scooters needed a bike lane or a dedicated lane, otherwise people traveling on the sidewalk pose a threat to pedestrians. It has emerged that fines should be applied as a deterrent to solve this problem (Ozelturkay et al., 2022). Inthe study conducted by Topcuoglu et al.in 2022, it was concluded that participants who perceived public transport as risky and had a high level of environmental anxiety during the Covid-19 period had high intentions to use electric scooters (Topcuoglu vd.,2022).

According to the purpose of the study, the research problem is "What are the factors that lead consumers to use e-scooters?" And according to the literature review, an original research model has been created with reference to The Unified Theory of Acceptance and Use of Technology 2 developed by Venkatesh et al. in 2012. Through this model, the factors affecting consumers' behavioural intention to use e-scooters are analysed.

2. Research Methodology

With this study, it is aimed to investigate the effects of Performance Expectation, Effort Expectation, Social Impact, Facilitating Conditions, Price Value and Perceived Risk on consumers' Behavioral Intention to use electric scooters. Quantitative research method was used in the research. In this study, convenient sampling was chosen as the data collection technique and the online survey method was adopted. Scale developed by Venkatesh et al. (2012) scale developed by Laroche et al. for the variables of performance expectancy, effort expectancy, social impact, price value, facilitating conditions, and behavioral intention. For the perceived risk variable, its validity and reliability have been tested and accepted in the field (Laroche et al., 2005).

2.1. Research Model and Hypothesis

The research framework is presented below.

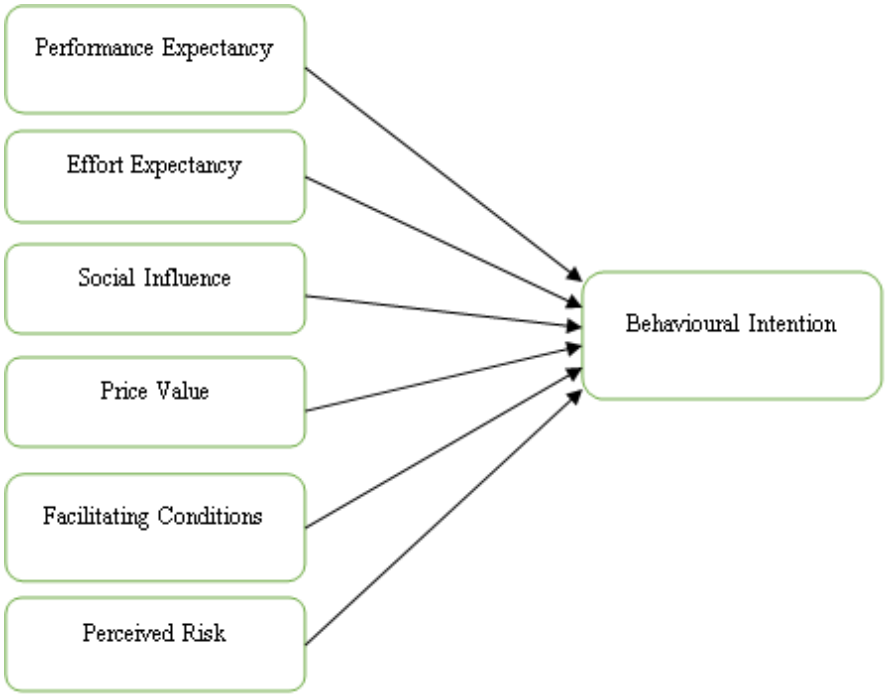

Figure 1. Research Framework

The hypotheses of the research are shown below. All hypothesis are need to be supported with literature.

