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# Modeling eco-friendly house purchasing intention: a combined study of PLS-SEM and fsQCA approaches

Study of  
PLS-SEM and  
fsQCA  
approaches

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## Abstract

**Purpose** – The urgency to address climate change and its devastating consequences has never been more pressing. As societies become increasingly aware of the detrimental impact of traditional housing on the planet, there is a growing demand for eco-friendly housing solutions that prioritize energy efficiency, resource conservation and reduced carbon emissions. Therefore, this study aims to investigate the factors that influence customers' priority toward eco-friendly house purchasing intention.

**Design/methodology/approach** – This study collected 386 data using a quantitative research strategy and purposive sampling method. This study uses a hybrid analysis technique using partial least squares structural equation modeling (PLS-SEM) and fuzzy-set qualitative comparative analysis (fsQCA) approaches to identify the influencing factors.

**Findings** – The PLS-SEM analysis found that attitude toward the eco-friendly house, subjective norms, performance expectancy, environmental knowledge and environmental sensitivity have a positive influence on eco-friendly house purchasing intention. However, perceived behavioral control and willingness to pay were found to have insignificant effect on customers' intention to purchase eco-friendly houses. The fsQCA results further revealed complex causal relationships between the influencing factors.

**Practical implications** – This research will not only contribute to academic knowledge but also provide practical guidance to real estate developers, policymakers and individuals looking to make environmentally responsible choices. By understanding the factors that influence consumers' intentions to purchase eco-friendly houses, we can pave the way for a more sustainable and resilient future.

**Originality/value** – This study has used a hybrid analysis technique, combining PLS-SEM and fsQCA, to enhance the predictive accuracy of eco-friendly house purchase intentions among individuals residing in densely populated and highly polluted developing countries, such as Bangladesh.

**Keywords** Eco-friendly house, Purchase intention, Environmental knowledge, Environmental sensitivity, Performance expectancy, fsQCA

**Paper type** Research paper



## 1. Introduction

Climate change has gained increasing recognition as a pressing global issue, with widespread acknowledgment of its destructive nature (Zhang and Liu, 2022). This heightened awareness has led to an amplified focus on daily practices that contribute to climate change (Sia and Jose, 2019; Sadiq *et al.*, 2021). Consequently, behavioral scientists have directed their attention toward understanding and predicting personal conservation behaviors, community actions and corporate-level sustainability initiatives (Rasoolimanesh *et al.*, 2019; Singh and El-Kassar, 2019; Zollo *et al.*, 2021), underscoring the growing significance of sustainability for global socio-economic progress over the past few decades (Passoni *et al.*, 2021).

The concept of sustainable development emerged in response to the need for social and environmental sustainability following Second World War, with the term “sustainable development” first introduced by the Brundtland Commission in 1987 (General Assembly of the United Nations). Sustainability, as defined by the World Commission on Environment and Development (World Commission on Environment and Development (WCED), 1987), entails meeting present human needs while preserving the ability to meet future needs (Hyun *et al.*, 2021). Given the significant impact of climate change on the environment, it stands as the foremost challenge of our time (Dilotsotlhe, 2021), necessitating a global endeavor to curtail greenhouse gas emissions and avert future climate-related catastrophes.

To address this imperative, policymakers worldwide established the first-ever global, legally binding agreement aimed at limiting the average rise in global temperature to well below 2°C, as it was prior to the industrial era. In December 2015, the objective of maintaining a pre-industrial level temperature was set (Novais *et al.*, 2020). Governments and organizations worldwide have since collaborated to encourage pro-environmental behavior and develop green products and services to cater to environmentally responsible consumers. In alignment with these efforts, real estate organizations are increasingly directing their focus toward constructing eco-friendly houses in support of government policies on environmental sustainability.

The construction industry emerges as a prominent contributor to excessive energy consumption and pollution (Bhairappanavar *et al.*, 2021). Buildings account for approximately 30%–40% of global primary energy consumption, with nearly one-third of greenhouse gas emissions arising from building and construction-related activities (Evin and Ucar, 2019; Passoni *et al.*, 2021). Moreover, construction and operation activities consume a substantial 40% of the world’s energy supply (Tan and Goh, 2018; Bhairappanavar *et al.*, 2021). Without intervention, greenhouse gas emissions from the construction sector are projected to nearly double within the next two decades (United Nations Environment Programme, 2009).

Construction and housing have emerged as significant contributors to global carbon emissions, underscoring the need for environmentally friendly alternatives in building practices. Sustainable buildings are designed, constructed, operated and demolished with efficient resource utilization, grounded in the three pillars of sustainability: social, economic and environmental. By adopting such sustainable practices, real estate companies can play a crucial role in reducing environmental pollution. The use of raw materials in the construction industry is a major source of environmental pollution, making ecologically sustainable building practices vital for sustainable development (Tan and Goh, 2018; Amran *et al.*, 2021a). Eco-friendly building practices offer numerous benefits, including improved efficiency, well-being and health for residents (Allen *et al.*, 2015; Nakano and Washizu, 2018). Notably, China, the world’s most populous country, has witnessed a steady increase in

