ANADOLU ÜNİVERSİTESİ
Cilt: 22, Sayı: 4, Yıl: 2022
e-ISSN: 2667-8583
AÜSBD
Anadolu Üniversitesi Sosyal Bilimler Dergisi
Anadolu University Journal of Social Sciences

Do Subjective Norms and Willingness to Overpay Have an Effect on the Intention to Use Renewable Energy Sources?[1]

Aslı ERGENEKON ARSLAN [2]

Submitted by: 25.03.2022 **Accepted by:** 08.12.2022 **Article Type:** Research Article

Abstract

In this study, the behavior of using renewable energy sources (RES) has been investigated in the concept of planned behavior theory (PBT), taking into account the knowledge level and external concerns of environmental issues and RES. The willingness to overpay for energy demand by RES was also investigated. To this aim, a questionnaire was created and applied to 337 public officers from different sectors in Turkey. The questionnaire results were then analyzed by Structural Equality Modeling (SEM). In conclusion, it has been determined that the knowledge level on environmental issues has significant effects on environmental issues, which forced people to learn about RES. So, the intention of using RES is affected positively. Another important result obtained in the study is that the knowledge about RES affects the willingness to overpay. In addition, subjective norms have an impact on the attitude towards the use of RES.

Keywords: *Social Acceptance, Willingness to overpay, Renewable Energy, Planned Behavior Theory, Structural Equality Modeling*

Citation: Ergenekon Arslan, A. (2022). Do subjective norms and willingness to overpay have an effect on the intention to use renewable energy sources. *Anadolu Üniversitesi Sosyal Bilimler Dergisi, 22*(4), 1221-1254.

[1] The study was approved by Bilecik Seyh Edebali University Ethics Committee (Date: 18/06/2021 Document no: E-54674167-050.01.04-27303).

[2] Bilecik Seyh Edebali University Vocational School Mechanics and Metal Technologies Department, **asli.arslan@bilecik.edu.tr,** ORCID: 0000-0001-8052-8566

ANADOLU ÜNİVERSİTESİ
Cilt: 22, Sayı: 4, Yıl: 2022
e-ISSN: 2667-8683
AÜSBD
Anadolu Üniversitesi Sosyal Bilimler Dergisi
Anadolu University Journal of Social Sciences

Sübjektif Normlar ve Fazla Ödeme İsteği Yenilenebilir Enerji Kaynaklarını Kullanma Niyetini Etkiler mi?

Aslı ERGENEKON ARSLAN [3]

Başvuru Tarihi: 25.03.2022 **Kabul Tarihi:** 25.03.2022 **Makale Türü:** Araştırma Makalesi

Öz

Bu çalışmada, Yenilenebilir Enerji Kaynakları (YEK) kullanım niyeti, çevresel bilgi, sahip olunan YEK bilgi düzeyi ve çevresel endişeler dikkate alınarak Planlı Davranış Teorisi kapsamında (PBT) araştırılmıştır. Ayrıca tüketicilerin YEK kullanımı için fazladan ödeme yapma isteklilikleri de çalışmaya dahil edilmiştir. Bu amaçla 337 kamu görevlisine anket uygulanmış olup veriler Yapısal Eşitlik Modellemesi (YEM) ile analiz edilmiştir. Çalışma sonucunda, çevresel bilginin çevresel endişeleri etkilediği ve kişileri YEK hakkında bilgi edinmeye yönlendirdiği tespit edilmiştir. Çevresel bilgi, yenilenebilir enerji kaynakları hakkında bilgi ve çevresel endişenin YEK kullanma tutumunu olumlu anlamda etkilediği sonucuna ulaşılmıştır. Çalışmada elde edilen diğer bir önemli sonuç ise YEK hakkında sahip olunan bilginin fazladan ödeme isteğini olumlu yönde etkilediğidir. Ayrıca subjektif normların YEK kullanımına yönelik tutum üzerinde de etkisi vardır.

Anahtar Kelimeler: *Social Acceptance, Willingness to overpay, Renewable Energy, Planned Behavior Theory, Structural Equality Modeling*

[3] Bilecik Şeyh Edebali Üniversitesi MYO Üretimde Kalite Kontrol Bölümü, **asli.arslan@bilecik.edu.tr,** ORCID: 0000-0001-8052-8566

Introduction

With the increase in population and developing technology, energy use is also increasing. Today, people's energy needs are met by traditional fuels (fossil fuels) and alternative (renewable) energy sources. RES has come to the fore more in recent years due to the harmful effects of fossil fuels such as air pollution, acid rain, and health problems (Arslan and Uzun, 2017, p. 96).

As a result of the burning of conventional energy sources, called fossil fuels, to provide energy, harmful gases such as CO_2, SO_2, and NO_x, which are expressed as greenhouse gases, are released into the environment. Global climate change caused by greenhouse gases directly changes the balance of the ecological system and causes fundamental problems for the future of living things. The cost of global warming consists of three categories: damage cost, adaptation cost, and incremental cost (Ekins, 1996). High collateral damage costs include medical expenses, death expenses, building expenses, and vegetation-related expenses. The cost of damage from sulfur emissions in the USA is approximately US$4661 per ton (Pearce, 1992). This cost ranges from $861-$5191 in the UK, $3959-$4368 in Germany, and $500-$8960 in Norway (ECOTEC, 1994; Ekins, 1996). Fossil fuels have adverse effects on human health and damage the environment. Among the most harmful effects of fossil fuel consumption on human health are health problems such as asthma, chronic bronchitis, and fatal lung diseases. All these problems bring extra costs to society. It is crucial to inform the public about these damages and costs (EPA, 2022a; EPA, 2022b; WHO, 2015; WMO, 2019). Avoiding these loss costs is only possible by reducing the use of fossil fuels and emissions.

Due to the adverse effects of fossil fuels on the environment and human health, limited reserves, and high costs (including ecological problems) in energy production, less harmful and sustainable energy sources have gained importance (Arslan and Arslan, 2022a; Arslan and Arslan, 2022b; Arslan, 2021; Ucar and Arslan, 2021; Arslan and Kilic, 2021; Arslan, 2010). According to the figures of 1996, it is estimated that coal will run out in 235 years, oil in 43 years and natural gas in 66 years. (Yilmaz, Ilbas and Su, 2003, p. 401). Thus, renewable energy sources such as solar, wind, hydraulics, and geothermal become an alternative solution. Countries implement policies to reduce their dependence on energy imports and other countries and to encourage the establishment and use of RES, which is more profitable in the long run. Although protocols such as the Kyoto Protocol, the Montreal Protocol, and the Paris agreement were signed and decisions were taken on a global scale, the use of RES could not reach the desired level. It is known that the social acceptance of the society and the policies implemented by the countries in spreading the use of RES are limiting factors in achieving the desired goal (Wüstenhagen, Wolsink and Bürer, 2007; Batley, Colbourne, Fleming and Urwin, 2001; Yazdanpanallah, Komendantova and Ardestani, 2015). Besides, due to higher installation costs, RES-based electricity generation requires extra payment for consumers. It is hard for consumers to accept this extra burden. Although consumers have positive attitudes and intentions about RES, they do not want to pay this extra for their energy consumption.

In recent years, there has been an increase in studies on the social acceptance of RES. Muhammed, Zhen and Abdul (2021) aimed to investigate the effect of consumers' intention factors on willingness to pay (WTP) for renewable energy (RE) in Pakistan. In the study, they added the constructs of belief to the cost of RES and environmental concern to PDT. The study results show that the influencing factors such as attitude, subjective norms, and perceived behavioral control positively affect the consumer's intention to use RES. Belief in the cost of RES has a negative effect, and environmental concern has no significant effect.

Srivastava and Mahendar (2018) examined the intentions of solar energy panel use for energy saving in their study. The study's findings showed that demographic factors significantly influence both the propensity to acquire solar energy products and their perceived benefits. The study found a favorable relationship between perceived benefit and consumer attitude.

Fang, Wang, Sun, Zheng and Wei (2021) aimed to empirically investigate the factors affecting the consistency between the actual behavior of consumers and their desire for renewable energy support. They used a bivariate probit model in the study. The results show that socio-economic factors, socio-demographic factors, and subjective factors have significant effects on the consistency of consumers to support renewable energy development. The results also show that income, education, and satisfaction with energy supply have a more significant impact on rural residents, where environmental concerns and knowledge of carbon emissions affect urban residents.

Sunyoung and Joosung (2015) concluded that attitude, subjective norms, and perceived behavioral control affect consumers' intention to use and purchase renewable energy systems. Lynch and Martin (2013) investigated the intention and behavior of the consumers' electricity use in the Central Victoria Solar City (CVSC) program. They used PBT to determine how the participants were affected by the program. They concluded that the intention to reduce energy use is affected by environmental attitudes, financial attitudes, and perceived controls. They suggested that the programs that encourage positive attitudes and beliefs would be more attractive than conventional PBT.

In the study of Taranto et al. (2020) in which they analyze the external costs arising from fossil fuel consumption, it is estimated that the total annual external cost is around 10 billion euro (US$ 11 billion) based on the emissions resulting from the use of fossil fuels in Turkey. The magnitude of the external cost of fossil fuel consumption corresponds to about 1.5 percent of GDP and about 1/3 of total annual health expenditures. Turkey imports the oil (94%) and natural gas (98.8%) it consumes and is a 76% foreign-dependent country in energy supply. Turkey provides only 7.5% of its energy needs from renewable energy sources (Ozalp, 2018). Most of the country's electricity needs by 38.6% are met by natural gas (Dogan and Mohammed, 2019). For this reason, diversification of energy resources, technology level and improvement of infrastucture systems in Turkey are of great importance in terms of ensuring energy supply security (Bayrac, 2020). Turkey, aiming for EU membership as a national policy, attaches increasing importance to RES. Turkey's hydropower, geothermal, solar, wind energy potential is 216 billion kWh, 31500 MWt, 500 Mtoe/year, 400 billion kWh, respectively. Turkey, which is in a very potential position in terms of RES, encourages the use of RES in terms of international commitments, European Union membership target, national needs and interests. Within the scope of the "Turkish National Program for the Adoption of the European Union Acquis", which entered into force in 2003, it is aimed to increase the use of renewable energy in the energy supply balance in order to reduce energy import dependency and ensure supply security (Ozkaya, 22.10.2022). For this reason, the RES studies in the social sciences are accelerated. However, the studies on the social acceptance of RES use in Turkey are limited. These limited studies focus on the social acceptance of nuclear energy (Palabiyik, Yavas and Aydin, 2010), the social acceptance of geothermal energy (Tuncbilek and Yilmaz, 2022), the social acceptance of wind energy (Taskin, Yilmaz and Kilic, 2021). It is not possible to find a study that investigates the effects of the willingness to overpay and the intention of use on the general RES perspective through environmental information, environmental concerns, and PBT.

One of the priorities of Turkey, which is among the developing countries, is to achieve sustainable growth targets by reducing its dependence on foreign energy and to use its potential RES effectively in order to gain a stronger position in the international arena. For this purpose, in addition to the incentives and policies provided by the state, it has been stated in the previous parts of the study that social acceptance of RES is an important factor. It is of great importance for policy makers and Public Administrations to know that individuals are willing to overpay for RES compared to fossil fuel energy and what the factors that positively affect this willingness are. Since the RES use in Turkey is not at desirable level, it is realy very important to determine the intention about RES use and overpay for this aim. In this regard, the information about RES and the awareness about the extermal costs caused by the use of fossil fuels are the important parameters which

affect the RES use. For this purpose, it is aimed to evaluate the consumers' perspective and usage intentions for RES by integrating the factors of Environmental Concern, Environmental and RES Information, and Willingness to overpay into PBT. In the light of the proposed model, seven hypotheses were analyzed with SPSS and AMOS software. Therefore, this study is expected to contribute to the literature since it investigates the willingness to overpay in a long-term profit and loss perspective. This study is also expected to contribute to the literature by evaluating society's perspective on RES use. It is thought that this study, which investigates the factors affecting the acceptance of the use of RES, will fill an important gap in terms of guiding both policy and lawmakers on RES and RES investors.