Performance Expectancy

Performance expectancy (Venkatesh et al., 2012), which is derived from the structure of perceived usefulness (Davis, 1989) in the technology acceptance model, is an indicator of the extent of the benefit that consumers can obtain when using a technology. From the consumers' perspective, it is the motivation to use new technology. Therefore, the following hypothesis is assumed in this study; *H1:Performance expectancy positively affects consumers' intention to use electric scooters*

Effort Expectancy

It is the degree to which consumers can easily use any technology without any effort (Venkatesh et al., 2012; Chiu & Wang, 2008). If the technology to be used is easy to use, it is thought that the intention to use will be positively affected (Al-Okaily, 2020). Therefore, the following hypothesis is assumed in this study; *H2:Effort expectancy positively affects consumers' intention to use electric scooters.*

Social Influence

It is thought to have a significant effect on the behavioural intention of the individual (Ajzen & Fishbein, 1980) with the belief that the individuals who are valued in human life will use a certain technology (Venkatesh et al., 2012). Therefore, the following hypothesis is assumed in this study; *H3:Social influence positively affects consumers' intention to use electric scooters.*

Price Value

The consumers' intention is influenced by the relationship between the benefit they perceive during product or service use and the cost of use (Venkatesh et al., 2012). Therefore, the following hypothesis is assumed in this study; *H4:Price value positively affects consumers' intention to use electric scooters.*

Facilitating Conditions

It is considered as consumers' perception of the resources and support available at that time when trying to perform an event (Venkatesh et al., 2012), and it is known that facilitating conditions in digital applications are effective on intention (Verkijika, 2018). In order for people to use scooters, they must first use the mobile application correctly. Therefore, the following hypothesis is assumed in this study; *H5:Facilitating conditions positively influence consumers' intention to use electric scooters*.

Perceived Risk

It is a state of uncertainty that slows down the person because they cannot fully predict the outcome during decision making (Bauer, 1960; Stone & Mason, 1995). Since it slows down the behaviour of the person, it is very important to examine it. Therefore, the following hypothesis is assumed in this study. *H6:Perceived risk positively affects consumers' intention to use electric scooters.*

The sample of the study consisted of adult participants over the age of 18. In this study, convenience sampling method was used. Structural equation modeling (SEM) requires a sample size of at least 200 (Weston & Gore Jr., 2006), 307 people were reached by online survey method in this study. Microsoft Forms was used for the online survey. In the first part of the questionnaire form, questions were asked to learn demographic characteristics.

3. Findings

The demographic information of the participants is presented in the table below.

Table 1. Demographic Characteristics of the Participants(N:307)

Variables	Groups	F (Frequency)	% (Percentage)
Gender	**Female**	212	69,1
	Male	95	30,9
Age	**18-25**	85	27,7
	26-40	156	50,8
	41-56	54	17,6
	57 and over	12	3,9

Marital Status	**Married**	133	43,3
	Single	174	56,7
Education Status	**High School**	27	8,8
	Associate Degree	15	4,9
	Licence	112	36,5
	Postgraduate	153	49,8
Income Status	**10.000 TL and below**	146	47,6
	10.001- 15.000 TL	67	21,8
	15.001 TL and over	94	30,6

Considering the demographic characteristics of the participants, it was seen that 69.1% of the 307 participants were women and 78.5% were under the age of 40. It is seen that 86.3% of the participants have undergraduate or higher education. Whenthe income status of the participants is analysed, it is observed that 47.6% of them have an income below 10.000 TL and 52.4% of them have an income above 10.001 TL.

3.1. Confirmatory Factor Analysis, Validity, Reliability

Structural equation modelling, which combines multiple regression and factor analysis to test the relationship between variables as well as hypothetical relationships, was used (Hair vd., 2019). Confirmatory factor analysis, which facilitates the development of measurement models and is the first stage in structural equation modelling, was performed. BI4 (Behavioural Intention), PR5 (Perceived Risk), FC4 and FC5 (Facilitating Conditions) expressions were removed from the scale expressions with factor loadings less than 0.6, respectively. After each statement was removed, the confirmatory factor analysis was run again and the factor loadings were analysed. Thus, since the factor loadings were not less than 0.60, the AVE (average variance explained by factors) value was greater than 0.50 and the CR (composite reliability) value was greater than 0.70 (Fornell & Larcker, 1981), it was seen that the discriminant and convergent validity of the research was provided.