eco-friendly buildings (Li *et al.*, 2021a). Given the escalating demand for housing in Bangladesh, it presents a potential location for the construction of eco-friendly homes. The motivation behind this study lies in the pressing need to address the environmental challenges posed by climate change and unsustainable practices in the construction industry. As awareness of the destructive nature of climate change grows, there is an increasing demand for eco-friendly housing solutions that prioritize energy efficiency, resource conservation and reduced carbon emissions. Numerous studies have been conducted on eco-friendly housing from various perspectives. For instance, Liu *et al.* (2018) investigated the psychological factors influencing Chinese residents' intentions to adopt green construction practices. Salvi and Syz (2011) explored motivators for environmentally friendly buildings and houses. Fuerst and McAllister (2011) examined the benefits of eco-friendly buildings in the USA. Additionally, Chan *et al.* (2018) focused on the adoption of eco-friendly building technologies, whereas Darko *et al.* (2017) studied motivations for eco-friendly homes. Other studies have explored specific eco-friendly building materials. Amran *et al.* (2021b) discussed the use of slag to create environmentally friendly, long-lasting concrete, and Naderpour and Mirrashid (2020) researched eco-friendly concrete that uses recycled coarse aggregates. Moreover, Novais *et al.* (2020) looked into the energetic and acoustic performance of eco-friendly buildings. Further research has centered on attainable green building materials. Jeon *et al.* (2019) investigated such materials, focusing on their accessibility and applicability. Meanwhile, Evin and Ucar (2019) delved into residential buildings with environmental efficiency. Several studies also concentrated on specific aspects of eco-friendly housing. Alphonsa Jose and Sia (2022) explored techniques for building environmentally friendly houses, whereas Passoni *et al.* (2021) examined sustainable building renovation. Although previous studies have explored the green home purchasing intention of Malaysian Millennials (Masukujjaman *et al.*, 2022) and residents in Sabah (Lajuni *et al.*, 2018) using the extended theory of planned behavior (TPB), these studies focussed on understanding the factors influencing purchasing intentions among Malaysians specifically, considering their concerns about environmental pollution and intention to purchase eco-friendly houses. However, the present study differs in several ways. First, Malaysian customers generally have higher purchasing power than individuals in other South Asian countries such as Bangladesh (Zahan *et al.*, 2020). Second, pollution levels and population density in Malaysia are considerably lower than in South Asian countries such as India, Pakistan and Bangladesh (Rahman *et al.*, 2020). Finally, the living standards of Malaysians are generally higher than those of Bangladesh (Zahan *et al.*, 2020). Since population density, pollution intensity and purchasing power can influence customers' perceptions and intentions toward green purchasing, the findings of this study will provide valuable insights for other highly populated and severely polluted countries worldwide. However, limited research has been conducted to understand eco-friendly house purchasing intentions among people living in highly polluted yet densely populated countries such as Bangladesh. Therefore, to bridge this research gap, this study aims to investigate the factors influencing customers' priorities toward eco-friendly house purchasing intentions in a densely populated and heavily polluted developing country. The following research question has been addressed to achieve this objective:

*RQ1.* What factors influence customers' priorities toward eco-friendly house purchasing intention?

The findings of this study hold significant theoretical implications as they contribute to our understanding of consumers' behavioral intentions toward eco-friendly housing. By using the TPB in its extended form and using a combined analysis of partial least squares

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structural equation modeling (PLS-SEM) and fuzzy-set qualitative comparative analysis (fsQCA), this research sheds light on the factors that shape consumers' intentions in this domain. The outcomes of this study are expected to provide valuable insights for real estate businesses, land development firms and other organizations associated with the construction industry. By understanding the future demand for eco-friendly houses, these stakeholders can effectively align their strategies and offerings. This is particularly crucial as eco-friendly housing is a novel concept in many countries, including Bangladesh. The study also addresses the need for environmentally friendly housing materials, which will facilitate future business growth and innovation. Moreover, the findings have the potential to inspire young and entrepreneurial individuals to develop innovative ideas that meet the escalating demand for eco-friendly housing. By harnessing the insights generated by this study, they can create sustainable and socially responsible solutions to address this pressing need. Policymakers will benefit from the findings of this study as well. The research outcomes can inform their decision-making processes regarding sustainable housing policies, enabling them to meet future sustainability demands and combat climate change effectively. In summary, the theoretical implications of this study extend beyond academia and offer practical significance to a range of stakeholders involved in the construction industry. By illuminating consumers' behavioral intentions toward eco-friendly housing, this research fosters informed decision-making, innovation and sustainable development.