Theoretical Framework

Planned Behavior Theory (PBT)

The purchasing decision of the consumers is a very complicated process. Many models and theories have been proposed to figure out this complication. PBT comes into prominence since it predicts the intention to perform certain behaviors. PBT, which successfully predicts individual behavior, is a powerful and applicable model (Kumar and Chandra, 2018; Hansmann and Laurenti, Mehdi and Binder, 2020; Irfan, Zhao, Li and Rahman, 2020). PBT is based on the comprehension of how rational decision-makers systematically gather information. (Azjen and Fishbein, 1975). This comprehension is a result of the cognitive processes belonging to essential deterministic factors of the individuals' behaviors. Moreover, PBT assumes that behavioral intentions drive behaviors. These behavioral intentions mainly include three factors; attitude (i), subjective norms (ii), and perceived behavioral controls (iii). According to PBT, the intention is the closest antecedent and the best predicator of the real behavior (Rezaei and Mianaji, 2019). Wang et al. (2019) indicated that intention is a function of perceived behavioral control (PBC) as well as attitude and social norm (SN). PBC is described as the view of the individual on the difficulty level of performing the behavior (Ajzen, 1991). SN is the sum of beliefs of the individuals (or groups) about a behavior (Bang et al., 2000). Since ecological behavior is considered a complex structure consisting of ecological attitude, ecological information, ecological value, and ecological behavior intention, PBT can successfully identify complex components used to predict ecological behaviors (Kaiser, Wolfing and Fuhrer, 1999). According to this theory, individuals will have an intention to use RES technologies as long as they consider these technologies to be valuable and profitable. At the same time, it is clear that PBC and SN positively affect individuals' intention to use RES (Rezai and Heijden, 2022).

In the literature, PBT is commonly used to investigate the factors affecting the intention to use RES (Masrahi, Wang and Abudiyah, 2021; Halder et al. 2016; Gamel, Bauer, Decker and Menrad, 2022). Due to long payback periods, higher installation costs of RES, and reluctance of the individuals towards the new unknown technologies, more propulsive factors are needed. In this regard, three external factors were included in the study. These external factors are Information about the Environment and Renewable Energy (IaERE), Willingness to Overpay (WtO), and Concern about the Environment (CaE). The conceptual framework of the study is given in Figure 1.

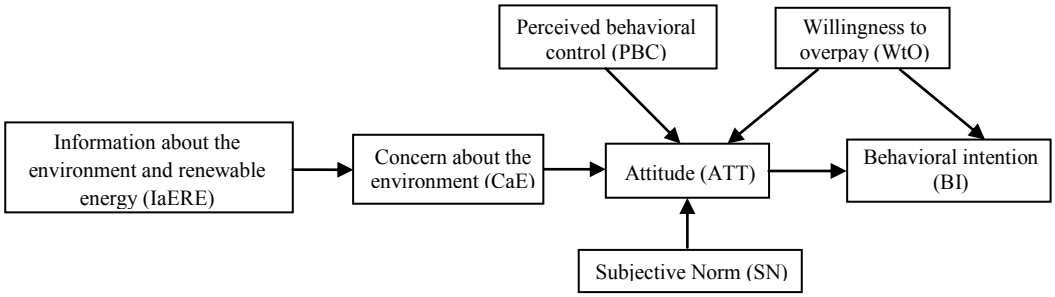

Figure 1. The Research Model Created

Formulation of Hypotheses

In the study, seven hypotheses were conducted taking into consideration the research model created by the literature data.

Information about the environment and renewable energy (IaERE)

Information about the environment (IaE) is defined as a term indicating awareness of environmental issues and their solutions (Zsóka, Szerényi, Széchy and Kocsis, 2013). IaE, beyond a term, is a method to balance environmental conditions with social and economic developments in a sustainable way (Jamison, 2003; Gunes, 2019). IaE is the starting point for developing a conscious and raised awareness about environmental problems (Jensen, 2002; Kocak, 2019). IaE is one of the most critical factors that affect environmental behaviors (Kaplan, 1991), and it is a necessity for environmental awareness and behaviors (Ajzen, Joyce, Sheikh, and Cote, 2017). According to this awareness, information about renewable energy (IaRE) is necessary for solving environmental concerns. The awareness of RES use means the level of information about available technologies, their benefits, and how to use them. Therefore, it is among the essential components of intention (Rohollah and Marjan, 2018). Based on the information mentioned above, in the study, it was assumed that the knowledge of individuals about the environment and RES has an indirect effect on the intention of RES use by influencing environmental concerns. In this regard, the hypothesis of H_1 is proposed as follows:

H_1: IaERE directly and positively affects CaE.

Concern about the environment (CaE)

Concern about the environment (CaE) is expressed as a level of interest based on knowledge of solving environmental problems (Tan, Ooi and Goh, 2017). Depending on the activities of the media about environmental disasters, awareness of the environment and environmental problems has begun to increase (Kalafatis, Pollard, East and Tsogas, 1999). Over the past decade, most consumers have become conscious of the consequences of their purchasing choices. Therefore, they also consider environmental issues while consuming a product (Gurcum and Yildirim, 2018). In this context, people started to search for less harmful and environmentally friendly alternatives for their needs (Muhammed and Tekbiyik, 2020). The effects of environmental concerns on decision-making have been investigated by many researchers (Gadenne, Sharma, Kerr and Smith, 2011; Pienaar, Lew and Wallmo, 2013; Fraj and Martinez, 2006; Chen, 2014; Bernhard and Jutta, 2016). In addition, CaE was accepted as a determinant of overpayment for RES use (Dienes, 2015). Pagiaslis and Krontalis (2014), in a study examining the relationship between individuals' interest and concern levels towards the environment and environmental behavior, concluded that environmental anxiety has a positive effect on environmental knowledge and beliefs. According to Bang, Ellinger, Hadjimarcou and Patrick (2000), environmental concerns, knowledge about RES, and beliefs about the consequences of using RES affect

the intention to use RES. Based on the literature, it is assumed that consumers' environmental concerns are effective in developing an attitude towards RES use. In this regard, the hypothesis of H_2 is proposed as follows:

H_2: CaE directly and positively affects ATT.

Willingness to overpay (WtO)

It is known that the installation, maintenance, and usage costs of RES are more expensive than those of fossil fuels in the short term. Ajzen and Driver (1992) reported that there is no relationship between willingness to overpay (WtO) and PBT constructs (attitudes, subjective norms, perceived control and intentions). In subsequent studies, WtO for RES use has been reported as a reflection of homeowners' attitudes and choices (Nomura and Akai, 2004; Zografakis et al. 2010). Demographic factors such as age, income values, socio-economic problems, and population may impact WtO size (Bang et. al., 2000; Hansla, Gamble, Juliusson and Gärling 2008; Arslan, 2022b). In their study conducted for rural areas, Liu, Wang and Mol (2013) reported that WtO for RES use increases with the increase in income and knowledge levels, and decreases with the increase in age level. The country-by-country survey revealed that most respondents are willing to pay up to 5% more of their energy costs. However, when this rate reached 30%, most participants did not accept the overpayment (Arslan and Uzun, 2017). According to their research, Muhammed et al. (2021) revealed that costs nega6+tively affect RES use. According to these results, the participants support the use of RES; however, they do not want to overpay. In this framework, hypotheses H_3 and H_5 were proposed to determine the effect of WtO on attitude (ATT) and behavioral intention (BI) for RES use.

H_3: WtO directly and positively affects ATT.

H_5: WtO directly and positively affects BI.

Subjective norm- effect of familiars (SN)

The perceived social stress of performing or not performing a particular behavior is addressed as the subjective norm (SN). SNs are normative beliefs of closer friends, family members, or associates. Therefore, the individual is affected by the expectations of these people. For this purpose, SN can be defined as listening to the ideas of environmentalist behaviors of close relatives (Conner and Armitage, 1998; Erten, 2002). According to PBT, SNs and ecological normative beliefs affect the intention of ecological behavior (Kaiser et al., 1999). Harland, Staats and Wilke (1999) argue that SNs are more powerful in predicting environmental intentions. Similarly, Thøgersen and Grønhøj (2010) report that SN is an essential factor that affects consumers' intention on energy and energy-saving issues. Assuming that the positive remarks of prominent people positively affect the attitude (ATT) of RES use, the following hypothesis is proposed:

H_4: SN directly and positively affects ATT.

Attitude (ATT)

ATT, in contradistinction to common intention, defines the typical evaluation of individuals for the event and is developed by behavioral beliefs (Arslan, 2018, p. 24). In PBT, the ATT of the individuals affects intention, and intention affects actual behavior (Lee, Bray, Carter, Glaeser, Ivers and Street, 2004, p. 886). ATT, the negative or positive evaluation of performing the relevant behavior, affects behavioral intention (Macovei, 2015). A positive ATT increases the intention to act, which is expected to be a good predictor of behavior (Fishbein and Ajzen, 2011). According to Ajzen (1991), ATT is the positive or negative remarks of individuals as a precessor of the intention to use RES. ATT has an important role in the emergence of the intention of ecological behavior (Han, Hsu and Lee, 2009). ATT is a dominant predictor of energy consumption (Tan, Ooi, and Goh, 2017). Yazdanpanah, Komendantova and Ardestani (2015) state that ATTs affect RES use and its acceptance by the society. Similarly, Halder, Pietarinen, Havu-Nuutinen, Pöllänen and Pelkonen (2016)

showed that ATT has positive and significant effects on the intention of RES use. In this study, ATT expresses the positive remarks of individuals towards RES use. Assuming that these remarks have a key role in the intention, the hypothesis of H_6 is proposed as follows:

H_6: ATT directly and positively affects BI.

Perceived behavioral control (PBC)

PBC is a structure that can be applied where actions are not under voluntary control (Lopes, Kalid, Rodríguez and Filho 2019). PBC allows the prediction of behaviors that are not under complete voluntary control (Armigate and Conner, 2001). PBC is expressed as the individuals' perception of ability and proficiency in performing the relevant behavior. PBC is determined by the individual's beliefs of the facility and sources in performing the behavior (Ajzen, 1991). PBC affects attitudes and intentions for ecological behaviors (Wang, Zhao, Yin and Zhang, 2017; Tan, Ooi and Goh, 2017). Alam et al. (2014) stated that factors such as ease of use, relative advantage, price reduction, and awareness, together with perceived behavioral control, significantly affect the intention of using RES. Assuming that the individuals decide to use RES considering the difficulty level, the hypothesis of H_7 is proposed.

H_7: PBC directly and positively affects ATT.

Behavioral intention (BI)

Behavioral Intention (BI) defines when individuals are ready to perform the behavior (Bagozzi and Warshaw, 1990). BI identifies positive or negative emotions to perform the target behavior. In this study, the intention factor defines the individuals' RES usage intentions. Therefore, BI explains the willingness of the consumers intended for environmental behavior (Wu and Chen, 2014; Maloney, Steger and Ward, 1973; Maloney, Ward and Braucht, 1975; Lansana, 1992). The intention of ecological behavior has a strong relationship with actual behavior (Kaiser et al., 1999). According to Masukujjaman, Shah, Chamhuri and Halim (2021), if the purchase does not involve any cost/investment for the household, it is in principle a single action with behavioral intent similar to supporting or adopting any technology.

Methodology

This section covers detailed survey information, data collection, methodological tools, and data analysis based on the Structural Equation Modeling (SEM) technique.

Questionnaire Design

In the study, a questionnaire was created to evaluate the hypothesis developed for testing the relationships of the proposed model (see Fig.1) under the approval of Bilecik Seyh Edebali University Ethics Committee with the date of June 18th 2021 and the official document no of E-54674167-050.01.04-27303. The questionnaire was based on the sample scales presented in the literature. The consistency of the resulting scale was tested on 50 participants as a pilot evaluation. For this purpose, reliability and exploratory factor analysis were conducted. According to the results of the analysis, the final version of the questionnaire was obtained. The questionnaire was composed of two parts. The first part has six questions to measure the demographic types of the partricipants. The second part has 49 statements prepared on a Likert scale. A Likert scale was developed to measure each construct's scale items ranging from 1 to 5, defined as 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. Table 1 gives information about the statements in the research scale.

Table 1
Constructs Included into the Questionnaire

Expression	Count	Source
CaE	7	Bang et al. (2000), Straughan and Roberts (1999).
IaERE	16	Kocak (2019), Rohollah and Marjan (2018), Celikler and Aksan (2016)
ATT (Attitude)	4	Rohollah and Marjan (2018), Yazdanpanah et al. (2015).
Behavior Intention (BI)	5	Yazdanpanah et al. (2015), Rohollah and Marjan (2018).
PBC	3	Rohollah and Marjan (2018).
SN	3	Rohollah and Marjan (2018).
WtO	11	Bang et al. (2000), Ustaahmetoglu and Toklu (2015).

