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Research Article

Determinants of consumers' sustainable product preferences: Research on hybrid cars

Tüketicilerin sürdürülebilir ürün tercihlerinin belirleyicileri: Hibrit otomobiller üzerine bir araştırma

Onur Çelik[1]

Erdem Akkan[2]

[1] Assoc.Prof. Dr., Adana Alparslan Türkeş Science and Technology University, Adana, Turkey, ocelik@atu.edu.tr

ORCID: 0000-0002-8552-1133

[2] Assoc.Prof. Dr, Mersin University, Mersin, Turkey, eakkan@mersin.edu.tr

ORCID: 0000-0001-5684-5676

Corresponding Author:

Onur Çelik,

Adana Alparslan Türkeş Science and Technology University, Adana, Turkey, ocelik@atu.edu.tr

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Abstract

Technological changes and developments are also evident in the automotive sector, and in parallel, consumers' environmentally conscious preferences are on the rise. This increase has made it crucial to understand the driving force behind hybrid car preferences. This study examined the impact of environmental concern, perceived risk, green consumer value, and self-image congruence on consumer attitudes, as well as the influence of these attitudes on consumer intentions. A total of 598 participants were recruited for the study. Structural Equation Modelling was employed in the data analysis using the AMOS 21.0 program. It was suggested that environmental concern, perceived risk, green consumer value, and self-image congruence influence consumer attitudes, and that the impact of these attitudes on the intention to use, specifically for hybrid cars, is also significant. The obtained results aim to contribute to the literature and practitioners by examining consumers' sustainable product preferences specifically for hybrid vehicles.

Keywords: Sustainable Products, Consumer Preferences, Hybrid Cars

Jel Codes: D12, M31, Q56

Öz

Teknolojide meydana gelen değişimler/gelişimler otomotiv sektöründe de kendisini göstermekte, buna paralel olarak tüketicilerin çevreci bilinç ile yapılan tercihleri artmaktadır. Bu artış hibrit otomobillerin tercih edilmesinde itici gücü anlamanın önemli hale gelmesine sebebiyet vermiştir. Çalışmada çevresel kaygı, algılanan risk, yeşil tüketici değeri ve benlik imajı uyumunun tüketicilerin tutumlarına ve tutumun da kullanım niyetelerine etkisi incelemiştir. Çalışma kapsamında 598 kişiye ulaşılmıştır. Verilerin analizinde AMOS 21.0 programı kullanılarak Yapısal Eşitlik Modellemesi kullanılmıştır. Hibrit otomobiller özelinde; çevresel kaygı, algılanan risk, yeşil tüketici değeri ve benlik imajı uyumunun tüketicilerin tutumlarına, tutumların da kullanım niyetine etkisinin var olduğu desteklenmiştir. Araştırmanın bulguları ile tüketicilerin sürdürülebilir ürün tercihleri, hibrit otomobiller özelinde ele alınarak literature ve uygulayıcılara katkı sağlanması amaçlamıştır.

Anahtar Kelimeler: Sürdürülebilir Ürün, Tüketici Tercihleri, Hibrit Otomobiller

Jel Kodları: D12, M31, Q56

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Introduction

The information society and increased education of consumers today created a large group of conscious consumers who prefer more sustainable consumption patterns (Maity, Dass and Kumar, 2018; VanEpps and Chin, 2024). In turn, this shift in the consumer market led companies to emphasise sustainable and environmentally friendly products. Sustainability, as a result, is becoming a more common component of corporate marketing strategies (Anjorin, Raji, Olodo, and Oyeyemi, 2024).

The shifts in consumption patterns and technological advances have influenced changes within the automotive industry. The impact on the automotive industry is the incorporation of new technologies into vehicles, which diversifies them, primarily in terms of fuel types. Thus, electric, hybrid, and plug-in hybrid cars are available today (Rosenfeld, Lindorfer and Fazeni-Fraisl, 2019; Moradi, Banagar, Mehranfar, Andwari, Könnö and Gharehghani, 2024).

It is a genuine shift in paradigms that warrants scientific attention. In fact, the literature is not lacking articles dedicated to this upheaval in the industry (Wang, Fan, Zhao, Yang, and Fu, 2016; Sharma, Das, and Maitra, 2024).

The factors that influence attitude about hybrid cars. Many of the variables that affect attitudes about hybrid have been studied in the literature. For example, environmental issues may be categorised into several major themes such as personal norms, perceived values, emotional impact, technical specifications, economic costs, and social norms (Sharma et al., 2024; Ong, Cordova, Longanilla, Caprecho, Javier, Borres and German, 2023; Wang et al., 2016; Higueras-Castillo, 2019; Zamil, Ali, Akbar, Zubr and Rasool, 2023).