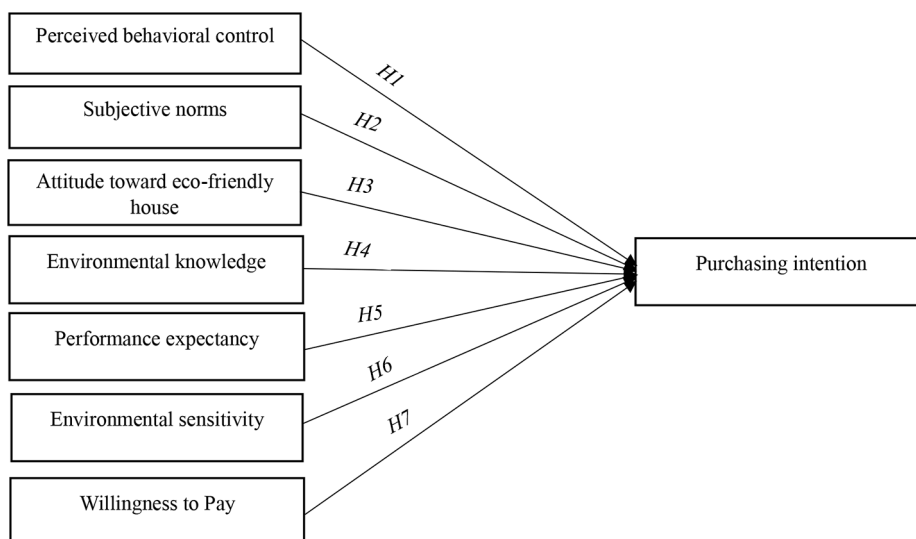
## 2. Literature review and theoretical framework

### 2.1 *An extended theory of planned behavior*

Rivis *et al.* (2009, p. 2985) emphasized that "the TPB is arguably the most influential theory in predicting social and health-related behaviors." The TPB holds significant recognition and influence in ecology and consumer behavioral intention studies (Shukla, 2019). TPB is grounded in a well-structured empirical foundation for predicting consumer intentions and behaviors and has been frequently used to explore green product consumption behavior (Shukla, 2019). Ajzen (1985) proposed that an individual's behavioral intention is shaped by subjective norms, attitude and perceived behavioral control, ultimately leading to intended and actual behavior. Attitude reflects an individual's belief regarding the consequences of a specific behavior (Ajzen, 1991), whereas subjective norms indicate the social pressure individuals experience to either conform to or avoid certain tasks (Ajzen, 1985). Perceived behavioral control, on the other hand, pertains to the degree of control an individual perceives over their own behavior (Ajzen, 1991). This study incorporates additional variables, namely environmental knowledge, environmental concern, performance expectancy and willingness to pay, to complement the existing TPB variables in exploring consumers' intention to purchase eco-friendly houses. Consequently, the study examines the relationship of these extended variables in the structural model with consumers' eco-friendly house purchasing behavioral intention (Figure 1). Furthermore, Ellen *et al.* (1991) contended that a theory can be extended with additional variables if these variables meet three conditions in the model. First, the chosen variables must be independent. Second, they should have the ability to influence the decision-making process. Finally, the variables must be related to the specific behavior being studied. The chosen variables in this study satisfy all these conditions, supporting the extension of the TPB in this context.

### 2.2 *Eco-friendly house*

The word green or sustainability is increasingly gaining popularity day by day among people across the world as a weapon to fight against climate change. Eco-friendly houses



**Figure 1.**  
Theoretical  
framework

**Source:** Figure by authors

indicate houses which use resources supporting environmental well-being and sustainability. Thus, sustainable homes, low-energy consuming homes and eco-friendly buildings, known as eco-friendly houses, are constructed from eco-friendly raw materials. The eco-friendly houses also benefit residents by generating less waste and improving living conditions by lessening the strain on the environment and human health (Li *et al.*, 2021b). Previous research found that buildings consume roughly two-fifths of all energy used worldwide (Li *et al.*, 2021d). Due to the excessive resource consumption in creating and maintaining homes, green buildings began to appear in the 1990s. They were designed to consume less energy, water and material resources while improving long-term environmental preservation efforts and human well-being (Jeon *et al.*, 2019). Governments worldwide have acknowledged that green buildings might be the construction industry's primary initiative in contributing to environmental sustainability (Shen *et al.*, 2017). Building sustainability has been measured using a system for almost 20 years, but systems have only recently been developed to determine whether a structure is healthy or not (McArthur and Powell, 2020).

### 2.3 Overview of the previous studies

Many researchers have previously studied eco-friendly buying behavioral intention (Clot *et al.*, 2022; Lavuri *et al.*, 2022a; Wang *et al.*, 2021). They were found to conduct their studies from various perspectives to examine customers' green purchasing intention, summarized in this study. Zhang *et al.* (2018) confirmed that attitudes toward eco-friendly houses and social pressure (subjective norms) are highly likely influential in convincing customers to buy eco-friendly houses. Alphonsa Jose and Sia (2022) found that attitudes and perceived behavioral control (PBC) highly influence human behavior while constructing eco-friendly homes. Rashid and Shaharudin (2017) observed that environmental knowledge and environmental concern are associated with Malaysian customers' green home purchasing