Sample Size, Characteristics, and Selection Criteria

Ajzen (1991) indicated that information about the environment is a need for environmental concern (EC) and environmental behavior. In addition, the intention to use IaE and EC are related to educational level (Arslan, 2022a, Arslan, 2022b, Arslan, 2022c). Therefore, public officials were selected as the sample participants, as they were thought to have enough information about the environment, EC, and RES. The questionnaire was applied to 450 participants from different public sectors. However, 337 out of 450 participants were determined as available to be used in the datasheet. The remaining ones were not included as some were not completed and some had the same answers for the all questions. The data obtained from the questionnaire were first analyzed demographically. Then the questionnaire was evaluated in terms of reliability. Then SEM analysis was conducted. In this aim, exploratory (EFA) and confirmatory (CFA) factor analyses were performed.

Results

Sample Characteristics

In the study, the participants were evaluated from demographic characteristics such as gender, age, education, income level, ownership, resources used, and place of residence. The informative statistics are given in Table 2.

Table 3
Demographic Profiles of Participants

		Number (N)	Percentage (%)
Gender	Men	194	57.6
	Women	143	42.4
Age	18-28	61	18.1
	29-39	40	41.5
	40-49	92	27.3
	>50	44	13.1
Educational status	Elementary education	3	9
	Secondary education	13	3.9
	B.Sc.	124	36.8
	M.Sc.	148	43.9
	Ph.D.	49	14.5
Income level (₺/month)	2000-2999	52	15.4
	3000-4999	105	31.2
	5000-7999	123	36.5
	>8000	57	16.9
Ownership status	Renter	410	41.5
	Owner	197	58.5
Resources used for domestic hot water	Solar	15	4.5
	Natural gas	299	88.7
	Electricity	17	5.0
	Other (such as fuel-oil and lignite)	6	1.8
Place of Residence	<100 m^2	53	15.7
	100 m^2-149 m^2	213	63.2
	>150 m^2	71	21.1

According to Table 2, 42.4 percent of the participants are women, whereas the rest are (57.6 percent) men. Approximately 41.5 percent of the participants range in age from 29 to 39. 43.9 percent of the participants have a M.Sc. degree. 36.5 percent of the participants have a monthly income level ranging between 5000 and 7999 ₺/month. 58.5 percent of the participants are tenants. 88.7 percent of the participants use natural gas as energy source. 63.2 percent of the participants live in residences ranging from 100 to 150 m^2.

Reliability Analysis

The reliability of the questionnaire was evaluated by Cronbach's Alpha values and item-total correlation step by step for each question. The questions were removed when the value of Item total correlation was below 0.3 and/or when the factor reliability eigenvalue exceeds the general factor reliability value. According to the analysis, nine expressions belonging to WtO and IaE-IaRE were removed from the scale, and the analysis was repeated The final results of reliability are given in Table 3.

Table 3
Results of Reliability Analysis

Reliability	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of questions
CaE	0.863	0.865	7
IaE	0.911	0.912	9
IaRE	0,850	0,849	5
WtO	0.809	0.807	4
ATT	0.879	0.879	4
BI	0.862	0.862	5
SN	0.799	0.807	3
PBC	0.724	0.723	3

Cronbach's Alpha value of the scale was determined as 0.876, which means that the scale is reliable at a high level.

Results of Exploratory Factor Analysis (EFA)

Exploratory factor analysis (EFA) is used to test the structural validity of the developed scale and to reveal unobservable and unmeasurable dimensions. It is also a valuable tool to examine the structural suitability of translated scales or test the existing factorial structure on different main groups (Johnson and Winchern, 2002; Sencan and Fidan 2020). In EFA, Barlett's test of sphericity and Kaiser-Meyer Oklin (KMO) test are conducted. In social sciences, the KMO must be greater than 0.60 for sufficient factor analysis. In addition, the level of the significance of Barlett's test of sphericity (p) should be less than 0.05 (Buyukozturk, 2002). Accordingly, the sample size and significance of the scale were found acceptable. Taking into account the factor loads, unsuitable items with a load value below0.3 were removed from the scale. The items loaded on two factors were also removed if the difference between these factors was recorded as less than 0.1. In this regard, PBC was excluded from the scale. EFA results are given in Table 4.

Table 4

Factor Loadings Along with the Results of Kaiser–Meyer–Olkin (KMO)

	Variable	Factor load			Cronbach alfa	Explained Variance (%)	KMO
CaE	CaE 2	0.815			0.863	55.441	0.856
	CaE 1	0.794					
	CaE 6	0.744					
	CaE 7	0.740					
	CaE 4	0.739					
	CaE 5	0.725					
	CaE 3	0.643					
IaE-IaRE	IaE-IaRE 2	0.786			0.911	57.835	0.918
	IaE-IaRE 4	0.774					
	IaE-IaRE 7	0.772					
	IaE-IaRE 8	0.762					
	IaE-IaRE 3	0.730					
	IaE-IaRE 1	0.723					
	IaE-IaRE 9	0.687					
	IaE-IaRE 5	0.654					
	IaE-IaRE 6	0.605					
	IaE-IaRE11		0.881		0.850	56.625	
	IaE-IaRE12		0.865				
	IaE-IaRE10		0.882				
	IaE-IaRE13		0.607				
	IaE-IaRE 14		0.488				
WtO	WtO 2	0.859			0.809	67.010	0.776
	WtO 3	0.849					
	WtO 4	0.825					
	WtO 1	0.735					
PBT	ATT 1	0.862			0.879	56.419	0.916
	ATT 4	0.830					
	ATT 2	0.763					
	ATT 3	0.662					
	BI 2		0.761		0.862	11.262	
	BI 1		0.700				
	BI 4		0.694				
	BI 5		0.640				
	BI 3		0.597				
	SN 3			0.831	0.807	6.046	
	SN 1			0.776			
	SN 2			0.769			

The information about RES and the information about the environment were designed as a single factor (IaERE) at the beginning of the study. However, the EFA results showed that this single factor should be considered as two separate factors: information about RES (IaRE) and information about the environment (IaE). Marquart-Pyatt (2008) indicated that detailed information about the environment may cause higher environmental concerns. Information about the environment not only raises awareness about the negative aspects of the environmental problems, but also drives the intention and behaviors of reducing environmental damages (Laroche, Toffoli, Kim and Muller, 1996; Zsóka et al., 2013). Reviewing the EFA results and literature, the research model was revised as given in Figure 2.

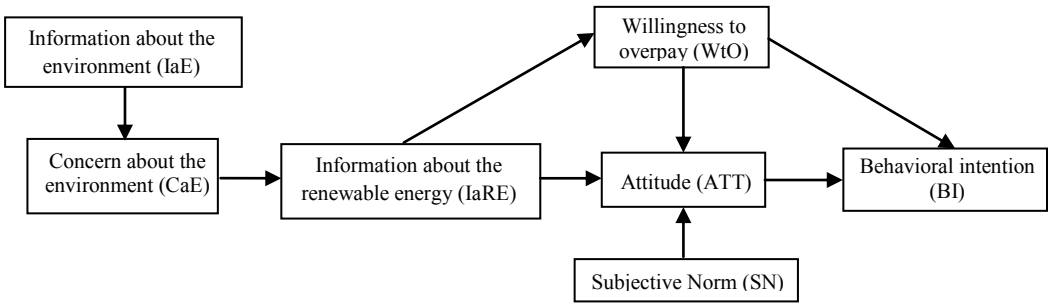

Figure 2. Research model revised based on EFA.

According to the revised model, it was assumed that the information level about the environment would increase environmental concern. Therefore, the individuals will try to have information about RES. In this regard, the hypothesis created was revised as given in Table 5.

Table 5
Hypothesis revised based on EFA

No	Hypothesis
H_1	IaE directly and positively affects CaE.
H_2	CaE directly and positively affects IaRE.
H_3	IaRE directly and positively affects WtO.
H_4	IaRE directly and positively affects ATT.
H_5	WtO directly and positively affects ATT.
H_6	SN directly and positively affects ATT.
H_7	ATT directly and positively affects BI.
H_8	WtO directly and positively affects BI.

Structural Reliability and Validity

Following the exploratory factor analysis in the study, the existence of combination and decomposition validity of the variable measurement model was investigated. The concurrency of the scale is determined by the expounded average variance (AVE) and the combined reliability (CR). It is accepted that composite/structure reliability (CR) is a better alternative to Cronbach's alpha in variable measurement models (Kline, 2015). It is recommended to have AVE ≥ 0.5, CR > 0.70 and CR > AVE for convergence validity (Hair, Black, Babin and Anderson, 2009). The calculated AVE and CR values are given in Table 6. The concurrency of the scale is ensured.

Table 6
AVE and CR Values of the Scale

	AVE	CR
CaE	0.554	0.896
IaE	0.578	0.924
IaRE	0.612	0.885
WtO	0.669	0.889
ATT	0.733	0.916
BI	0.687	0.916
SN	0.722	0.886

Discriminant validity means a weak relation (a lower correlation) between the scale of related structures and the scale measuring different structures (Altunisik, Coskun, Bayraktaroglu and Yildirim, 2010). Discriminant validity is obtained when the square root of AVE is greater than the correlation (Fornell and Larcker, 1981). In addition, it is accepted that discriminant validity is provided when there is a significant correlation between the structures, and this correlation value is below 0.85 (Dolarslan, 2013; Arslan and Guven, 2020). The values of correlation between the structures and the square root of AVE are given in Table 7.

Table 7
The Correlation between the Structures and Discriminant Validity

	Correlation							$\sqrt{AVE}$
	CaE	**IaE**	**IaRE**	**WtO**	**ATT**	**BI**	**SN**	
CaE	1							0.744
IaE	.682	1						0.760
IaRE	.371	.518	1					0.782
WtO	.220	.347	.332	1				0.817
ATT	.448	.568	.505	.403	1			0.856
BI	.518	.652	.583	.415	.817	1		0.828
SN	.316	.448	.423	.389	.502	.603	1	0.849

According to Table 7, all the criteria mentioned above have been actualized. Thus, the discriminant validity of the scales was ensured.

Results of Confirmatory Factor Analysis (CFA)

CFA is an extended version of EFA. CFA determines the sufficiency of the relation between factors, determines the relation between the variables and factors, determines the independence of factors from each other, and CFA determines the sufficiency of factors in explaining the model (Raykov, 2004; Arslan and Guven, 2020). Empirical evidence in CFA (and SEM in general) is generally evaluated using criteria such as the comparative fit index (CFI), squared multiple correlations (R^2), the significance of parameter estimates (factor loading), and goodness-of-fit statistic (GFI). In DFA analysis, RMSEA= 0.071 and X^2/df =1652.027 values were found within acceptable fit values. However, some index values are not in the desired results. In such cases, the AMOS program shows where the model can be improved by presenting a residual covariance matrix and modification indices to better fit the model into factor analysis. In the study, covariance connections were made between the error terms of the observed variables that were theoretically expressed within the same factor. DFA values before and after the change are presented in Table 8.

Table 8
Goodness of Fit Values of the CFA

Conformance indexes	Acceptable value before modification	Acceptable value after modification	Acceptable value
Conformance of common model			
X^2	1652.027	1381.996	$3 \leq X^2/df \leq 5$
df	614	606	
X^2/df	2.691	2.281	
Comparative conformance index			
NFI	0,803	0.835	0.90≤NFI≤0.95
CFI	0.865	0.900	0.90≤ CFI ≤0.95
RMSEA	0.071	0.062	0.05≤RMSEA≤0.8
Absolute conformance index			
TLI	0.854	0.889	0.90≤ TLI ≤0.95
IFI	0.866	0.900	0.90≤ IFI ≤0.95

The chi-square normalized with the degrees of freedom (X^2/df) should be less than five (Bentler, 1989); and the comparative fit index (CFI) should all exceed 0.90, and the root mean square error (RMSEA) should be less than 0.10 (Henry and Stone, 1994). The X^2/df = 2,281 ratios are within acceptable limits as a measure of the model's goodness of fit of in terms of these factors. Moreover, the CFI= (0.900) and RMSEA= (0.062) values, other goodness of fit measures, were also within the acceptable fit limits.

Table 9 contains the results of the regression analysis of the post-modification research model variables. In the interpretation of the model, first, standardized values and t values are checked. According to Table 9, the standardized regression coefficients, t (t> 1.96) values, p (p=0.01) values and fit indices of the variables show that the model is at an acceptable fit level (Meydan and Sesen, 2011). Since all results provided acceptable fit values, confirmatory factor analysis was accepted with the mentioned variables and path analysis was started.