Taking into account the general trends in literature and existing research gaps, the research priority and research question of the study are structured as follows;

What is the impact of environmental concern, perceived risk, green consumer value, and self-image congruence on consumer attitudes toward hybrid cars? Also, to what extent do these attitudes determine hybrid car purchase intentions?

The model employed in this research also measured the impact of the independent variables (Environmental Concern, Perceived Risk, Green Consumer Values, and Self-Image Congruence) on consumer attitude, as well as the impact of attitude on usage intention. The proposed framework is based on Ajzen's Theory of Planned Behaviour (Ajzen, 1991).

Conceptual background

Sustainable consumption

Sustainable consumption is a way of consumption that allows people to meet their needs under current conditions. It should not harm the environment, prevent the destruction of existing resources and not threaten the lives of future generations (Vargas-Merino, Ríos-Lama and Panez-Bendezú, 2023; Myers, 2000).

The concept of sustainable consumption extends beyond environmental considerations to encompass social and economic aspects as well. The purpose of this approach is to ensure that individuals are aware of their choices during consumption (Sesini, Castiglioni, and Lozza, 2020; Al-Nuaimi and Al-Ghamdi, 2022).

Research on sustainable consumption gained momentum in the 1990s, driven by studies on implementation. From 1995 to 2014, consumer behaviour was multidimensionally explained, including aspects such as energy use and environmental impacts. (Liu, Qu, Lei and Jia, 2017; Da Mota Araújo, Oliveira and Correia, 2021). During the COVID-19 pandemic, research began to shift in response to changes in consumption habits (Kristia, Kovacs, Bács, and Rabbi, 2023).

Lately, it has been divided into various fractions, including eco-efficiency, social and cultural dimensions, consumer behaviour, green product promotion, and interdisciplinary approaches (Da Mota Araújo et al. 2021; Al-Nuaimi et al., 2022). If we consider sustainable consumption behaviours, we can state that hybrid vehicles are the prominent segment. There is a widespread adoption of hybrid vehicles, as consumers with a high level of environmental awareness opt for sustainable products. (Mukhamadiev, 2023; Chen, Ghosh, Liu and Zhao, 2019).

Environmental concern

Environmental awareness (EA) can be defined as a construct that reflects people's sensitivity to environmental problems. It is characterised by values, beliefs, and behaviours related to the

environment. EA is directly linked to individual motivations toward the environment (Cruz and Manata, 2020; Weigel and Weigel, 1978; Fransson and Gärling, 1999).

Environmental sensitivity is influenced by both individual and ecological factors in which a person is currently situated. The research mentioned environmental sensitivity alongside three basic motivational perspectives: individual interest-oriented, others' well-being-oriented, or a simple concern for nature itself (Stern and Dietz, 1994; Schultz, 2001; Torkar and Bogner, 2019).

Environmental sensitivity is one of the basic variables that influences individuals' environmental attitudes. Individuals with a high level of ecological sensitivity tend to develop positive attitudes towards environmental sensitivity (Gansser and Reich, 2022; Hidalgo-Crespo, Coello-Pisco, Reyes-Venegas, Bermeo-Garay, Amaya, Soto and Hidalgo-Crespo, 2022).

The impact of environmental awareness on hybrid vehicle preferences has recently been included in the literature. In general, ecological awareness and concern have a positive effect on the purchase intention and attitude towards hybrid vehicles. Additionally, the individual's environmental knowledge positively influences their attitude towards hybrid cars.

H_1: *Consumers' environmental concerns affect attitudes to an environmental product.*

Green consumer values

The multidimensional perceived values of consumers in their preference for environmentally friendly products/services are termed green consumer value. Green consumer value is measured in terms of social, functional, conditional, emotional, and environmental aspects. Consumers can turn their sensitivity towards the environment into their behaviours through these dimensions. (Sangroya and Nayak, 2017; Adhitiya and Astuti, 2019)

Consumers' environmental awareness leads to more positive attitudes towards environmental issues and eco-social benefits, which in turn leads to green purchasing, as suggested by Cheung and To (2019). Green consumer values encompass personal and consumption values that reflect a person's environmentally and socially responsible personality. Green consumer values can lead to increased adoption of green products and marketing success. Marketers can shape their marketing strategies with consumer values taken into account (Sivapalan, Heidt, Scherrer, and Sorwar, 2021; Bhardwaj, Sreen, Das, Chitnis, and Kumar, 2023). Hur, Yoo, and Hur (2015) drew a valid inference in their study for marketing managers in the automotive industry, specifically finding that functional and social values, alongside consumer values, contribute to increased satisfaction with hybrid vehicles.