intention. On the other hand, [Dilotsotlhe \(2021\)](#) also confirmed the association of attitude, SN and PBC with purchasing intention of green products. At the same time, [Ackaah et al. \(2021\)](#) stated that purchasing intention for eco-friendly vehicles is strictly determined by the intensity of consumers' environmental concerns. While [Chaudhary \(2018\)](#) and [Bhutto et al. \(2022\)](#) found that Consumers' willingness to pay for the goods or services they seek is highly influenced by their green purchasing behavior. [Zafar et al. \(2021\)](#) concluded that environmentally knowledgeable people always show sustainable purchasing behavioral intention toward various green products and services. On the other hand, [Shahzad et al. \(2022\)](#) revealed that if the benefit of green technology successfully fulfills customers' expectations, customers' adoption intention of green technology remains comparatively high. Since the eco-friendly house has an unprecedented contribution to balancing future growing housing demand and environmental sustainability, the need for eco-friendly housing is an upward trend with time. While [Masukujjaman et al. \(2022\)](#) discovered that attitude, subjective norms, perceived behavioral control, reasonable pricing and green building knowledge influence Malaysian Millennials' intention to buy green homes, they recommended conducting similar studies in other cultural and environmental settings. The sample used in their study consisted of Malaysians with relatively better living standards (both economically and socially) compared to the sample chosen for the present study in Bangladesh. Such differences in countries and cultural contexts may result in variations in the factors that influence customers' intentions. Furthermore, Bangladesh and other South Asian countries experience higher population density and pollution intensity compared to Malaysia. Consequently, the present study aims to conceptualize behavioral intentions toward eco-friendly houses based on South Asian individuals living in densely populated and highly polluted geographic environments, such as India, Bangladesh, Pakistan, etc. Thus, Malaysia and Bangladesh represent two distinct social circumstances in terms of geography and living conditions. In addition, this paper employs both PLS-SEM and fsQCA methodologies for data analysis. The use of fsQCA allows the identification of various configurations of antecedents that can lead to high eco-friendly house purchasing intentions, providing a more in-depth understanding of the relationships between factors. Therefore, the differences in research context, influential factors and methodologies used in this study compared to previous studies underscore the importance of considering regional and cultural variations when designing sustainability strategies in the housing sector. For reference, a summary of the relevant earlier studies within the scope of this research is provided in [Appendix 1](#).

#### *2.4 Purchasing intention of eco-friendly house*

The contribution of houses to environmental pollution is of utmost concern. The evident impact of climate change is affecting people's daily lives ([Gulzari et al., 2022](#)). Eco-friendly houses are widely recognized as a crucial solution to maintain sustainability. Investing in a green home involves prudence in land use, energy efficiency and water conservation ([Lavuri et al., 2022b](#)). However, ensuring the maintenance and security of these green residences is equally important, as the sustainability of an eco-friendly home depends on the eco-friendly behavior of its residents ([Ogundipe et al., 2021](#)). To debunk the misconception that eco-friendly homes require expensive maintenance or significant green space, it is essential to grasp the concept of what truly constitutes an eco-friendly home. Embracing eco-friendly homes helps in mitigating environmental pollution ([W. Zhang and Liu, 2022](#)). Studies by [Khan et al. \(2022\)](#) have found that customers' green purchasing intention is heavily influenced by environmental knowledge, environmental sensitivity, attitude toward environmental health, subjective norms and purchasing behavioral control. Moreover,

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Zhang and Liu (2022) have confirmed that individual customers' attitudes and subjective norms significantly impact their intention to adopt eco-friendly smart home services. Therefore, consumers' behavioral intention toward buying eco-friendly houses plays a highly influential role in promoting environmental sustainability.

### 2.5 Perceived behavioral control

In the TPB, perceived behavioral control (PBC) plays a crucial role in determining whether a consumer will make an eco-friendly purchase (Jaiswal and Kant, 2018; Kumar *et al.*, 2021). PBC refers to individuals' perceptions of their ability to accomplish specific tasks and engage in desired behaviors (Ajzen, 1991). It represents the level of ease or difficulty a person experiences when performing particular actions. If customers have a strong sense of PBC, it can increase their readiness to engage in specific behaviors (Ajzen, 1991). However, when clients experience varying levels of organizational and self-related insecurity, PBC may diminish their interest in making purchases due to a lack of authentic information. Patel *et al.* (2020) highlighted that the TPB revealed three antecedents. In collectivist societies, PBC often emerges as one of the most important and influential predictors of eco-friendly behavioral intention. Studies by Alphonsa Jose and Sia (2022) and Masukujjaman *et al.* (2022) found that individuals with high PBC are more motivated to develop environmentally sustainable homes. Similarly, Dilotsotlhe (2021) confirmed that individuals who perceive themselves as capable of exhibiting pro-environmental behaviors are highly likely to show eco-friendly purchasing behaviors. Jeon *et al.* (2019) also noted that individuals with a strong sense of capability are more likely to use eco-friendly materials to build their houses. Furthermore, Ackaah *et al.* (2021) concluded that the PBC of individual customers significantly influences their purchasing intention of environmentally sustainable vehicles. Hence, following hypothesis has been formulated:

- H1. Perceived behavioral control positively impacts purchasing intention of an eco-friendly house.