Table 9
Results of Regression Analysis of the Post-Modification Research Model Variables

Latent variable	Observed variable	Std. B.	SE	CR	R^2	P
Concern about the environment (CaE)	CaE7	0.685			0.469	***
	CaE6	0.688	0.1	11.353	0.462	***
	CaE5	0.659	0.103	10.925	0.469	***
	CaE4	0.701	0.097	11.559	0.460	***
	CaE3	0.583	0.094	9.758	0.359	***
	CaE2	0.773	0.085	12.593	0.438	***
	CaE1	0.763	0.097	12.450	0.486	***
Information about the environment (IaE)	IaE1	0.673			0.450	
	IaE2	0.758	0.091	12.547	0.569	***
	IaE3	0.718	0.085	11.966	0.478	***
	IaE4	0.786	0.089	12.952	0.592	***
	IaE5	0.662	0.091	11.127	0.449	***
	IaE6	0.662	0.093	11.127	0.456	***
	IaE7	0.768	0.084	12.688	0.598	***
	IaE8	0.756	0.087	12.523	0.579	***
	IaE9	0.736	0.089	12.220	0.549	***
Information about the environment and renewable energy (IaRE)	IaRE14	0.472			0.206	
	IaRE13	0.544	0.149	7.194	0.280	***
	IaRE12	0.777	0.209	8.543	0.606	***
	IaRE11	0.89	0.221	8.942	0.804	***
	IaRE10	0.872	0.2	8.893	0.762	***
Attitude (ATT)	ATT2	0.782			0.608	
	ATT1	0.888	0.061	18.301	0.789	***
	ATT4	0.877	0.06	18.007	0.769	***
	ATT3	0.865	0.067	17.684	0.750	***
Willingness to overpay (WtO)	WtO1	0.614			0.289	
	WtO2	0.793	0.105	10.852	0.548	***
	WtO3	0.811	0.107	10.971	0.705	***
	WtO4	0.776	0.105	10.726	0.640	***
Subjective norm (SN)	SN	0.832			0.693	
	SN	0.814	0.064	14.793	0.661	***
	SN	0.649	0.078	11.852	0.424	***
Behavioral intention (BI)	BI 2	0.690			0.476	
	BI 1	0.736	0.074	13.506	0.541	***
	BI 4	0.762	0.086	13.403	0.581	***
	BI 5	0.758	0.076	13.963	0.574	***
	BI3	0.757	0.090	12.759	0.573	***

Results of Path Analysis

One technique, path analysis, is a variation of multiple-regression analysis and is useful for analyzing a number of issues involved in causal analysis. Path analysis is an extension of the regression model that researchers use to test the fit of a correlation matrix with a causal model that they test (Garson, 2004). The aim of path analysis is to provide estimates of the magnitude and significance of hypothesized causal connections among sets of variables displayed through the use of path diagrams (Stage, Carter and Nora, 2010). As a result of the path

analysis in the AMOS program, good fit values should be achieved as in the DFA analysis. Therefore, the model determined as a result of the literature research was tested in the program and the values obtained were examined in Table 10.

Table 10
Goodness-of-fit Indices of the SEM Model

Conformance indexes	**Post-modification acceptable fit**	**Acceptable fit**
Conformance of common model		
X^2	1426.138	
Degree of freedom (df)	610	$3 \leq X^2/df \leq 5$
X^2/df	2.290	
Comparative conformance index		
NFI	0.830	0.90≤NFI≤0.95
CFI	0.900	0.90≤ CFI ≤0.95
RMSEA	0.062	0.05≤ RMSEA≤0.8
Absolute conformance index		
TLI	0.884	0.90≤ NNFI(TLI) ≤0.95
IFI	0.890	0.90≤ RFI ≤0.95

According to the results of the path analysis of the final model; $X^2/df = 2.290$, RMSEA= 0.62, IFI= 0.900, CFI= 0.900 (Table 10). The regression table after SEM is presented in Table 11.

Table 11
Structural Paths and Hypothesis Results

Hypotheses		**Standard B**	**SE**	**t(CR)**	**P**	**Hypothesis Results**
H_1	CaE-IaE	0.815	0.085	10.108	***	Accepted
H_2	IaRE-CaE	0.569	0.061	6.149	***	Accepted
H_3	WtO-IaRE	0.402	0.134	4.895	***	Accepted
H_4	ATT-IaRE	0.423	0.119	5.829	***	Accepted
H_5	WtO-ATT	0.100	0.055	**1.823**	**0.068**	**Rejected**
H_6	ATT-SN	0.451	0.056	7.220	***	Accepted
H_7	BI-ATT	0.853	0.060	12.531	***	Accepted
H_8	BI-WtO	0.184	0.043	3.790	***	Accepted

SEM results of the research model, Standard B, CR, and P values in structural relationships are given in Table 11. According to these values, the values are within the compliance values standards. For this reason, the model tested in the path analysis was accepted without the need for any modification.

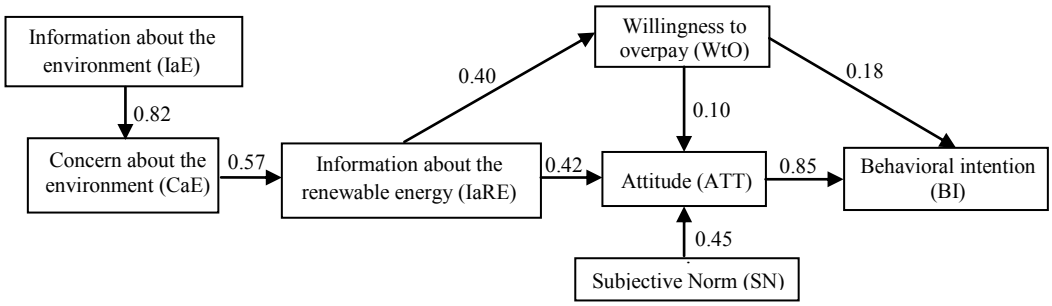

Figure 3. The Final Model of the Study

Discussion

In the study, the effect of the knowledge level of the society about RES and the environment, concerns for the environment, and altruism of overpaying on the intention to use RES were examined. Accordingly, it has been concluded that knowledge about the environmental impacts, environmental concerns, subjective norms and intrinsic motivation positively affects the intention to use by pushing individuals to know renewable energy sources. In addition, another important result obtained in the study is that the level of information about RES has a positive effect on the willingness to overpay and the willingness to overpay has a positive effect on the use of RES.

Relationships between IaE - CaE and CaE - IaRE

IaE and IaRE were considered as single factor (IaERE) at the beginning of the study. However, after EFA, IaE and IaRE were determined as two separate factors. Thus, the hypotheses were re-established. In this regard, IaE affects CaE (H_1), and CaE affects IaRE (H_2). The proposed hypothesis of H_1 (IaE directly and positively affects CaE) was confirmed. Environmental knowledge is defined as a person's ability to understand and evaluate the impact of society on the ecosystem (Haron, Paim, and Yahaya, 2005, p. 427). Environmental anxiety is defined as people's evaluation or attitude towards phenomena, one's behavior, or the environmental consequences of other people's actions (Frasson and Gärling, 1999). The other finding of the study shows that CaE has a positive and significant effect on IaRE. Therefore, the hypothesis of H_2 is acceptable. According to this finding, consumers who are concerned about the environment tend to learn about environment-friendly energy sources such as renewable energy. This finding is consistent with the typical results from the literature (Wang et al., 2016). Consumers' information plays a vital role in decision-making processes since it directly affects existing information and the acquisition of new information (Chiou, Droge and Hanvanich, 2002).

The increase in the individual's general attitudes toward environmental problems and concerns is essential in predicting people's pro-environmental behavior (Shin, Im, Jung and Seve, 2017). Wang, Fan, Zhao, Yang and Fu (2016) stated that high environmental concerns of consumers will create a more positive attitude toward environmental practices. According to Zografakis et al. (2010), the individuals who have awareness about RES, are more likely to use RES. Similarly, individuals who do have not enough information about environmental problems will not be able to perceive the environmental risks (Keller et al., 2012). All the new information about the environment may drive individuals to change their lifestyles (Hobson, 2003).

Relationships between IaRE – WtO, WtO - BI, and IaRE - ATT

RES installation and maintenance costs are higher in the short term than fossil fuels. For this reason, an overpayment should be made in the use of RES compared to fossil fuels. In this study, the view of the society on the use of RES and the intention to overpay for the use of RES in the long term, and the intention to use

RES were examined. For this purpose, hypotheses H_3, H_5 and H_8 were established. The hypothesis of H_3 (IaRE directly and positively affects WtO) and hypothesis of H_8 (WtO directly and positively affects BI) were confirmed. According to the findings, the hypothesis of H_5 was not confirmed.

These results are consistent with studies in the literature (Zografakis et al., 2010; Arslan and Uzun, 2017). The conclusion that individuals who have knowledge about renewable energy sources and their use are willing to overpay for their long-term advantages is consistent with the literature. It has been stated in the literature that the concern about the environment, environmental awareness and knowledge about RES affect the willingness to overpay for the use of RES (Dogan and Muhammed, 2019; Arslan, 2022a). Nomura and Akai (2004) stated that consumers will be willing to pay more for the use of RES with the increase in the prevalence and awareness of RES. In addition, according to the study, if consumers think that the environmental problems, they consider important will decrease with the use of RES, they will attach importance to the system and their willingness to overpay will positively affect their behavioral intentions. Eagly and Chaiken (1998) mentioned that behavioral intentions predict behavior better than attitude. Yoo and Kwak (2006) stated in their studies that concerns about environmentally friendly energy have increased and people are willing to pay to use green electricity. Kostakis and Sardianou (2012) stated that factors such as environmental awareness and information dissemination are powerful factors that positively affect tourists' willingness to pay for accommodation in a hotel using RES. Lin and Syrgabayeva (2016) emphasize that environmental concern should be positively associated with consumers' pro-environmental behavior (intention to use renewable energy).

Relationship between IaRE and ATT

According to the findings, the hypothesis of H_4 was confirmed. Thus, IaRE has a positive and significant effect on BI. This finding is consistent with the literature findings (Egea and Frutos, 2013; Pagiaslis and Krontalis, 2014). Stigka, Paravantis and Mihalakakou (2014) indicated that individuals who have concerns about environmental issues and have information about RES and energy problems develop a positive attitude toward RES. Depending on the concern about the environment's future and information about the benefits of RES use, consumers tend to use RES.

Relationship between SN and ATT

According to the findings, the hypothesis of H_6 confirmed. SN affects ATT. SNs are normative beliefs about family members, close friends, or people they care about. Studies show that SNs are effective on consumers' social and environmental behavior (Thøgersen and Grønhøj, 2010; Gadenne et al. 2011; Dwyer, Maki and Rothman, 2015; Gifford and Nilsson, 2014; McDonald and Crandall, 2014). Individuals are forced to act willing for environmental issues such as energy-saving behavior as long as they observe the reference people's behaviors (Xingjun, Shanyong and Shuai, 2018).

On the other hand, Ajzen states that there is no direct relationship between SN and the outcome variable, but indirect effects can be found through attitude and behavioral belief. In other words, the environment's expectations about households regarding their energy choices should support a belief in the critical consequences of such choices. However, in this case, a positive attitude towards the elections can develop, and the probability of performing the behavior increases (Ajzen, 1991). The higher the level of perceived SN, the higher the probability of performing the behavior is observed (De Leeuw, Valois, Ajzen and Schmidt, 2015). According to Sangroya and Kumar (2017), consumers are driven not only by financial concerns but also by emotional and social concerns. Social norms and moral obligations and greater acceptance of renewable energy and information about it affect consumers' willingness to pay for green energy.

Relationship between ATT - BI

According to the findings, the hypothesis of H_7 was confirmed. Thus, ATT has a positive and significant effect on BI. The intention factor describes the positive or negative emotions of realizing the target behavior and explains the environmentalist behavior-oriented willingness (Wu and Chen, 2014; Arslan, 2018). This finding is consistent with the literature. Studies on green product purchasing and environmental behaviors (such as energy and fuel saving) show a strong relationship between attitude and intention (Tan, Ooi and Goh 2017; Ha and Janda, 2012). In this regard, it was observed from the study that consumers who intend to use RES were committed.