In addition to this practical situation in terms of satisfaction, green consumer values play a crucial role in the development of green products that foster positive consumer attitudes and behaviours. (Kautish and Sharma, 2019; Alagarsamy, Mehrolia and Mathew, 2021; Kamrul, Mohammed, Quader and Aktar, 2022). In particular, social and environmental values among green consumer value dimensions form positive consumer attitudes. (Ahmed, Štreimikienė, Qadir and Streimikis, 2022; Woo and Kim, 2019). This situation is also significant in terms of raising awareness of social values and environmental responsibilities, which contribute to the development of green attitudes among young consumers. (Kamrul et al., 2022; Caniëls, Lambrechts, Platje, Motylska-Kuźma and Fortuński, 2021).

The most common idea found in the literature is that environmental protection motivation and environmental values influence attitudes toward hybrid vehicles, and the higher the level of ecological knowledge, the greater the impact of these attitudes on them. (Zamil et al., 2023; Hamzah and Tanwir, 2021). 'Greens' are more likely to use public transportation, consume less gasoline, and purchase green vehicles, such as hybrids (Kahn, 2007). According to an empirical study conducted in the UK, the most significant motivation for buying hybrid cars was found to be their environmental benefits and compatibility with green values (Ozaki and Sevastyanova, 2011: 2221). Based on these, H_2 is formed as follows:

H_2: *Consumers' green consumer values affect attitudes to an environmental product.*

Perceived risk

Introduced to the marketing literature by Bauer (1960), perceived risk was defined as the consumer's apprehension and uneasiness about possible losses while making a decision. In the subsequent literature, perceived risk has been studied in terms of different dimensions. Roselius (1971) was the first to classify the various risk dimensions as time risk, social risk, psychological risk, physical risk, and financial risk. Subsequently, performance risk (Jacoby and Kaplan, 1972), personal and privacy risk (Lim, 2003), political risk (Dolnicar, 2005), security risk (Han and Kim, 2017), and terrorism risk and health-related risk (Reisinger and Mavondo, 2005) were proposed as additional risk dimensions.

Featherman and Pavlou (2003) defined perceived risk as "the extent of perceived uncertainty about the adverse consequences of purchasing and using a good or service."

Risk perception has been found to affect consumer attitudes and behaviours (Weber and Milliman, 1997). To further validate this, Sjoberg (2000) developed a new proposed model that demonstrated a significantly stronger statistical association between perceived risk and consumer attitudes than the previously existing models. In a more recent study focusing specifically on Generation Z, Shaliha and Marsasi (2024) found that perceived risk had a significantly negative impact on consumer attitudes.

Insight into the current state of the literature on perceived risk towards hybrid vehicles reveals that it harms consumers' attitudes and purchase intentions. High costs, performance issues, maintenance and repair concerns, charging infrastructure limitations, and a lack of social representation increase the perceived risk associated with hybrid vehicles, leading to less favourable attitudes (McLeay, Yoganathan, Osburg and Pandit, 2018; Goh, Goh, Abbasi and Ting, 2022; Tchetchik, Kaplan and Rotem-Mindali, 2024).

H_3: *Consumers' perceived risk affects attitudes to an environmental product.*

Self-image congruence

Self-image congruence theory, proposed by Sirgy (1982), aims to provide a deeper understanding of how self-concepts influence consumer behaviour. The theory states that when a consumer's self-image is congruent with the perceived image of the brand, that consumer will prefer the brand and purchase it. A brand's level of congruence with an individual consumer's self-perception is a significant factor influencing the individual's brand preference and resulting satisfaction (Cowart, Kelly, Fox, Gavin, Wilson and Andrew, 2008). In this case, purchase decisions can be considered a means for consumers to communicate their identity and let others know who they are (Millan and Reynolds, 2014; Chernev, Hamilton and Gal, 2011; Escalas, 2013).

Research on self-image congruence has also tried to understand whether positive attitudes can be built through a good fit between an individual and a brand/product. In these studies, results on self-congruence have shown positive effects on brand perception and consumers' behavioural intentions (Claiborne and Sirgy, 2014; Ibrahim and Najjar, 2008).

In addition, the impact of self-image congruence on consumers' attitudes may be influenced by cultural factors. The extent to which self-congruence affects attitudes may vary across different cultures (Kim, Kim, Joo, & Hwang, 2024; He & Mukherjee, 2007).