Table 2. Factor loadings, Cr value, Ave value, Cronbach alpha (α) table

Items	**Factor loadings**	**AVE**	**CR**	**Cronbach's (α)**
Performance Expectancy PE1	,743	,69	,90	,893
Performance Expectancy PE2	,891			
Performance Expectancy PE3	,836			
Performance Expectancy PE4	,860			
Effort Expectancy EE1	,909	,70	,90	,899
Effort Expectancy EE2	,904			
Effort Expectancy EE3	,800			

Effort Expectancy EE4	,724			
Social Influence SI1	,926	,82	,93	,930
Social Influence SI2	,951			
Social Influence SI3	,844			
Facilitating ConditionsFC1	,717	,56	,73	,785
Facilitating ConditionsFC2	,742			
Facilitating ConditionsFC3	,799			
Price Value PV1	,861	,73	,91	,912
Price Value PV2	,908			
Price Value PV3	,918			
Price Value PV4	,722			
Perceived Risk PR1	,743	,51	,80	,808
Perceived Risk PR2	,661			
Perceived Risk PR3	,667			
Perceived Risk PR4	,785			
Behavioural Intention BI1	,853	,82	,93	,933
Behavioural Intention BI2	,943			
Behavioural Intention BI3	,932			

As a result of the confirmatory factor analysis, it was understood that the goodness-of-fit indices were within acceptable criteria (Schermelleh-Engel, Moosbrugger, & Müller, 2003). It is known that it will be sufficient to give 3 or 4 fit indices instead of reporting all of the model fit indices (Hair et al., 2019). Goodness of fit indices are given in the table below. When the results of the report were analysed, acceptable and goodness of fit indices were obtained within the scope of the measurement model. As a result, it is seen that the data collected in the research fits the measurement model created well (Hair et al., 2019).

Table 3. Model Goodness of Fit Indices Table

Goodness of Fit Indexes	Measurement Model Goodness of Fit Indexes	Reference Values	Results
CMIN/DF	2,760	**CMIN/DF ≤ 3**	Perfect Fit
GFI	,84	**,80 ≤ GFI ≤ 1**	Acceptable Fit
RMSEA	,07	**,03 ≤ RMSEA ≤ ,08**	Good Fit
TLI	,90	**,90 ≤ TLI ≤1**	Acceptable Fit
CFI	,92	**,90 ≤ CFI ≤1**	Acceptable Fit

3.2. Structural Equation Modelling (SEM)

In the structural model, there are exogenous and endogenous structures and hypothetical directions between structures. While the exogenous structure is the equivalent of the independent variable, the endogenous structure is the equivalent of the dependent variable. Exogenous and endogenous structures are also referred to as latent variables in structural equation modelling (Hair et al., 2019). Accordingly, the endogenous structure in the structural model of the current study is behavioural intention and exogenous structures are performance expectancy, effort expectancy, price value, facilitating conditions, social influence and perceived risk.

In this study, a structural equation model was created to test the hypotheses of the model. Figure 2 shows the screenshot of the structural equation model created in the AMOS 24 programme, which is an extension of the SPSS programme.