Relationship between PBC - BI

The addition of PBC should become increasingly useful as voluntary control over behavior decreases (Ajzen, 1991, p. 185). Where attitudes or normative effects are forceful, PBC may predict intentions poorly. Thus, Ajzen (1991) argues that the importance of the relationship between PBC - BI depends on the kind of behavior and the inherence of the case. Ajzen (1991) also argues that PBC and self-efficacy structures can be used interchangeably. However, some sources argue that PBC and self-efficacy are not completely synonymous (Terry, 1993; Bandura, 1986). In some literature sources, self-efficacy should be used instead of PBC to predict intentions and behaviors (Vries, Dijkstra and Kuhlman, 1988; Dzewaltowski, Noble and Shaw, 1990). Self-efficacy is concerned with cognitive control perceptions based on self-control whereas PBC is concerned with common exterior factors (Armitage and Conner, 2001). According to this, although individuals have self-efficacy, they do not see themselves sufficient for RES use due to external factors such as legal procedures, overpayment obligation, taxes and the twilight state of RES use. Notani (1998) notes two factors that may affect the predictivity level of PBC on intention and behavior. The first one is the closeness of perceived behavior control with actual behavior. From the viewpoint of predictive ability, perceived control has no certainty on conditional intention since the effect of PBC on intention is related to motivation level rather than the actuality of the perceptions. The second one is the uniformity of behavioral control perception in time (Kocagoz and Dursun, 2010).

Accordingly, individuals may feel that they have enough facilities for RES use although they have not. Therefore, they may have an intention to use RES under these positive feelings. However, these individuals will not be able to have the opportunity to activate the behavior when the time is comes. In this case, PBC and intention are not sufficient to explain the behavior.

Conclusion

In this study, the behavior of using renewable energy sources (RES), taking into account the knowledge level and external concerns of environmental issues and RES, was investigated in the planned behavior theory concept (PBT). The willingness of overpaying for energy demand by RES was also investigated. It was concluded that information about environment (IaE) affects the environmental concerns (EC) of public officers. It was also concluded that EC enforces public officials to get new information about RES. This result is consistent with the literature findings (Marquart-Pyatt, 2015). In the study, the willingness of public officials to overpay (WtO) for RES use was also investigated. In the study, it was concluded that public employees have the intention to use renewable energy sources by overpaying.

In Turkey, energy consumption increases with the population increase and technological development. From the viewpoint of sustainable development and the target of membership in the European Union (EU), it is an important issue to diversify and expand the RES use. Although various support, tax and investment subsidies are available, Turkey can not manage to generate enough energy in comparison to consumption. In this regard,

Turkey is not a self-contained country. However, Turkey has a great advantage depending on its geopolitical position and technology level. Despite Turkey having a pretty convenient condition in terms of RES such as wind energy, solar energy and geothermal energy, Turkey could not achieve the desired targets on RES use in comparison to the the politics of EU. The negative aspects and uneasiness of society are the main reasons for this issue. The esthetic and financial concerns of estates as well as the technical concerns such as noise and vibration prevent the environmental concerns. However, as indicated in the results of the study and the common literature, the information about the RES and environment affects the intention of RES use. Especially, it would positively affect the social acceptance of RES to inform society about the external costs sourced by the environmental damages and health expenses. Herein, the RES suppliers, politicians and role models of the society have an important mission to tell the social, sanitary and economic advantages of RES use by comparing the fossil fuels.

The other important reason that prevents the pervading of RES use is the dependence on foreign sources for the installation and maintenance of the required technology. This dependency has also negative effects on the process bringing higher costs with it. Herein, more attractive incentive politics are required to encourage local investors.

This study was just applied to the public officials in Bilecik province. Hence, it is hard to generalize the results due to this limitedness. It is possible to obtain different results for the different samples depending on the concerns sourced by geological, cultural, demographical and economic issues. Also in the study, the intention of RES use and willingness to overpay was investigated on a scale. The investigation of the use of a specific source (single solar, single wind, single geothermal and so on) can result in different conclusions.

Today, oil and natural gas prices are increasing. Both these increases and the conflicts between nations make attaining fossil fuels difficult. In this conclusion, the required incitements and policies for RES use should be revised. Necessary research and development (R&D) activities and substructures should be carefully planned taking into account the reduction in the cost of production. Individuals should be informed about the costs of fossil fuels, including the health side, and the promotions of RES use.

References

Ajzen I (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes. 50*(2),179–211. doi.org/10.1016/0749-5978(91)90020-T.

Ajzen, I. and Driver, B. L. (1992). Application of the theory of planned behavior to leisure choice. *Journal of Leisure Research*, *24*, 207- 224. doi.org/10.1080/00222216.1992.11969889.

Ajzen, I. and Fishbein, M. (1975). A Bayesian analysis of attribution processes. *Psychological Bulletin*, *82*(2), 261-277. doi.org/10.1037/h0076477.

Ajzen, I., Joyce, N., Sheikh, S. and Cote, N.G. (2017). Knowledge and the prediction of behavior: the role of information accuracy in the theory of planned behavior. *Basic and Applied Social Psychology*, *33*(2), 101-117. doi.org/10.1080/01973533.2011.568834.

Alam, S., Hashim, N., Rashid, M., Omar, N., Ahsan, N., and Ismail, M. (2014). Small-scale households' renewable energy usage intention: theoretical development and empirical settings, *Renewable Energy, 68*, 255-263. doi: 10.1016/j.renene.2014.02.010.

Altunisik, R., Coşkun, R., Bayraktaroglu, S. and Yildirim E. (2010). *Sosyal bilimlerde araştırma yöntemleri SPSS uygulamalı*. Sakarya, Sakarya Kitabevi.

Armitage, C.J., and Conner, M.T. (2001). Efficacy of the theory of planned behaviour: a meta-analytical review. *British Journal of Social Psychology*, *40*, 471-499. doi.org/10.1348/014466601164939.

Arslan, O., and Arslan A.E. (2022a). Pareto principle-based advanced exergetic evaluation of geothermal district heating system: Simav case study. *Journal of Building Engineering*, *58*, 1-16. doi.org/10.1016/j.jobe.2022.105035.

Arslan, O., and Arslan A.E. (2022b). Performance evaluation and multi-criteria decision analysis of thermal energy storage integrated geothermal district heating system. *Process Safety and Environmental Protection*, *167*, 21-33. doi.org/10.1016/j.psep.2022.08.073.

Arslan, A.E. (2022a). Yenilenebilir Enerji Kaynakları Kullanımında Çevresel Motivasyonlar ve Ahlaki Normun Rolü: Bilecik Örneği. [The Role of Environmental Motivations and the Moral Norm in the Use of Renewable Energy Resources: The Case of Bilecik]. *Alanya Akademik Bakış Dergisi, 6*(3), 2775-2808. doi: 10.29023/alanyaakademik.1098224.

Arslan, E.A. (2022b, February). *Investigation of public workers' opinions on renewable energy sources according to different variables*. International Euroasia Congress on Scientific Researches and Recent Trends 9. Antalya, Turkey.

Arslan. E.A. (2022c, January). *Investigation of factors affecting the environmental awareness and attitude behavior of officers.* V-International European Conference on Interdisciplinary Scientific Research. Valencia, Spain.

Arslan, O. (2021). Performance analysis of a novel heat recovery system with hydrogen production designed for the improvement of boiler effectiveness. *International Journal of Hydrogen Energy*, *46*(10/8), 7558-7572. doi.org/10.1016/j.ijhydene.2020.11.253.

Arslan, O., and Kilic, D. (2021). Concurrent optimization and 4E analysis of organic Rankine cycle power plant driven by parabolic trough collector for low-solar radiation zone. *Sustainable Energy Technologies and Assessments*, *46*, 101230. doi.org/10.1016/j.seta.2021.101230.

Arslan, O. (2010). Technoeconomic analysis of electricity generation from wind energy in Kutahya, Turkey. *Energy*, *35*(1), 120-131. doi.org/10.1016/j.energy.2009.09.002.

Arslan, A.E., and Guven, O. Z. (2020). GTKM Kapsamında Akademisyenlerin Çevrimiçi Tatil Satın Alma Davranışlarında eWOM'un Etkisi. [The effect of ewom on the online holiday purchase behaviors of academics within of ETAM]. *Journal of Business Research-Turk, 12*(1), 43-64. doi.org/10.20491/isarder.2020.827.

Arslan, A.E. (2018). *Güven, imaj ve elektronik ağızdan ağıza iletişimin çevrimiçi satın alma niyeti üzerine etkisi: Akademisyenler üzerinde bir uygulama*. [*The effect of confidence, image and electronic word of mouth on online holiday purchasing intention: An application on the academics]*. Institute of Social Sicences, Kutahya Dumlupinar University, Ph.D. Thesis.

Arslan, F. and Uzun, A. (2017). Yenilenebilir enerji yatırımlarının sosyal kabul boyutu. [The Investments aspect of social acceptance of renewable energy]. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, *51*, 95-116. https://dergipark.org.tr/en/pub/dpusbe/issue/27739/294759.

Bagozzi, R.P., and Warshaw, P.R. (1990). Trying to consume. *Journal of Consumer Research*, *17*, 127-140. doi.org/10.1086/208543.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bang, H.K., Ellinger, A.E., Hadjimarcou, J., and Patrick, A.T. (2000). Consumer concern, knowledge, belief, an attitude toward renewable energy: an application of the reasoned action theory. *Psychology & Marketing*, *17*(6), 449- 468. doi.org/10.1002/(SICI)1520-6793(200006)17:6%3C449::AID- AR2%3E3.0.CO;2-8.

Batley, S.L., Colbourne, D., Fleming, P.D., and Urwin P. (2001). Citizen versus consumer: challenges in the UK green power market. *Energy Policy*, *29*(6), 479-487. doi.org/10.1016/S0301-4215(00)00142-7.

Bayrac, H.N., and Cemrek, F. (2022). Avrupa Birliği ve Türkiye'nin enerji bağımlılığı ve enerji tüketiminin ekonomik büyüme üzerindeki etkisi [The European union and Turkey's enegry dependence and it's impact on economic growth of energy consumption]. *Mehmet Akif Ersoy İktisadi ve İdari Bilimler Fakültesi Dergisi*, *9*(2), 742-762. https://doi.org/10.30798/makuiibf.799842

Bentler, P.M. (1989). *EQS structural equations program manual BMDP Statistical Software.* Los Angeles: Multivariate Software.

Bernhard, J.K., and Jutta, R. (2016). Citizens' willingness to participate in local renewable energy projects: The role of community and trust in Germany. *Energy Research & Social Science*, *13*, 60-70. doi.org/10.1016/j.erss.2015.12.006.

Buyukozturk, S. (2002). *Sosyal bilimler için veri analizi el kitabı*. Ankara: Pegem Academy

Celikler, D., and Aksan, Z. (2016). The development of an attitude scale to assess the attitudes of high school students towards renewable energy sources. *Renewable and Sustainable Energy Reviews*, *54*, 1092-1098. doi.org/10.1016/j.rser.2015.10.049.

Chen, K.K. (2014). Assessing the effects of customer innovativeness, environmental value and ecological lifestyles on residential solar power systems install intention. *Energy Policy*, *67*, 951-961. doi.org/10.1016/j.enpol.2013.12.005.

Chiou, J.,S., Droge, C. and Hanvanich, S. (2002). Does customer knowledge affect how loyalty is formed? *Journal of Service Research*, *5*(2), 113–124. doi.org/10.1177%2F109467002237494.

Conner, M., and Armitage, C.J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology*, *18*(15), 1429-1464. doi.org/10.1111/j.1559-1816.1998.tb01685.x.

De Leeuw, A., Valois, P., Ajzen, I., and Schmidt, P. (2015). Using the theory of planned behavior to identify key beliefs underlying pro-environmental behavior in high-school students: implications for educational interventions. *Journal Environmental Psychology*, *42*, 128-138. doi.org/10.1016/j.jenvp.2015.03.005.

Dienes, C. (2015). Actions and intentions to pay for climate change mitigation: environmental concern and the role of economic factors. *Ecological Economics*, *109*, 122–129. doi.org/10.1016/j.ecolecon.2014.11.012

Dogan, E., and Muhammad, I. (2019). Willingness to pay for renewable electricity: A contingent valuation study in Turkey. *The Electricity Journal, 32,* 106677. doi.org/10.1016/j.tej.2019.106677.