In the case of hybrids, the study found that people were more likely to develop positive attitudes towards cars if they shared similar characteristics to typical users. It has a more substantial influence on positive brand attitude and environmentally friendly purchase intentions. Hence, self-image congruence is an effective determinant of sustainable marketing strategies for such offerings (Oliver and Lee, 2010; Bennett and Vijaygopal, 2018). On this premise, the hypothesis is that:

H_4: *Consumers' self-image congruence affects their attitudes toward an environmental product.*

Attitude and intention to use for environmental products

Attitude is a term that describes how we think or feel about something and how this influences our behaviour (Cambridge Dictionary, n.d.). Consumers have attitudes toward a wide range of attitude objects, from product-specific behaviours (e.g., when we use Crest toothpaste rather than Colgate) to more general, consumption-related behaviours (e.g., how often we should brush our teeth) (Solomon, 2018:285). Consumer attitudes represent the most reliable determinant in forecasting individuals' readiness to spend on environmentally friendly products (Chen and Chai, 2010: 30).

A recent empirical study from Korea reveals that environmental attitudes are a significant determinant of green purchasing behaviour. (Kim, 2011:66). According to that study, consumers with high environmental attitudes are more willing to buy ecologically considered products.

A consumer is described as having "buying intent" when they express a willingness to make a purchase, although they have not yet completed the transaction (Rehman, Seman, and Harun, 2024:257). Many factors influence buying intent, or in terms of this study, "intention to use" environmental products, such as environmental concern, social pressure, green consumer values, self-image congruence, or attitude toward those products. For organic products in particular, it is suggested that health and environmental concerns, food safety, norms, and ethical concerns are the driving forces behind consumers' purchasing decisions (Avcı, 2023:431). It is also suggested that ecological concerns/green tendencies might increase consumers' intention to purchase environmental products (electric cars)

(Kocagöz and İğde, 2022:106). Similarly, according to recent research with Turkish consumers, it is found that there is a positive relationship between consumers' attitudes and intentions to purchase electric vehicles (Tunçel, 2022:1). On that basis, it is hypothesised that;

H_5: *Consumers' attitudes to an environmental product affect their intention to use those products.*

Drawing on the theoretical background, the research model of this study is presented below.

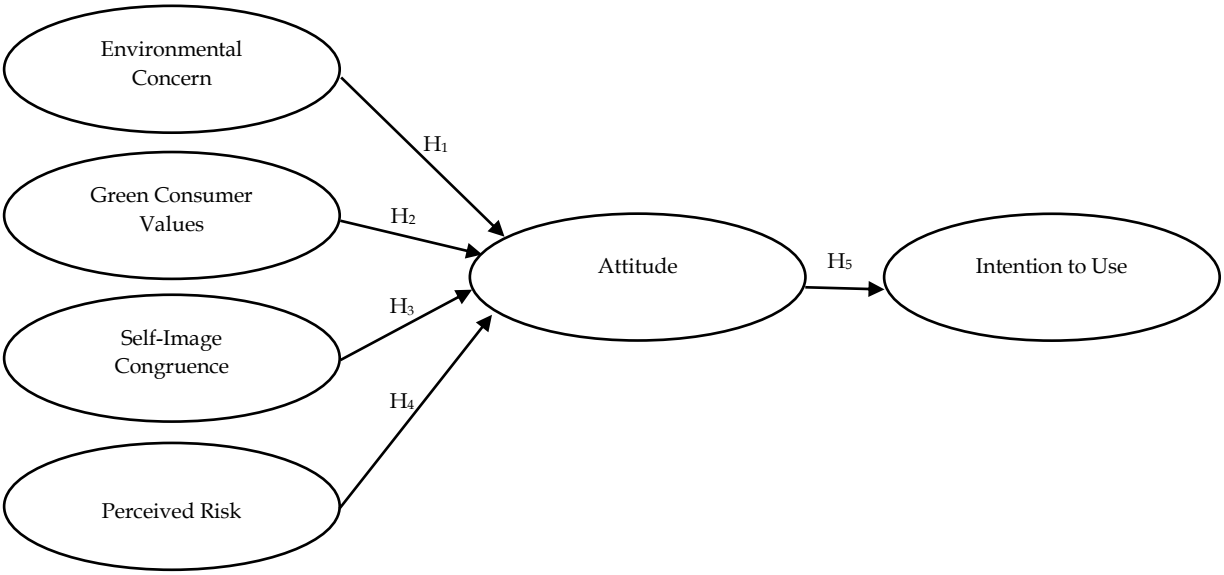

Figure 1: Research Model

Methodology

To meet the requirements of this research, primary data collection was necessary. A quantitative research approach was adopted to gather this data. The study is descriptive in nature, and data were collected using a questionnaire. The questionnaire items were adapted from previously validated and reliable measurement scales. Table 1 presents the scales used and their corresponding references:

Table 1: Scales and Sources

Scales	Sources
Intention to Use	Moons & Pelsmacker, 2012
Attitude	Higueras-Costillo, 2019
Environmental Concern	Moons & Pelsmacker, 2012
Green Consumer Values	Haws, Winterich & Naylor, 2014
Perceived Risk	Stone & Grønhaug, 1993
Self-Image Congruence	Jamal & Al-Marri, 2007

Although these scales had established validity and reliability in previous studies, they were re-evaluated for suitability to the current target group. To ensure clarity and appropriateness, feedback was obtained from two dealership managers in the automotive sector, resulting in minor revisions to specific items. Furthermore, a pilot evaluation was conducted with 10 individuals who reflected the characteristics of the target group, and the questionnaire was refined accordingly.

The final version of the questionnaire consisted of 37 items measured on a 5-point Likert scale, ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Additionally, demographic and background questions were included to provide further insight into the research topic.

To accurately target the intended population and maximise relevant responses, only participants who planned to purchase a car within the next year were included in the study. Accordingly, the survey began with a screening question: "Do you plan to buy a car next year?" Respondents who answered "yes" continued with the questionnaire, while those who answered "no" were excluded from further participation.

The study focused on consumers residing in Adana and Mersin who plan to purchase a vehicle within the following year. These provinces were chosen as the target audience due to their high vehicle density and their status as key markets for the automotive sector. Furthermore, the fact that the researchers resided in these provinces was a significant complementary factor that affected the feasibility of the study and minimised operational constraints in data collection.

Judgmental sampling was chosen as it is commonly employed in online research, particularly in cases that require specific expertise or knowledge. This method also helps achieve more accurate and representative results while addressing limitations related to budget and time (Sudirjo, Nurbakti, Nugroho, Ekaputra, and Utami, 2024; Ntona, Chalikakis, Busico, Mastrocicco, Kalaitzidou, and Kazakis, 2023). Indeed, this study also focused on a specific group, so judgmental sampling was preferred. Furthermore, data were collected from individuals with the potential to engage in the behaviour within the framework of the Theory of Planned Behaviour, ensuring that the research and model served their intended purpose.

A total of 598 respondents were reached. Depending on the target audience, surveys were conducted online or face-to-face. Among these questionnaires, those deemed valid and usable for analysis were selected. To test the theoretical research model, structural equation modelling (SEM) was used with AMOS 21.0. Before data collection, Approval was obtained from the Ethics Committee.

Findings

To test the theoretical research model, Structural Equation Modelling (SEM) was employed using AMOS 21.0 and SPSS 21.0. The skewness and kurtosis values for most items were within the ±2 range, indicating approximate normality (George and Mallery, 2010:114-115). Consistent with prior simulation studies that generated data under nonnormal conditions with kurtosis values up to 6.0 (Harring, Weiss, & Hsu, 2012:11), the observed outlier kurtosis values in this study (ENV4 = 2.284; ENV6 = 4.732; GRE1 = 2.325; GRE4 = 2.297) are still considered within acceptable bounds for structural modelling analyses.

Table 2: Sample Characteristics

Characteristics	**n**	**%**	**Characteristics**	**n**	**%**
Gender			*Marital status*		
-Male	404	67,6	-Single	332	55,5
-Female	194	32,4	-Married	266	44,5
Age			*Driving experience*		
-18-25 years old	219	36,6	-0-5 years	293	49,0
-26-35 years old	179	29,9	-6-10 years	113	18,9
-36-45 years old	122	20,4	-11-20 years	127	21,2
-46+ years old	78	13,0	-21+ years	65	10,9
Education			*Car ownership*		
-Primary/Secondary/high school	160	26,8	-Yes	519	86,8
-Associate degree	95	15,8	-No (rental)	41	6.9
-Bachelor's degree	244	40,8	-No	12	2.0
-Master's/PhD degree	99	16,5	-No answer	26	4.3

According to the data presented in Table 2, the proportions of male (67.3%) and single (55.5%) respondents were higher than those of female (32.4%) and married (44.5%) respondents. In terms of age, the respondents appear relatively young, with the 18-25 age group comprising the most significant proportion (36.6%). Additionally, nearly half of the respondents have 0-5 years of driving experience. In terms of education, it was seen that the respondents are highly educated. More than half of them hold an associate's or bachelor's degree, and one out of seven has a master's or doctoral degree, which is significantly higher than the Turkish community's average (TUIK, 2022). Most respondents (86.4%) own a car.