### 2.6 Subjective norms

Ajzen (1985) defined subjective norms (SN) as the social pressure that consumers feel to engage in a particular activity or behavior. Subjective norms also refer to the perceived social pressure or normative direction that individuals receive from influential people, such as classmates, family and friends, either encouraging or discouraging a specific behavior (Chanda *et al.*, 2023b; Vafaei-Zadeh *et al.*, 2022). However, due to its subjective nature, the impact of subjective norms may vary among consumers. Consumers are more likely to have favorable purchase intentions for a product if they believe that the opinions and attitudes of the people who matter to them are positive toward it (Shimul *et al.*, 2022). In the context of green consumption, subjective norms relate to the influence of peer pressure on a person's decision to either purchase or forgo an environmentally friendly product (Fishbein and Ajzen, 2005). Research, such as that conducted by Abrar *et al.* (2021), supports the affirmative relationship between subjective norms and the decision to purchase energy-saving items. Numerous studies have already established the link between consumers' subjective norms and their intention to behave in an environmentally responsible manner (Sun *et al.*, 2022a; Sharma *et al.*, 2022a; Vu *et al.*, 2021). In particular, Vats *et al.* (2022) found that subjective norms play a significant role in influencing consumers' intentions to buy environmentally friendly products. Similarly, Yu *et al.* (2018) discovered that subjective norms impact consumers' intentions regarding sustainable bike sharing. Concerning



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eco-friendly house purchasing intention, L. Zhang *et al.* (2018) identified that subjective norms have a noticeable impact on Chinese consumers' decisions to buy eco-friendly houses. Additionally, Alphonsa Jose and Sia (2022) and Lajuni *et al.* (2018) concluded that subjective norms influence individuals to construct environmentally sustainable homes. Therefore, the second hypothesis of this research is as follows:

H2. Subjective norms positively impact purchasing intention of eco-friendly house.

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### 2.7 Attitude toward the eco-friendly house

The persisting positive and negative sensations about engaging in a specific behavior are described as attitudes by Ajzen (1991) and Vafaei-Zadeh *et al.* (2021). Cognitive psychology identifies attitudes as one of the primary forces influencing people's decisions (Yeow and Loo, 2022). The phrase "the extent to which a consumer has a favorable or unfavorable judgement or appraisal of the behavior" is also used to define attitude toward the behavior (Ajzen, 1991). A person is more likely to engage in a behavior if he has a favorable attitude about it (Haj-Salem *et al.*, 2022; Wei *et al.*, 2021). Customers who think green products have a remarkable contribution to environmental development would be more likely to purchase green products (Roh *et al.*, 2022). Thus, attitude is a powerful tool to measure the future behavior of customers. According to numerous studies on consumers' behavioral intentions, there is a substantial correlation between attitudes about green products and customers' intention to buy green items (Qi and Ploeger, 2021; Mazhar *et al.*, 2022; Tewari *et al.*, 2022). Rausch and Kopplin (2021) observed in their study that customers who have a favorable attitude toward sustainable fashion are more likely to buy it. Yeow and Loo (2022) and Abdul-Halim *et al.* (2022) described that customers who have a positive evaluation of environmentally friendly technologies want to buy environmentally friendly computers. While Sharma *et al.* (2022b) and Prakash *et al.* (2019) concluded that customers' intentions to make green purchases are greatly influenced by their sense of self as green person and their *locus* of control. According to Alphonsa Jose and Sia (2022) and Rashid and Shaharudin (2017), there is a correlation between attitudes toward environmentally sustainable homes and construction intention of environmentally sustainable homes. Hence, this study hypothesized as follows:

H3. Attitude toward an eco-friendly house positively impacts purchasing intention of eco-friendly house.

### 2.8 Environmental knowledge

Proper knowledge of the surrounding environment and its ecosystems, facts, concepts and their relationship with each other, is generally known as environmental knowledge (Fryxell and Lo, 2003). Lavuri (2022) explained that an individual's capacity to study data pertaining to the environment to comprehend the ecosystem and how it affects social interactions is referred to as having environmental knowledge. When consumers are poorly informed, have incomplete information, or are unaware of ecologically friendly options, it may be difficult for them to engage in pro-environmental activities (Hamzah and Tanwir, 2021). Consumer ignorance for lack of available information could be a psychological barrier to their acceptance of electrified environmentally friendly products (Wang *et al.*, 2018). Hence, ENK is crucial for shaping individual intentions about future consumption behavior (Vermeir and Verbeke, 2006; Kautish and Sharma, 2020). Customers' purchasing intentions for green products improve when they gain significant environmental and green product knowledge

through learning from personal experiences. Environmental knowledge is usually measured based on two types of knowledge: subjective and objective knowledge (Tan, 2011). However, subjective knowledge regarding environmental issues is more significant than objective knowledge in measuring consumers' purchasing intention of environmentally sustainable products (Jaiswal and Kant, 2018). Numerous earlier studies looked into the relationship between environmental knowledge and intentions to buy environmentally friendly sustainable goods (Zaremohzzabieh *et al.*, 2021; Shah *et al.*, 2021). Rausch and Kopplin (2021) found that customers with insightful environmental knowledge have strong intentions to purchase environmentally friendly products. Saari *et al.* (2021) observed that customers' sustainable consumption behavior is highly likely influenced by environmental knowledge. Wang (2022) discovered in his research that Customers' selection of green hotels is significantly influenced by environmental knowledge. Therefore, the next hypothesis is as follows:

- H4. Environmental knowledge positively impacts purchasing intention of an eco-friendly house.