Dolarslan, E.S. (2013). Kalite, değer ve tatminin davranışsal niyet üzerine etkileri: perakendecilik sektöründe alternatif modellerin değerlendirilmesi. [The effects of quality, value and satisfaction on behavioral intentions: Evaluation of Alternative Models in the Retail Industry]. *Hacettepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 31*(2), 15-52. doi.org/10.1016/j.ecolecon.2014.11.012.

Dwyer, P.C., Maki, A., and Rothman, A.J. (2015). Promoting energy conservation behavior in public settings: the influence of social norms and personal responsibility. *Journal of Environmental Psychology*, *41*, 30-34. doi.org/10.1016/j.jenvp.2014.11.002.

Dzewaltowski, D.A., Noble, J.M., and Shaw, J.M. (1990). Physical activity participation: Social cognitive theory versus the theories of reasoned action and planned behavior. *Journal of Sport & Exercise Psychology, 12*(4), 388–405. Retrieved from: https://psycnet.apa.org/record/1991-18363-001.

Eagly, A.H., Chaiken, S. (1998). Attitude structure and function. In: Gilbert, D.T., Fiske, S.T., Lindzey, G. (Eds.), *Handbook of social psychology*. New York: Oxford Universty Press.

Ediger, S.V. and Kentmen, C. (2010). Enerjinin toplumsal boyutu ve Türk halkının enerji tercihleri. [Social dimension of energy and energy choices of Turkish public]. *Mülkiye, 34*(268), 281-301. Retrieved from: https://dergipark.org.tr/en/pub/mulkiye/issue/269/619.

Egea, J.M.O. and Frutos, N.G. (2013). Toward consumption reduction: An environmentally motivated perspective. *Psychology & Marketing*, *30*, 660– 675. doi.org/10.1002/mar.20636.

Ekins, P. (1996). How large a carbon tax is justified by the secondary benefits of CO_2 abatement? *Resource and Energy Economics*, *18*(2), 161-187. doi.org/10.1016/0928-7655(96)00003-6.

EPA (Environmental Protection Agency of United States). (2022-a). Climate Impacts on Ecosystems. (Available from: https://19january2017snapshot.epa.gov/climate-impacts).

EPA (Environmental Protection Agency of United States). (2022-b). Overview of Greenhouse Gases. (Available from: https://www.epa.gov/ghgemissions/overview-greenhouse-gases).

Erten, S. (2002). Kız ve erkek ögrencilerin evde enerji tasarrufu yapma davranış amaçlarının Planlanmış Davranış Teorisi yardımıyla araştırılması. [Research on about energy saving of intention toward the behaviour at homes for male and female students by the application of the theory of planned behavior]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *22*, 67-73. Retrieved from: http://www.efdergi.hacettepe.edu.tr/yonetim/icerik/makaleler/931-published.pdf

Fang, X., Wang, L., Sun, C., Zheng, X. and Wei, J. (2021). Gap between words and actions: Empirical study on consistency of residents supporting renewable energy development in China. *Energy Policy*, *148*(Part A), 111945. doi.org/10.1016/j.enpol.2020.111945.

Fishbein, M. and Ajzen, I. (2011). *Predicting and changing behavior the reasoned action approach*. New York: Psychology Press.

Fornell, C., and Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50. doi.org/10.1177%2F002224378101800104.

Fosil Yakıtların Can Yakan Gizli Maliyetleri, İklim haber, (2017). Available from: https://www.iklimhaber.org/fosil-yakitlarin-can-yakan-gizli-maliyetleri/, (29.03.2022).

Fraj, E., and Martinez, E. (2006). Environmental values and lifestyles as determining factors of ecological consumer behavior: an empirical analysis. *Journal Consumer Marketing*, *23*, 133-144. Retrieved from: http://www.emeraldinsight.com/0736-3761.htm

Fransson, N., and Gärling, T. (1999). Environmental concern: Conceptual definitions, measurement methods, and research findings. *Journal of Environmental Psychology*, *19*(4), 369–382. doi:10.1006/jevp.1999.0141.

Gadenne, D., Sharma, B., Kerr, D., and Smith, T. (2011). The influence of consumers' environmental beliefs and attitudes on energy saving behaviors. *Energy Policy*, *39*, 7684-7694. doi.org/10.1016/j.enpol.2011.09.002.

Gamel, J., Bauer A., Decker, T., and Menrad, K. (2022). Financing wind energy projects: An extended theory of planned behavior approach to explain private households' wind energy investment intentions in Germany, *Renewable Energy*, *182*, 592-601. doi: 10.1016/j.renene.2021.09.108.

Garson, G.D. (2004). *Multivariate analysis for applied social science*. Retrieved March 14, 2004, Available from http://www2.chass.ncsu.edu/garson/ pa765/path.htm

Gifford, R., and Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behaviour: a review. *International Journal of Psychology*, *49*, 141-157. doi.org/10.1002/ijop.12034.

Gunes, V. (2019). *Çevreci tüketim davranişinin belirleyicilerinin görece etkilerinin incelenmesi.* [*Analyzing the relative effects of determinants of environmental consumption behavior*]. (Doktora tezi, Sakarya Üniversitesi İşletme Enstitüsü, Sakarya). Retrieved from: https://acikerisim.sakarya.edu.tr/bitstream/handle/20.500.12619/68681/T09015.pdf?sequence=1&isAllowed=y

Gurcum, B.H., and Yildirim, R. (2018). Yeşil pazarlama ve dünyadan bir yeşil tekstil işletmesi: ECOALF. [Green marketing and a worldwide green textile company: ECOALF]. *The Journal of Academic Social Science Studies*, *68*, 222-233. dx.doi.org/10.9761/JASSS7610.

Ha, H.Y., and Janda, S. (2012) Predicting consumer intentions to purchase energy-efficient products. *J Consum Mark, 29*(7), 461–469. doi: 10.1108/07363761211274974.

Hair, J.F., Black, W.C., Babin, B.J., and Anderson, R.E. (2009). *Multivariate data analysis*. NJ: Prentice-Hall.

Halder P., Pietarinen J., Havu-Nuutinen S., Pöllänen S., and Pelkonen P. (2016). The Theory of Planned Behavior model and students' intentions to use bioenergy: A cross-cultural perspective, *Renewable Energy*, *89*, 627-635. doi.org/10.1016/j.renene.2015.12.023.

Han, H., Hsu, L.T., ve Lee, J.S. (2009). Empirical investigation of the roles of attitudes toward green behaviors, overall image, gender, and age in hotel customers' eco-friendly decision-making process. *International Journal of Hospitality Management*, *28*, 519–528. doi.org/10.1016/j.ijhm.2009.02.004.

Han, H., Hsu, L.-T., and Sheu, C. (2010). Application of the Theory of Planned Behaviour to green hotel choice: testing the effect of environmental friendly activities. *Tourism Management, 31*, 325-334. doi.org/10.1016/j.tourman.2009.03.013.

Hansla, A., Gamble, A., Juliusson, A. and Gärling, T. (2008). Psychological determinants of attitude towards and willingness to pay for green electricity. *Energy Policy*, *36*, 768-74. doi: 10.1016/j.enpol.2007.10.027.

Hansmann, R., Laurenti, R., Mehdi, T., and Binder, C.R. (2020). Determinants of pro-environmental behavior: a comparison of university students and staff from diverse faculties at a Swiss University. *Journal of Clean Production*, *268*, 121864. doi.org/10.1016/j.jclepro.2020.121864.

Harland, P., Staats, H., and Wilke, H.A. (1999). Explaining pro-environmental intention and behavior by personal norms and the theory of planned behavior. *Journal of Applied Social Psychology*, *29*(12), 2505-2528. doi: 10.1111/j.1559-1816.1999.tb00123.x.

Haron, S.A., Paim, L., and Yahaya, N. (2005). Towards sustainable consumption: An examination of environmental knowledge among Malaysians. *International Journal of Consumer Studies*, *29*(5), 426–436. doi:10.1111/ijc.2005.29. doi.org/10.1111/j.1470-6431.2005.00440.x.

Henry, J.W., and Stone, R.W. (1994). A structural equation model of end-user satisfaction with a computer-based medical information systems. *Information Resourch Management Journal*, *7*(3), 21-33. doi: 10.4018/irmj.1994070102.

Hobson, K. (2003). Thinking Habits into Action: The role of knowledge and process in questioning household consumption practices. *The International Journal of Justice and Sustainability*. *8*(1), 95-112. http://dx.doi.org/10.1080/135498303200041359.

Hussain, M., Khan, M., Al-Aomar, R. A. (2016). Framework for supply chain sustainability in service industry with Confirmatory Factor Analysis. *Renewable and Sustainable Energy Reviews, 55*, 1301–1312. https://doi.org/10.1016/j.rser.2015.07.097.

Jamison, A. (2003). The making of green knowledge: the contribution from activism. *Futures*, *35*(7), 703-716. doi.org/10.1016/S0016-3287(03)00023-5.

Jensen, B.B. (2002). Knowledge, action and pro-environmental behavior. *Environmental Education Research, 8*(3), 325-334. doi.org/10.1080/13504620220145474.

Johnson, R.A., and Wichern, D.W. (2014). *Applied multivariate statistical analysis*. NJ: Prentice-Hall.

Kaiser, F.G., Wölfing, S., and Fuhrer, U.U. (1999). Environmental attitude and ecological behavior. *Journal of Environmental Psychology, 19*(1), 1-19. doi.org/10.1006/jevp.1998.0107.

Kalafatis, S.P., Pollard, M., East, R., and Tsogas, H.M. (1999). Green marketing and Ajzen's theory of planned behavior: A cross-market examination. *Journal of Consumer Marketing, 16*(5), 441-460. Retrieved from: https://www.emerald.com/insight/content/doi/10.1108/07363769910289550/full/html

Kaplan, S. (1991). *Beyond rationality: clarity-based decision making. environment, cognition, and action: an integrative multidisciplinary approach*. New York: Oxford University.

Keller, C., Bostrom A., Kuttschreuter, M., Savadori, L., Spence, A., and White, M. (2012). Bringing appraisal theory to environmental risk perception: a review of conceptual approaches of the past 40 years and suggestions for future research. *Journal of Risk Research*, *3*, 237-256. https://doi.org/10.1080/13669877.2011.634523.

Kocagöz, E., and Dursun, Y. (2010). Algılanan davranışsal kontrol, Ajzen'in teorisinde nasıl konumlanır? Alternatif model analizleri. [How can perceived behavioral control be positioned in the ajzen's theory: alternative model analyses]. *KMÜ Sosyal ve Ekonomik Araştırmalar Dergisi, 12*(19), 139-152. Retrieved from: dergipark.org.tr/tr/pub/kmusekad/issue/10217/125597.

Kocak, E. (2019). *Tüketicilerin hane içi enerji tasarrufu davranişina etki eden faktörlerin incelenmesi. [Examination of the factors affecting residential energy conservation behavior of consumers]*. (Yüksek lisans tezi, Hacettepe Üniversitesi, Sosyal Bilimler Enstitüsü, İşletme Anabilim Dalı, Ankara). Retrieved from:http://www.openaccess.hacettepe.edu.tr:8080/xmlui/bitstream/handle/11655/22422/Ece%20Ko%C3%A7ak-yeni.pdf?sequence=3&isAllowed=y.

Kostakis, I., and Sardianou, E. (2012). Which factors affect the willingness of tourists to pay for renewable energy? *Renewable Energy*, *38*(1). doi.org/10.1016/j.renene.2011.07.022.

Kumar, V, and Chandra, B. (2018) An application of theory of planned behavior to predict young Indian consumers' green hotel visit intention. *Journal of Clean Production, 172*, 1152–1162. doi.org/10.1016/j.jclepro.2017.10.047.

Lansana, F. (1992). Distinguishing potential recyclers from non-recyclers: a basis for developing recycling strategies. *Journal of Environmental Education, 23*, 16-23. doi.org/10.1080/00958964.1992.9942792.

Laroche, M., Toffoli, R., Kim, C., and Muller T.E. (1996). The influence of culture on pro-environmental knowledge, attitudes, and behavior: A Canadian perspective. *Advances in Consumer Research*, *23*, 196-202. Retrieved from: https://www.acrwebsite.org/volumes/7942/.

Lee, J., Bray, M., Carter Wells, J., Glaeser B., Ivers, K., and Street, C. (2004). Discovering the meaning of community in an online master's degree program. *Association for Educational Communications and Technology*, *27*(3), 19-23. Retrieved from: https://files.eric.ed.gov/fulltext/ED485112.pdf

Leicht, A., Heiss, J., and Byun, W.J. (eds). (2018). *Issues and trends in Education for Sustainable Development*. Unesco Publishing. Retrieved from: https://unesdoc.unesco.org/ark:/48223/pf0000261445/PDF/261445eng.pdf.multi.