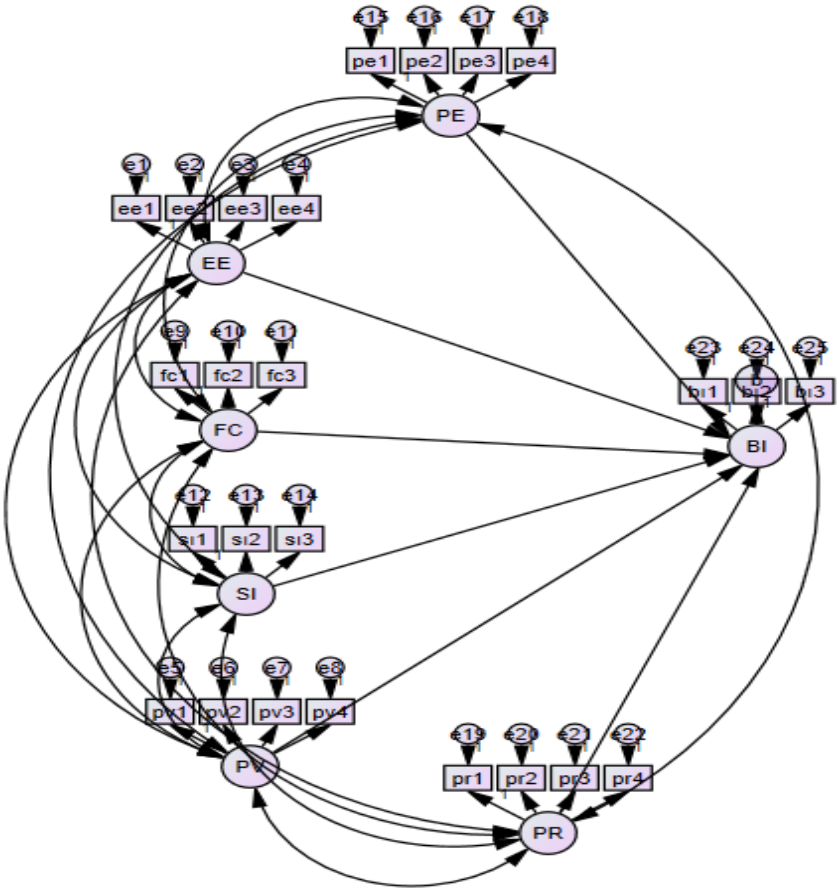

Figure 2: Structural Model of the Study

3.3. Path Analysis

Hypotheses were tested with the analyses. In order for a hypothetical relationship established in the model to be supported, the unstandardised regression load for the relevant relationship must be significant at the p≤0.05 level (95% confidence interval) (Weston & Gore Jr., 2006). Table 6 below shows the results of the path analysis. In the light of these results, hypotheses H1, H2, H4 and H5 are not supported. H3 and H6 hypotheses are supported.

Table 4. Path Analysis Results

	Estimate	**S.E.**	**C.R.**	**P**	**Results**
BI<---PE	,206	,072	2,867	,004	Not supported
BI<---EE	,130	,073	1,789	,074	Not supported
BI<---FC	,048	,087	,550	,583	Not supported
BI<---SI	,319	,049	6,484	***	Supported
BI<---PV	,097	,052	1,863	,062	Not supported
BI<---PR	-,454	,079	-5,727	***	Supported

CONCLUSION

It is becoming an increasingly important issue to examine the behavior of consumers regarding the use of shared electric scooters, which is becoming widespread day by day, and to be informed about their trends. Moreover, these vehicles, which take their place in almost every corner in metropolises today, even worn on their feet and attracting attention, are used easily and frequently by young people for entertainment purposes. Sharedelectric scooters have started to be widely used in many countries and in Turkey, especially in big cities, despite some negativities.

In this study, the effects of consumers' performance expectation, effort expectancy, social impact, facilitating conditions, price value, and perceived risk on consumers' behavioral intention regarding electric scooters were investigated.

According to the findings obtained as a result of this study; It is seen that rental scooters are not affected by facilitating conditions and price value due to factors such as the fact that their prices are more affordable than transportation vehicles such as taxis with similar features, the system is easy to use, and the users have no expectation of performance or effort due to factors such as rental scooters.In the study, it is seen that consumers are affected by their social environment in terms of renting electric scooters. Especially people who see that one of their friends or closecirclerent a scooter, may prefer to rent it. It is thought that people use these vehicles not only for short-term transport, but also for both the experience of using scooters and for entertainment (Özelturkay et al., 2022; Bolen & Çeliker, 2021). In the study, in parallel with the literature, it was concluded that social influence positively affects consumers' intention to use electric scooters.

On the other hand, in parallel with the literature, consumers perceive scooter use as risky in this study (Sucha et al., 2023; Felix et al., 2023; Almannaa et al., 2021). It is thought that the average age of the individuals we surveyed is also effective in this. Because most of the survey participants (68.4%) are between the ages of 26-56. In addition, it is thought that the study group's having a university or higher education also affects the perceived risk. It is seen that perceived risk positively affects consumers' intention to use electric scooters. In order to reduce the perceived risk, it is recommended that local governments organize bicycle lanes for scooter use, as in foreign countries. In order to prevent behaviors that threaten pedestrians such as using sidewalks as roads, parking in the middle of sidewalks, and uncontrolled use, scooter usage rules should be clearly defined and fines should be given to those who do not comply with the rules. In this way, walking short distances in big cities and especially in Istanbul or underground metro, marmaray, etc. Instead of walking to reach transportation vehicles, you can travel without getting tired and save time by using electric scooters. Infuture studies, issues such as age, gender, ease of use, sustainability can be focused on the use of electric scooters.

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