### 2.9 Performance expectancy

One of the essential and remarkable factors affecting a person's behavioral intention is performance expectancy (PE) (Mathavan *et al.*, 2022). This indicates that PE is "the degree to which an individual believes that using the system will help him or her to attain productivity in job performance" (Venkatesh *et al.*, 2003). Perceived usefulness, work fit, extrinsic incentive and comparative edge comprise PE's four key performance metrics (Huang and Kao, 2015). PE is an influential antecedent for determining customers' intention to buy anything (Zhao and Bacao, 2020). According to previous studies, the intention to embrace and apply the environmentally sustainable technology is favorably and considerably influenced by performance expectations (Neves *et al.*, 2022). As several green criteria, such as supplier selection, procurement, industrial engineering and consumerism, have a considerable impact on customers' green buying behavior, PE can considerably affect green purchasing intention (Anser *et al.*, 2020). Shahzad *et al.* (2022) certified that the performance level of green products significantly influences purchasing intention. Yang *et al.* (2022) also confirmed that customers' expectancy of the performance of green products influences their intention to purchase the respective products. Rahman *et al.* (2022) identified a positive and statistically significant association between performance expectancy and customers' environmentally sustainable product purchasing intention. Bhat *et al.* (2022) also found that performance expectations impact the eco-friendly behavioral intention of individual customers. Therefore, the below hypothesis is formulated:

- H5. Performance expectancy positively impacts purchasing intention of an eco-friendly house.

### 2.10 Environmental sensitivity

Environmental sensitivity demonstrates internal empathetic reaction, concern and care of human beings toward environmental health and the intention to revitalize the damaged ecological habitat and initiate to protect the existent ecological balance (Sun and Gao, 2015). Candrea and Hertanu (2015) viewed that those who are responsible, protective, kindhearted and emotionally attached to the environment and ecosystem are generally considered highly

environmentally sensitive. However, [Carlson et al. \(2017\)](#) explained that environmentally sensitive individuals always remain respectful toward the environment and prefer to investigate environmental health to take appropriate actions to protect the environment from degradation. Thus, environmental sensitivity is an individual's overall mental and emotional association with the environment ([Kunz et al., 2016](#)). When individuals make purchasing decisions on any product, they are aware of the impact of environmental pollution. This awareness helps to grow a positive intention toward products that contribute to less environmental pollution. An environmentally sensitive individual has a positive behavioral intention toward green products due to their deep gratitude and concern regarding environmental health ([Manzo, 2005](#)). [Sun et al. \(2022b\)](#) identified a strong association of ENS with customers' environmentally friendly product purchasing intention. [Chen and Zhang \(2021\)](#) stated that people sensitive to environmental well-being are positive toward purchasing environmentally sustainable products. [Li et al. \(2021c\)](#) also found that environmentally sensitive customers prefer to choose products that support environmental sustainability. Therefore, the next hypothesis is as below:

*H6.* Environmental sensitivity positively impacts purchasing intention of an eco-friendly house.

#### *2.11 Willingness to pay*

When examining consumers' decision-making processes, the product's price is consistently considered one of the most important factors. The WTP defines an "affordable price for a product that a buyer is willing to pay for the amount" ([Schmidt and Bijmolt, 2020](#)). WTP can also be defined as "the degree to which a customer accepts a raise in price for a particular product." ([Kasilingam and Krishna, 2022](#)). Customers who are aware of environmental issues are willing to pay more for environmentally sustainable products, according to research by [Kumari and Kaur \(2021\)](#) and [Gulzari et al. \(2022\)](#). Moreover, according to [Ng et al. \(2018\)](#) and [Tian et al. \(2022\)](#), the desire to pay positively correlates with buying an eco-friendly vehicle. According to a global study, more than 55% of consumers have intention to pay more for products and services that promote environmental sustainability ([Bhutto et al., 2022](#)). Surprisingly, Asia Pacific responded positively to paying more for green products, with a response rate of 64%, which is greater than worth America and Europe's responses of 42% and 44%, respectively ([Bhutto et al., 2022](#)). [Tan and Goh \(2018\)](#) have confirmed that WTP is positively related with eco-friendly purchasing intention of customers. [Chaudhary \(2018\)](#) and [Kumar et al. \(2021\)](#) also confirmed that willingness to pay (WTP) significantly influences green products purchasing intention of customers. [Kumar et al. \(2021\)](#) have studied on individual customers' environmental responsibility and concluded that WTP extra for environmentally supported products is strongly associated with the green purchasing intention of individual customers. Therefore, the last hypothesis is as below:

*H7.* Willingness to pay positively impacts purchasing intention of eco-friendly house.

### **3. Research methodology**

#### *3.1 Participants and sampling design*

The participants in this study are individuals who have the intention to purchase houses in the near future. To select participants, a purposive sampling technique, a nonprobability sampling method, was applied due to the lack of an available sampling

framework (Kühn and Petzer, 2018; Vafaei-Zadeh *et al.*, 2020). This sampling technique was used to ensure a better representation of the selected sample from Bangladesh. Participants were chosen based on their level of knowledge and willingness to provide data in line with the study’s objectives, making the purposive sampling technique appropriate (Naeem, 2019; Vafaei-Zadeh *et al.*, 2019).