Lin, C.-Y., and Syrgabayeva, D. (2016). Mechanism of environmental concern on intention to pay more for renewable energy: Application to a developing country. *Asia Pacific Management Review*, *21*(3), 125-134. doi.org/10.1016/j.apmrv.2016.01.001.

Liu, W., Wang, C., and Mol, A.P.J. (2013). Rural public acceptance of renewable energy deployment: The case of Shandong in China. *Applied Energy*, *102*, 1187–1196. doi.org/10.1016/j.apenergy.2012.06.057

Lopes, J.R.N., Kalid, R.A., Rodríguez, J.L.M., and Filho Avilla, S. (2019). A new model for assessing industrial worker behavior regarding energy saving considering the theory of planned behavior, norm activation model and human reliability. R*esources, Conservation & Recycling*, *145*, 268–278. doi.org/10.1016/j.resconrec.2019.02.042.

Lynch, D., and Martin, P. (2013, June). *How energy efficiency programs influence energy use: an application of the theory of planned behavior.* Proceedings in ECEEE Summer Study on Energy Efficiency: Rethink, Renew, Restart (p.2037-2048), Hyeres, France. Retrieved from: https://proceedings.eceee.org/docs/2013/contents.pdf.

Macovei, O.I. (2015). Applying the theory of planned behavior in predicting pro-environmental. *Acta Universitatis Danubius*, *4*, 15-32. Retrieved from: https://journals.univ-danubius.ro/index.php/oeconomica/article/view/2958/2705

Maloney, M.P., Steger, H.G., and Ward, M.P. (1973). The Quick Test as a measure of general intelligence in an urban community psychiatric hospital. *Psychological Reports*, *32*(3), 823-827. psycnet.apa.org/doi/10.2466/pr0.1973.32.3.823

Maloney, M.P., Ward, M.P., and Braucht, G.N. (1975). A revised scale for the measurement of ecological attitudes and knowledge. *American Psychologist*, *30*, 787-790. psycnet.apa.org/doi/10.1037/h0084394.

Marquart-Pyatt S.T. (2018). Trust and environmental activism across regions and countries. *Journal of Environmental Studies and Sciences*, *8*, 249–263. doi.org/10.1007/s13412-018-0498-1.

Masrahi, A., Wang, J., and Abudiyah, A.K. (2021). Factors influencing consumers' behavioral intentions to use renewable energy in the United States residential sector, *Energy Reports*, *7*, 7333–7344. doi.org/10.1016/j.egyr.2021.10.077.

Masukujjaman, M., Shah, S.A., Chamhuri, S. and Halim, S.A. (2021). Purchase intention of renewable energy technology in rural areas in Bangladesh: Empirical evidence. *Renewable Energy*, *170*, 639-651. doi: 10.1016/j.renene.2021.01.125

McDonald, R.I., and Crandall, C.S. (2015). Social norms and social influence. *Current Opinion in Behavioral Sciences, 3*, 147–151. doi.org/10.1016/j.cobeha.2015.04.006.

Meydan, C.H., and SeSen, H. (2011). *Yapısal eşitlik modellemesi AMOS uygulamaları*. Ankara: Detay Yayın.

Muhammed, İ., Zhen, Y.Z., Heng, L., and Abdul, R. (2020). The influence of consumers' intention factors on willingness to pay for renewable energy: a structural equation modeling approach. *Environmental Science and Pollution Research, 27*, 21747–21761. doi.org/10.1007/s11356-020-08592-9.

Muhammad, I., Yu, H., Muhammad, I., Haitao, W., Rabia, A., and Abdul, R. (2021). Assessment of the public acceptance and utilization of renewable energy in Pakistan. S*ustainable Production and Consumption*, *27*, 312-324. doi.org/10.1016/j.spc.2020.10.031.

Muhammed, G., and Tekbiyik-Ersoy, N. (2020). Development of renewable energy in China, USA, and Brazil: A comparative study on renewable energy policies. *Sustainability, 12*(21), 2-29. 9136. doi.org/10.3390/su12219136.

Nomura, N., and Akai, M. (2004). Willingness to pay for green electricity in Japan as estimated through contingent valuation method. *Applied Energy*, *78*, 453–463. doi.org/10.1016/j.apenergy.2003.10.001. doi.org/10.1016/j.apenergy.2003.10.001

Notani, A.S. (1998). Moderators of perceived behavioral control's predictiveness in the theory of planned behaviour: a meta-analysis. *Journal of Consumer Psychology*, *7*(3), 247-271. doi.org/10.1207/s15327663jcp0703_02.

Osman-Elasha, S., Campbell, B.,J., Cheong S.-M., McCormick, S., Pulwarty, R., Supratid, S., and Ziervogel, G. (2012). Managing the risks from climate extremes at the local level. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. (Special Report of the Intergovernmental Panel on Climate Change). Retrieved from web site of Working Groups of Intergovernmental Panel on Climate Change: https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap5_FINAL-1.pdf.

Ozalp, M. (2018). *Küresel enerji denkleminde merkez ülke Türkiye*. Ankara: Seçkin Yayıncılık.

Ozkaya, S.S. (2022). Yenilenebilir enerji kaynakları. T.C. Dışişleri Bakanlığı. Available from: https://www.mfa.gov.tr/yenilenebilir-enerji-kaynaklari.tr.mfa. (22.10.2022)

Pagiaslis, A., and Krontalis, A.K. (2014). Green consumption behavior antecedents: environmental concern knowledge, and beliefs. *Psychology & Marketing*, *31*(5), 335-348. doi.org/10.1002/mar.20698.

Palabiyik, H., Yavas, H. and Yalcin, M. (2010). Türkiye'de nükleer santral kurulabilir mi? Çatişmadan uzlaşiya: Türkiye'de nükleer enerji projelerinde sosyal kabul sorunu ve halkın reddetme sendromunun araştırılması. [Can a nuclear power plants be constructed in Turkey? From conflict to agreement: the social acceptence problem of nuclear energy projects in Turkey and analys.] *Girişimcilik ve Kalkınma Dergisi*, *5*(2), 175-201. Retrieved from: http://acikerisim.comu.edu.tr/xmlui/bitstream/handle/20.500.12428/349/hamit_palabiyik_makale.pdf?sequence=1&isAllowed=y.

Pearce, D. (1992). Green economics. *Environmental Values, 1*, 3-13. doi.org/10.3197/096327192776680179.

Pienaar, E.F., Lew, D.K., and Wallmo, K. (2013). Are environmental attitudes influenced by survey context? An investigation of the context dependency of the New Ecological Paradigm (NEP) scale. *Social Science Research*, *42*, 1542-1554. doi.org/10.1016/j.ssresearch.2013.07.001.

Raykov, T. (2004). Behavioral scale reliability and measurement invariance evaluation using latent variable modeling. *Behavior Therapy*, *35*(2), 299-331. doi.org/10.1016/S0005-7894(04)80041-8.

Rezaei, R., and Heijden, van der P.G.M. (2022). Understanding Iranian Rural People's Intention to Use Renewable Energy Technologies: Pro-Self or Pro-Social Orientations? *Tarbiat Modares University Press*, *24*(3). Retrieved from: https://jast.modares.ac.ir/article-23-54204-en.pdf.

Rezaei, R., and Mianaji, S. (2019). Using the health belief model to understand farmers' intentions to engage in the on-farm food safety practices in Iran. *Journal of Agricultural Science and Technology*, *21*(3), 561-574. Retrieved from: https://dorl.net/dor/20.1001.1.16807073.2019.21.3.10.3.

Rohollah, R., and Marjan, G. (2018). Rural households' renewable energy usage intention in Iran: Extending the unified theory of acceptance and use of technology. *Renewable Energy, 122*, 382-391. doi.org/10.1016/j.renene.2018.02.011.

Sangroya, D., and Kumar, J. (2017) Factors in fluencing buying behaviour of green energy consumer. *Journal of Cleaner Production*, *151*, 393-405. doi.org/10.1016/ j.jclepro.2017.03.010

Sencan, H., and Fidan, Y.Y. (2020). Normality assumption in the exploratory factor analysis with Likert scale data and testing its effect on factor extraction. *Business & Management Studies: An International Journal*, *8*(1), 640-687. doi.org/10.15295/bmij.v8i1.1395.

Shin, Y.H., Im, J., Jung, S.E. and Seve, K. (2017). Consumers' willingness to patronize locally sourced restaurants: the impact of environmental concern, environmental knowledge, and ecological behavior. *Journal of Hospitality Marketing & Management, 26*(6), 644–658. doi.org/10.1080/19368623.2017.1263821.

Srivastava, C., and Mahendar, G. (2018). Intention to adopt sustainable energy: Applying the theory of planned behavior framework. *Indian Journal of Marketing*, *48*(10), 20-33. doi.org/10.17010/ijom%2F2018%2Fv48%2Fi10%2F132325.

Stage, F. K., Carter, H. C., and Nora, A. (2010). Path analysis: an introduction and analysis of a decade of research. *The Journal of Educational Research, 98*(1), 5-12. doi.org/10.3200/JOER.98.1.5-13

Stigka, E.K., Paravantis, J.A., and Mihalakakou, G.K. (2014). Social acceptance of renewable energy sources: A review of contingent valuation applications. *Renewable and Sustainable Energy Reviews*, *32*, 100-106. doi.org/10.1016/j.rser.2013.12.026.

Straughan, R.D., and Roberts, J.A. (1999). Environmental segmentation alternatives: a look at green consumer behavior in the new millennium. *Journal of Consumer Marketing*, *16* (6), 558-575. doi.org/10.1108/07363769910297506.

Sunyoung, Y., and Joosung, L. (2015). Advancing societal readiness toward renewable energy system adoption with a socio-technical perspective. *Technological Forecasting and Social Change*, *95*, 170-181. doi.org/10.1016/j.techfore.2015.01.016.

Tan, C., Ooi., H., and Goh., Y. (2017). A moral extension of the theory of planned behavior to predict consumers' purchase intention for energy-efficient household appliances in Malaysia. *Energy Policy*, *107*, 459-471. doi.org/10.1016/j.enpol.2017.05.027.

Taranto, Y., Köksal M.A., and Dal, E. (2020). *The external cost of fossil fuel use in power generation, heating and road transport in Turkey*. Retrieved from: https://www.shura.org.tr/wp-content/uploads/2020/12/Externality_rapor_ENG_Web.pdf.

Taskın, E., Yilmaz, M., and Kilic, C. (2021). Rüzgâr Enerji Santrallerinin Ekonomik Etkileri ve Sosyal Kabul: Mucur Örneği. [Economic Effects of Wind Energy Systems and Social Acceptance: Mucur Case Z]. *Coğrafi Bilimler Dergisi/ Turkish Journal of Geographical Sciences*, *18*(2), 296-319, doi: 10.33688/aucbd.784601.

Terry, D.J. (1993). Self efficacy expectancies and the theory of reasoned action. D.J. Terry, C. Gallois, and M.McCamish (Eds.), In *The theory of reasoned action: Its application to AIDS-preventative behavior* (pp. 135-151). Oxford, England: Pergamon Press.

Thøgersen, J., and Grønhøj, A. (2010). Electricity saving in households-a social cognitive approach. *Energy Policy*, *38*, 7732-7743. doi.org/10.1016/j.enpol.2010.08.025.

Tuncbilek O.F. ve Yilmaz M. (2022). Jeotermal enerjinin çevresel etkileri ve sosyal kabul: Efeler ilçesi örneği. [Environmental impacts of geothermal energy and social acceptance: example of Aydın provınce Efeler district]. *Ankara Üniversitesi Sosyal Bilimler Dergisi*, *13*(2), 154–169. doi.org/10.33537/sobild.2022.13.2.14

Ucar, M., and Arslan, O. (2021). Assessment of improvement potential of a condensed combi boiler via advanced exergy analysis. *Thermal Science and Engineering Progress, 23*(1), 1-8. doi.org/10.1016/j.tsep.2021.100853.

Ustaahmetoglu, E., and Toklu, I.T. (2015). Organik gıda satın alma niyetinde tutum, sağlık bilinci ve gıda güvenliğinin etkisi üzerine bir araştırma. [A survey on the effect of attitude, health consciousness and food safety on organic food purchase intention]. *Ekonomik ve Sosyal Araştırmalar Dergisi*, *11*(1), 197-211. Retrieved from: https://dergipark.org.tr/tr/download/article-file/528487.