Measurement validation

To confirm whether the measures of constructs are consistent with the theory, confirmatory factor analysis (CFA) was employed. CFA is a method of evaluating how well a prespecified measurement theory, composed of measured variables and factors, aligns with reality as captured by the data (Hair,

Black, Babin, & Anderson, 2019, p. 660). CFA also confirmed that the proposed theoretical model was adequately valid, reliable, and suitable for data collection (Baharum, Ismail, Awang, McKenna, Ibrahim, Mohamed and Hassan, 2023:3). As seen in Table 3, the results of the confirmatory factor analysis indicated that the theoretical model of the study was validated.

Table 3: The Items' Arithmetic Mean ($\bar{X}$), Loading (λ), Cronbach's α, Composite Reliability (CR) and Average Variance Extracted (AVE) Values

Construct		Items	$\bar{X}$	SD	λ
Environmental Concern (α=0.738 CR=0.727 AVE=0.404 Square root of AVE=0.636)		Most of society does not act in an environmentally conscious manner.	4,20	0.922	0.511
		I am concerned about the environmental conditions our children will have to live in.	4.27	0.890	0.658
		If we continue as before, we are heading towards an environmental catastrophe.	4.45	0.777	0.741
		Politicians do far too little to protect the environment.	4.20	0.896	0.610
Green Consumer Values (α=0.811. CR=0.794. AVE=0.393, Square root of AVE=0.627)		It is important to me that the products I use do not harm the environment.	4.14	0.844	0.730
		I consider the potential environmental impact of my actions when making many of my decisions.	3.90	0.846	0.623
		My concern for the environment influences my purchasing habits.	3.74	0.893	0.546
		I am concerned about the depletion of our planet's resources.	4.34	0.808	0.671
		I would describe myself as environmentally responsible.	4.12	0.823	0.657
		I am willing to take the trouble to do more environmentally friendly things.	3.80	0.939	0.600
Self-image Congruence (α=766. CR=0.786. AVE=0. 551. Square root of AVE=0.742)		Driving a hybrid car (HC) aligns with my personal values.	3.27	1.049	0.675
		People like me drive an HC most of the time.	3.20	0.984	0.732
		Driving a hybrid car most of the time reflects who I am.	3.18	1.121	0.757
Perceived Risk	Time Risk (α=831. CR=0.834. AVE=0. 627. Square root of AVE=0.792)	Concerning me is the prospect of purchasing an HC within the next 12 months, as I worry that I would have to spend too much time using it effectively.	2.56	1.113	0.718
		The demands on my schedule are such that purchasing a home within the next 12 months concerns me because it would create even more time pressures that I don't need.	2.63	1.102	0.80
		-My purchasing an HC within the next 12 months could lead to an inefficient use of time because I would have to take care of the car.	2.43	1.066	0.852
	Financial Risk (α=0.866. CR=0.849. AVE=0. 652. Square root of AVE=0.808)	Purchasing an HC with a 12-month term would be a bad way to spend my money.	2.48	1.104	0.760
		Suppose I were to buy a home for myself within the next 12 months. I would be concerned that the financial investment I would make would not be wise.	2.66	1.094	0.840
		If I were to buy an HC for myself within the next 12 months, I would be concerned that I wouldn't get my money's worth from this product.	2.71	1.122	0.850
	Performance Risk (α=876, CR=0.862, AVE=0. 676, Square root of AVE=0.822)	I consider purchasing an HC within the next 12 months. I worry that the product may not perform as well as it is supposed to.	2.87	1.089	0.779
		As I consider purchasing an HC within the next 12 months, I become concerned that the car may not provide the level of benefits I expect.	2.77	1.090	0.84
		The thought of an HC within the next 12 months raises concerns about the car's reliability and dependability.	2.70	1.089	0.850
	Psychological Risk (α=0.922. CR=0.923. AVE=0. 799. Square root of AVE=0.894)	The thought of purchasing an HC within the 12 months makes me psychologically uncomfortable.	2.25	1.129	0.876
		The thought of purchasing an HC within the 12 months gives me a feeling of unwanted anxiety.	2.32	1.131	0.910
		The thought of purchasing a home within the next 12 months causes me unnecessary tension.	2.26	1.119	0.895
Attitude (α=743. CR=0.826. AVE=0.614 Square root of AVE=0.784)		In the long term. I think buying an HC is more cost-effective than owning a conventional (internal combustion engine) vehicle.	3.99	0.979	0.675
		Buying an HC will help to mitigate the effects of climate change.	4.26	0.882	0.615
		I think buying an HC is a good decision.	4.12	0.909	0.835
Intention to Use (α=801. CR=0.787. AVE=0.552. Square root of AVE=0.743)		I have the intention to drive an HC in the near future	3.82	0.992	0.729
		I will recommend the use of the HC to other people	3.85	0.934	0.717
		I expect that I will be driving an HC in the near future	3.85	1.018	0.781