The survey study consisted of two sections. The first section included demographic questions, covering gender, age, education, monthly income, occupation, attitudes toward eco-friendly houses and future purchasing intentions toward eco-friendly houses (Table 1). The second section aimed to investigate the constructs (Appendix 2). Online survey questionnaires were distributed to participants via email, using Google Forms to ensure easy access. Data collection took place between July and August of the current year (2022). Multi-item scales previously used in other studies were used to measure the constructs, which proved effective for predicting individual customers’ behavioral intentions (Ahmad and Zhang, 2020). A five-point Likert scale was used to assess each antecedent in the study. A total of 567 survey questionnaires were sent out, and 416 people responded (211 from Dhaka, 113 from Chittagong and 92 from Sylhet), resulting in a response rate of 73.34%. After data cleansing, 386 complete responses were selected for analysis, as 30 responses were incomplete (Dhaka = 211, Chittagong = 113 and Sylhet = 92).

There were 248 male and 138 female respondents (Table 1); most of those who responded were between the ages of 25 and 35 (87.3%). Bachelor’s and master’s degree holders were the most likely to participate in this study (86.8%). Most of the participants were job holders (working in different company as employee) (58.4%). Most respondents earn between 30,000TK

Total numbers of participants (N = 386)	Description	Frequency	%
Gender	Male	248	64.4
	Female	138	35.6
Age (Years)	25–35	337	87.3
	36–45	40	10.2
	46–55	9	2.5
	56–65	0	0
	Diploma	48	12.5
Education (Completed)	Bachelor	59	15.4
	Masters	275	71.3
	Others	4	0.8
	Professional	76	19.7
Occupation	Employed	225	58.4
	Self-employed business	78	20.4
	Others	4	1.5
Monthly family income	30,000–50,000TK	265	61.5
	51,000-70,000TK	90	23.3
	71,000-90,000TK	17	4.6
	91,000–110,000TK	14	3.6
Do you like eco-friendly house	Yes	386	100
	No	0	0
Do you like to buy eco-friendly house in the near future	Yes	291	75.40
	Maybe	86	22.30
	No	9	2.40

**Table 1.**  
Demographic profile  
of the respondents

Source: Table by authors

to 50,000TK monthly (61.5%). People who never stay in eco-friendly house were included in this research as respondents of this study. In all, 27 questions on a five-point-Likert-scale, which includes a scale from strongly disagree (1) to strongly agree (5), were used to collect data for this study. Questionnaires for this study were prepared based on past studies. This study used English and Bangla languages in the questionnaires to make the questionnaire understandable for respondents. Two research professionals fluent in both languages completed English to Bangla translation. A Chi-square test was used to see if there were any variations in the sample data from different cities in Bangladesh. There was no noticeable difference in the results of the analysis. Meanwhile, this study used a *t*-test to compare early and late responses to see if there was any non-response bias (Armstrong and Overton, 1977). However, there were no evidence indicators of non-response bias. On the other hand, this study further investigated the issue of common method bias by evaluating the full collinearity test, as suggested by Kock and Lynn (2012) and Kock (2015), as the data was obtained from a single source. This method regresses all variables against a common variable. However, there is no bias from the single data source if the VIF is less than 3.3. Gender was used as a common variable in this study. Single source bias was not found to be a major issue with the data of this study because the VIF for all constructs in this research was less than 3.3.

### 3.2 Measures

As SmartPLS does not require the assumption of normality for collected data for analysis (Ringle *et al.*, 2015; Hanifah *et al.*, 2019), the survey data of this research does also not follow normal distribution technique (Chin *et al.*, 2003). This study used the PLS-SEM as the statistical tool to evaluate the measurement and structural model. Though common and composite-based population can be handled by using PLS-SEM, fsQCA and necessary analysis have also been performed in this study to get deeper insights with a statistical software called fsQCA version-3 (Rasoolimanesh *et al.*, 2021; Ringle *et al.*, 2015). Overall, 25 items were adapted from earlier studies and have been used to evaluate the constructs of this research (Appendix 2). Three items were adapted from Prakash and Pathak (2017) to measure customers' purchasing intention for the eco-friendly house. Then, two items were also adapted from Hamzah and Tanwir (2021) to examine attitudes toward the eco-friendly house. While to measure perceived behavioral control, four items were adapted from Hamzah and Tanwir (2021). Subjective norms were measured with three items adapted from Hamzah and Tanwir (2021). At the same time, three items were adapted from Zafar *et al.* (2021) to measure environmental knowledge in this study. Then, four items were adapted to measure environmental sensitivity (Jaiswal and Kant, 2018). Performance expectancy as a construct was measured with three items adapted from Jain *et al.* (2022). Finally, this study adapted three items from Prakash and Pathak (2017) to measure willingness to pay.

## 4. Results

For performing confirmatory and exploratory analysis, the researchers usually use a suitable method (Henseler, 2017; Müller *et al.*, 2018). In the current study, SmartPLS 3.2.9 was used to implement the PLS-SEM approach for the measurement model, structural model and hypothesis testing (Ringle *et al.*, 2015). For common and composite-based populations, PLS-SEM is also a suggested approach (Rigdon *et al.*, 2017). Moreover, this study also used fsQCA and necessary analysis intending to gain a deeper and more insightful understanding regarding customers' eco-friendly house purchasing intention by employing fsQCA version 3.0 (Rasoolimanesh *et al.*, 2021).