Vries, H., Dijkstra, M., and Kuhlman, P. (1998). Self-efficacy: the third factor besides attitude and subjective norm as a predictor of behavioural intentions. *Health Education Research*, *3*(3), 273–282. doi.org/10.1093/her/3.3.273

Wang, Z., Zhao, C., Yin, J., and Zhang, B. (2017) Purchasing intentions of Chinese citizens on new energy vehicles: how should one respond to current preferential policy? *Journal of Clean Production*, *161*, 1000–1010. doi.org/10.1016/j.jclepro.2017.05.154

Wang, S., Fan, J., Zhao, D., Yang, S., and Fu, Y. (2016). Predicting consumers' intention to adopt hybrid electric vehicles: using an extended version of the theory of planned behavior model. *Transportation*, *43*,123-143. doi: 10.1007/s11116-014-9567-9.

Wang, Y., Liang, J., Yang, J., Ma, X., Li, X., Wu, J. Yanga, G., Rena, G., and Fenga, Y. (2019). Analysis of the environmental behavior of farmers for non-point source pollution control and management: an ıntegration of the theory of planned behavior and the protection motivation theory. *Journal of Environmental Management*, *237*, 15-23. doi.org/10.1016/j.jenvman.2019.02.070.

World Health Organization. (2015, October 6th). *WHO calls for urgent action to protect health from climate change–Sign the call* [Department News]. Available from: https://www.who.int/news/item/06-10-2015-who-calls-for-urgent-action-to-protect-health-from-climate-change-sign-the-call.

WMO (World Meteorological Organization). (2020). *Statement on the State of the Global Climate in 2019.* WMO Publications No: 1248. Available from: https://library.wmo.int/doc_num.php?explnum_id=10211.

Wu, S.I., and Chen, J.Y. (2014). A model of green consumption behavior constructed by the theory of planned behavior. *International Journal of Marketing Studies*, *6*(5), 119-132. dx.doi.org/10.5539/ijms.v6n5p119.

Wüstenhagen, R., Wolsink, M., and Bürer, M.J. (2007). Social acceptance of renewable energy innovation: An introduction to the concept. *Energy Policy, 35*(5), 2683-2691. doi.org/10.1016/j.enpol.2006.12.001.

Xingjun, R., Shanyong, W., and Shuai, Y. (2018). "Exploring the effects of normative factors and perceived behavioral control on individual's energy-saving intention: An empirical study in eastern China". *Resources, Conservation & Recycling*, *134*, 91–99. doi.org/10.1016/j.resconrec.2018.03.001.

Yaqoot, M., Diwan, P., and Kandpal, T.C. (2016). Review of barriers to the dissemination of decentralized renewable energy systems. *Renewable and Sustainable Energy Reviews*, *58*, 477-490. doi.org/10.1016/j.rser.2015.12.224.

Yazdanpanah, M., Komendantova, N., and Ardestani, R.S. (2015). Governance of energy transition in Iran: Investigating public acceptance and willingness to use renewable energy sources through socio-psychological model. *Renewable and Sustainable Energy Reviews, 45*, 565-573. doi.org/10.1016/j.rser.2015.02.002.

Yilmaz, I., Ilbas, M., and Su, S. (2003, Ekim). *Türkiye rüzgar enerjisi potansiyelinin değerlendirilmesi*. Yeni ve Yenilenebilir Enerji Kaynakları Sempozyumunda sunlan bildiri (s. 401-408), Kayseri, Türkiye.

Yoo, S.H., and Kwak, S.Y. (2009). Willingness to pay for green electricity in Korea: A contingent valuation study. *Energy Policy, 37*, 5408–5416. doi:10.1016/j.enpol.2009.07.062.

Zografakis, N., Sifaki, E., Pagalou. M., Nikitaki. G., Psarakis. V., and Tsagarakis, KP. (2010). Assessment of public acceptance and willingness to pay for renewable energy sources in Crete**.** *Renewable Sustainable Energy Reviews*, *14*, 1088-1095. doi.org/10.1016/j.rser.2009.11.009.

Zsóka, Á., Szerényi, Z. M., Széchy, A., and Kocsis, T. (2013). Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students. *Journal of Cleaner Production*, *48*, 126-138. doi.org/10.1016/j.jclepro.2012.11.030.

Genişletilmiş Özet

Amaç

Fosil yakıtların çevre ve insan sağlığı üzerindeki olumsuz etkileri, sınırlı rezervleri ve enerji üretiminde yüksek maliyetleri (ekolojik sorunlar dahil) nedeniyle daha az zararlı ve sürdürülebilir enerji kaynakları önem kazanmıştır. YEK uzun vadede fosil yakıtlara göre daha az zararlı ve dolaylı olarak daha az maliyetli olmasına karşın kısa vadede ele alındığında kurulum masrafları nedeni ile tüketicilerin fazladan ödeme yapmalarını gerektirmektedir. Literatürde yapılmış olan çalışmalarda devlet tarafından uygulanan politika ve teşviklerin YEK kullanımının yaygınlaşmasında tek başına etkili olmadığı, toplumsal kabulün de büyük önem arzettiği belirtilmektedir. Bu nedenle özellikle son yıllarda YEK kullanımının yaygınlaşmasında sözü edilen teşviklerin yanısıra YEK'e karşı olan tutum ve niyeti araştıran çalışmalara yoğunlaşılmıştır. Bu amaçla çalışmada; bireyleri YEK kullanmaya motive eden güçleri ve toplumsal kabul için en önemli olan faktörleri belirlenmesi amaçlanmaktadır. Çalışma kapsamında, çevresel kaygı, yenilenebilir enerji kaynakları, çevresel bilgi ve fazladan ödemeye isteklilik faktörlerinin Planlı Davranış Teorisi ile bütünleştirilerek tüketicilerin YEK'e bakış açıları ve kullanım niyetlerinin değerlendirilmesi amaçlanmaktadır.

Tasarım ve Yöntem

Çalışma, araştırma modelindeki değişkenler arasında tahmin edilen ilişkileri ve hipotezleri test etmek için nicel bir araştırma yöntemini benimsenmiştir. YEK kullanım niyetleri ve fazladan ödeme istekliliğinin araştırıldığı çalışmada anket yöntemi kullanılmıştır. Anket iki bölümden oluşmaktadır. İlk bölümde, katılımcıların demografik özelliklerini ölçmeye yönelik 6 soru bulunmaktadır. İkinci bölümde Likert ölçeğine göre hazırlanmış 49 ifade yer almaktadır. Çalışma, YEK'nın bulunduğu ve ilerideki zamanlarda yeni kaynak konumlandırılması planlanan Bilecik il merkezinde gerçekleştirilmiştir. Fosil yakıtların çevreye olan olumsuz etkileri, çevre-YEK ve YEK teknolojileri hakkında bilgi sahibi oldukları düşünülen, belirli bir eğitim düzeyine sahip kamu personeli araştırmaya dahil edilmiştir. Çalışmada Bilecik ilinde görev yapan 337 kamu görevlisinden sağlanan veri seti kullanılmıştır. Anketten elde edilen veriler öncelikle demografik olarak incelenmiştir. Daha sonra anket güvenirlik açısından değerlendirilmiş ve YEM analizi yapılmıştır. Bu amaçla açımlayıcı (KFA) ve doğrulayıcı (DFA) faktör analizleri yapılmıştır.

Bulgular

Çalışma kapsamında geliştirilen modelin bulguları ve uyum iyiliği değerleri verilerin modele uyduğunu göstermektedir ($\chi 2$ / df = 2.290; CFI = 0.900; NFI= 0.830; IFI= 0.890; TLI= 0.884; RMSEA= 0,062). Model kapsamında test edilen 8 hipotezden 7 tanesi kabul edilmiştir. Buna göre; sahip olunan çevresel bilgi, çevresel kaygı, YEK hakkında sahip olunan bilgi ve subjektif normun bireyleri yenilenebilir enerji kaynaklarını tanımaya yönelttiği ve fazladan ödeme yaparak kullanım niyetini olumlu yönde etkilediği sonucuna ulaşılmıştır. Çalışma sonucunda algılanan davranış kontrolü değişkeninin YEK kullanımında etkisiz olduğu sonucuna da ulaşılmıştır.

Sınırlılıklar

Çalışmanın bazı sınırlılıkları vardır. Çalışma Bilecik ilinde sınırlı kalması ve kamu personeline uygulanması nedeni ile genelleştirilemez. Farklı örneklemlerde farklı sonuçların elde edilmesi söz konusu olabilir. Ayrıca çalışmada YEK kullanım niyeti ve fazladan ödeme istekliliği genel bir perspektiften incelenmiştir. Spesifik YEK'in (Güneş panelleri, jeotermal enerji kaynakları, nükleer enerji vs.) kullanım niyetlerinin araştırılmasında farklı sanuçlara ulaşmak mümkün olabilir.

Öneriler (Teorik, Uygulama ve Sosyal)

Çalışmada YEK, çevresel bilgi ve çevre hakkında endişeye sahip olan bireylerin, çevre ve referans kişilerin de etkisi ile fazladan ödeme yaparak YEK kullanımına olumlu tutum geliştirdikleri sonucuna ulaşılmıştır. Dolayısı ile tüketicilerin YEK kullanımına karşı pozitif bir tutum ve niyet içinde oldukları ve bu amaç için fazladan ödeme yapmayı kabul ettikleri söylenebilir. Çalışmada elde edilen bu sonuçlara dayanarak YEK kullanımının yaygınlaştırılması ve toplumsal kabulün sağlanması için, ulusal ve sosyal medyada özellikle yerel yönetim ve topluluk liderleri tarafından YEK avantajları ve fosil yakıtların dolaylı maliyetleri hakkında halkın bilinçlendirilmesinin etkili olacaktır. Bunun yanında YEK kullanımı için devletin uyguladığı teşvik ve politikalar hakkında daha yoğun içerekler hazırlanmasının da YEK kullanımının yaygınlaşmasında faydalı olacağı düşünülmektedir. Bundan sonra yapılacak olan çalışmalarda, YEK spesifik olarak ele alınması, özellikle demografik değişkenlere ait etkilerin de çalışma kapsamında değerlendirilmesi bu alanda yapılacak olan çalışmalarda farklı sonuçların elde edilmesi açısından önerilmektedir. Ayrıca subjektif normların yanısıra ahlaki yükümlülüklerin de araştırma kapsamında değerlendirilmesi doğru olacaktır.

Özgün Değer

Gelişmekte olan ülkeler arasında yeralan Türkiye'nin önceliklerinden biri, enerjide dışa bağımlılığını azaltarak sürdürülebilir büyüme hedeflerine ulaşmak ve uluslararası arenada daha güçlü bir konuma gelmek için sahip olduğu potansiyel YEK'i etkin bir şekilde kullanmaktır. Bu amaçla devlet tarafından sağlanan teşvik ve politikalara ek olarak, YEK'in yaygınlaştırılmasında toplumsal kabul de önemli bir faktördür. Bireylerin YEK için fosil yakıt enerjisine kıyasla fazla ödemeye istekli olma durumları ve bu istekliliği olumlu etkileyen faktörlerin neler olduğunu bilmeleri politika yapıcılar ve kamu idareleri için büyük önem taşımaktadır. Bu nedenle Türk halkının RES kullanım niyetleri ve bu amaçla fazladan ödeme istekleri için sahip olduğu çevresel ve RES hakkında sahip olduğu bilgi ve fosil yakıtların neden olduğu dışsal maliyetlerin farkındalığının belirlenmesi RES politikalarının hazırlanmasında önem arzetmektedir. Bu amaçla çalışmada, Çevresel Endişe, Çevresel ve YEK Bilgisi ve Fazla Ödemeye İstekli olma faktörlerinin PBT'ye entegre edilmesiyle tüketicilerin YEK'e bakış açısı ve kullanım niyetlerinin değerlendirilmesi amaçlanmaktadır. Çalışmanın toplumun YEK kullanımına bakış açısını değerlendirerek uzun dönemli kâr ve zarar perspektifinde fazla ödemeye istekliliğini araştırması nedeni ile literatüre katkı sağlayacağı ve YEK ve YEK yatırımcıları konusunda hem politika hem de kanun yapıcılara yol göstermesi açısından önemli bir boşluğu dolduracağı düşünülmektedir.

Araştırmacı Katkısı: Aslı ERGENEKON ARSLAN (%100).