Note: *All values are significant at $p < 0.01$

According to the results, the model demonstrates an overall good fit to the data, as indicated by key indices, with an RMSEA of 0.048. Additionally, $\chi^2/df = 2.374$, GFI (0.901), NFI (0.904) and AGFI (0.880) fall within acceptable thresholds (Schermelleh-Engel, Moosbrugger and Müller, 2003:51). In other words, the model provides a satisfactory representation of the observed data. To assess the model's reliability and validity, both Cronbach's alpha and composite reliability (CR) coefficients exceed the established minimum threshold of 0.7, indicating adequate scale reliability, as shown in Table 3 (Hair et al., 2019). Additionally, the square roots of the average variance extracted (AVE) are greater than the correlations between constructs, which is essential for discriminant validity (Hair et al., 2019: 688), and

AVEs for all constructs -except for EC and GCV- are well above 0.5, which suggests adequate convergence (Hair et al., 2019: 676). In other words, the model has both discriminant and convergent validity. For constructs EC and GCV, AVEs are slightly below the reference value of 0.5. As Fornell and Larcker (1981) indicate, "based on p_n (composite reliability) alone, the researcher may conclude that the convergent validity of the construct is adequate, even though more than 50% of the variance is due to error" (46). Since the composite reliability of all the constructs exceeds the recommended level, the internal reliability of the measurement items appears to be acceptable. It is also suggested to retain one or two constructs in the analysis that have AVEs below the recommended level in the literature, provided the original scales have been validated in previous studies (Demirci Orel and Kara, 2014: 124-125). Considering that original scales were developed in different cultural contexts and different products, it is decided not to adopt a marginal cut-off validity measure approach in this research. To test the acceptability of the model, the goodness of fit values were examined, and it was seen that the goodness of fit values of the model were good and within acceptable limits (Hair, Black, Babin and Anderson, 2014; Schermelleh-Engel et al., 2003: 29). All the paths are significant (p<0.01), and all the hypotheses are supported.

Table 3: Hypotheses Results

	Estimate	**S.E.**	**t-value**	**Sig.**	
Environmental concern → Attitude	0,294	0,104	2,813	***	H_1: supported
Green consumer values → Attitude	0,358	0,084	4,280	***	H_2: supported
Self-image congruence → Attitude	0,228	0,046	4,967	***	H_3: supported
Perceived risk → Attitude	-0,254	0,040	-6,366	***	H_4: supported
Attitude → Intention to use	0,994	0,071	14,083	***	H_5: supported

***: $p < 0,01$

According to Table 3, all paths in the theoretical model are found to be significant. The Green Consumer Values (GCV) variable is the strongest determinant of attitude to hybrid cars. In other words, based on our findings, individuals' positive attitudes towards an environmental product are primarily influenced by their green consumer values. The second determinant of attitude to hybrid cars (in terms of absolute value) is the perceived risk variable. Thus, people's perceived risks significantly reduce positive attitudes to environmental products. From the model, the strongest relationship is the effect of attitude on intention to use (H_4; β_i =0,994). Additionally, the strongest perceived risk dimension is performance (β_i = 0.912), and the weakest one is time (βi = 0.798); however, all of them seem significant. Based on our findings, it is recommended that environmental product manufacturers and advertisers provide practical and convincing ideas in their promotional messages that aim to reduce consumers' perceived risks.

Conclusion & recommendations

The study aimed to examine the relationships between green consumer values, environmental concern, perceived risk, and self-image congruence, and consumers' attitudes towards hybrid vehicles, which are categorised as environmentally friendly products, as well as the impacts of these attitudes on usage intentions. Five hypotheses were formulated within the context of the study, and the analysis results supported all five hypotheses.

The first hypothesis (environmental concern → attitude) received statistical support. The results of various studies in the literature are inconsistent in this regard. In some studies, ecological concern is reported to affect attitudes indirectly (Ogiemwonyi, Alam, Alshareef, Alsolamy, Azizan, and Mat, 2023), whereas other studies suggest a direct and positive effect (Cachero-Martínez, 2020; Suhartanto, Suki, Najib, Suhaeni, and Kania, 2023). Even though environmental concern has an indirect effect on intention to use environmental products based on our findings, it is empirically found that it has a positive impact on intention to buy an environmental product (electric car) (Kocagöz et al., 2022:115, Tunçel, 2022: 6-7). For marketing managers, to positively impact consumer attitudes, it is suggested to highlight all environmental attributes, such as emissions, recyclability, or durability, in promotional messages.

It is essential to note the geographical context in which this research was conducted. Research from Türkiye, a developing country, suggests that consumers may value different aspects of hybrid vehicle purchase more. Prior research also indicates that the impact of environmentalism on attitudes is more substantial in developed countries (Franzen and Meyer, 2010; Dorsch, 2014; Furman, 1998; Çarkoğlu and Kentmen-Çin, 2015).

The second hypothesis examined whether green consumer values affect attitude. The hypothesis has been supported, as a positive relationship exists between consumers' green values and their attitude, which is consistent with earlier research (Tian, Chapa, Walsh, Kjaerholt, and Xia, 2020; Henning and Karlsson, 2011; Jansson, Marell, and Nordlund, 2010). In other words, for promoting an environmentally friendly product, such as a hybrid car, it is essential to emphasise consumers' green consumer values. Even if most owners consider their vehicles a functional household product, for hybrid car owners, the perception of engaging in environmentally responsible behaviour or achieving financial savings may hold equal significance to the tangible environmental outcomes or actual cost reductions realised (Heffner, Kurani and Turrentine, 2005:7). So, marketing managers should balance the functional and symbolic meanings of the ecological products they sell.

The third hypothesis examined whether perceived risk influenced consumers' attitudes. The results showed a significant effect of perceived risk and attitude. The perceived risks had led to consumers developing careful, suspicious, and hostile perceptions of hybrid vehicles. These findings are consistent with prior research on this subject (Jaiswal, Kaushal, Kant and Singh, 2021; Wang, Wang, Li, Wang, and Liang, 2018).

The fourth hypothesis concerned the relationship between self-image congruence and attitude. The results showed that the greater the congruence between the consumer's self-image and the image of green products, the more positive the attitude was. The research confirmed both direct (Nguyen and Nguyen, 2020; Versteegh, 2021) and indirect (Yen and Mai, 2020; Olfat, 2025; Kumar, Kumar, Singh, Sá, Carvalho and Santos, 2023) impact of self-image congruence on attitude. From a managerial perspective, it is essential to recognise that hybrid car purchase motivations are not only driven by environmental values but also by the expression of personal identity and the pursuit of a stylish, fashionable image. Hybrid car ownership thus reflects green values while simultaneously carrying personal meanings, such as being 'different' or 'trendy' (Ozaki et al., 2011: 2224). In this sense, consumers may perceive that using a green product reinforces their own 'greener' self-identity, which also supports the idea that the act of choosing green products represents a social dilemma, shaped by the influence of reference groups and guided by motivations to prioritise collective gains over personal ones (Gupta and Ogden, 2009:386).

The fifth and final hypothesis, which analysed the influence of attitude on usage intention, was also accepted. Attitudes towards hybrid vehicles significantly influenced usage intentions. These results are consistent with the Theory of Planned Behaviour (Ajzen, 1991), on which the study is based, and postulates that attitude is the primary determinant of behavioural intention. Other research on green products also confirms these results (Woo et al., 2019; Maichum, Parichatnon and Peng, 2016; Costa, Costa, Maciel, Aguiar and Wanderley, 2021; Kim, 2011).

The research outcomes highlight that marketers must consider that green product consumers are driven by green values, sensitive to risk, and seek opportunities for green identity-consistent consumption. Therefore, successful green marketing strategies for car brands require segmentation and specificity to reach their target customers effectively.

Future research is recommended to examine the effects of other motivators, such as performance, price, and reference groups, on attitudes toward sustainable products and purchase intentions, as well as to investigate potential differences across various demographic groups, such as women and young consumers.

The main limitation of the study is that the samples are from a limited geographical region. Although the commonalities in human values and lifestyles among countries with a similar socioeconomic environment may be high, the inclusion of data samples from different countries will allow for more generalisable conclusions in terms of niche markets.

The cross-cultural comparison between samples from different countries can be considered an opportunity for future research based on the same study model.

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