G\*Power was used in this research to determine the minimum required sample size for this study (Faul *et al.*, 2009; Hair *et al.*, 2017), and the findings show that 189 responses must be used for the suggested model for getting a power of 0.80. Because of this, the sample size acquired for this study is adequate to carry out the necessary analysis (386 respondents).

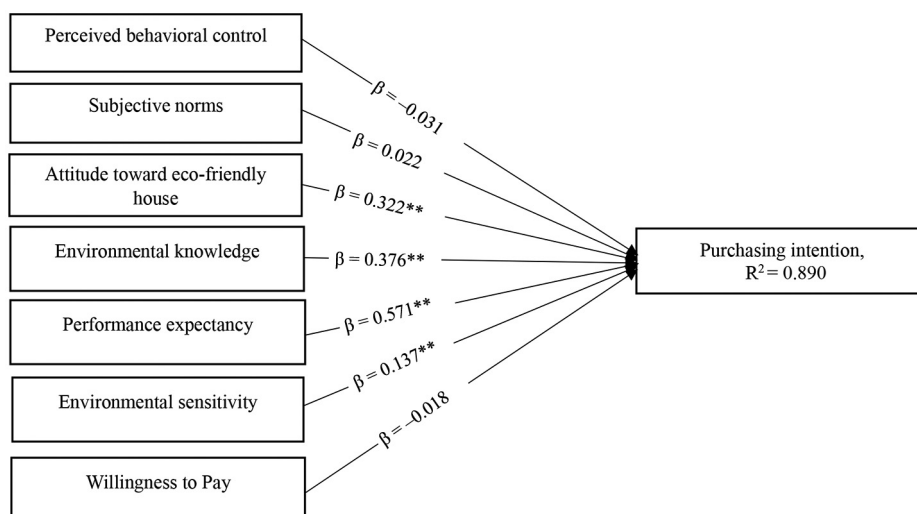
To assess the robustness of our findings, we conducted several tests to examine the stability and reliability of the results. First, we performed sensitivity analyses by excluding outliers from the data set, and the results remained consistent, reinforcing the robustness of the observed relationships. Second, we used alternative econometric models, such as the Tobit model and the Poisson regression, to validate the results obtained from the primary model. The outcomes from these alternative models were consistent with our initial findings, providing additional support to the robustness of our results. Furthermore, we conducted nonlinear tests by introducing interaction terms and quadratic terms for key predictor variables, and these tests revealed that the non-linear relationships were not statistically significant, reinforcing the validity of our primary linear regression results. Overall, the robustness tests support the reliability and consistency of our findings, adding strength to the conclusions drawn from this study.

#### 4.1 Assessment of model using partial least squares structural equation modeling

Three criteria are used to evaluate the measurement model to determine the validity and reliability of this study: reliability, convergent validity and discriminant validity (Ali *et al.*, 2018; Hair *et al.*, 2017). Additionally, the finding of hypothesis testing has been demonstrated through path co-efficient analysis, while the  $R^2$  has been reported to evaluate the interpretation power of the structural model (Figure 2).

#### 4.2 Assessment of measurement model

In total, eight constructs were selected for this study's framework. The composite reliability, Cronbach's alpha and rho C, which must be more than 0.7, have been used to assess the reliability of these eight constructs (Ali *et al.*, 2018; Hair *et al.*, 2017). Additionally, to achieve



**Figure 2.**  
Conceptual model  
result ( $p^{**} < 0.05$ )

Source: Figure by authors



convergent validity, the average variance extracted (AVE) must be greater than 0.5 (Rasoolimanesh *et al.*, 2019). The results of the study of the measurement model are shown in Table 2. According to Table 2's findings, all constructs have satisfactory reliability and convergence validity.

Establishing the discriminant validity, this study used the HTMT ratio (Rasoolimanesh, 2022). The HTMT ratio was suggested as a method in the literature to evaluate discriminant validity (Hair *et al.*, 2017; Rasoolimanesh and Ali, 2018). Each construct's HTMT value should be smaller than 0.9 to establish discriminant validity using HTMT (Henseler, 2017). Using both techniques, Tables 3 has established the discriminant validity of the collected data (Hair *et al.*, 2017).

Constructs	Items	Loading	CA	CR	AVE
Attitude toward eco-friendly house	ATEFH1	0.957	0.902	0.953	0.911
	ATEFH2	0.952			
Environmental sensitivity	ENS1	0.805	0.891	0.925	0.755
	ENS2	0.916			
	ENS3	0.909			
	ENS4	0.841			
Environmental knowledge	ENK1	0.891	0.825	0.885	0.72
	ENK2	0.829			
	ENK3	0.824			
Perceived behavioral control	PBC1	0.869	0.912	0.937	0.789
	PBC2	0.883			
	PBC3	0.919			
	PBC4	0.881			
Performance expectancy	PE1	0.912	0.892	0.933	0.823
	PE2	0.929			
	PE3	0.880			
Purchasing intention	PI1	0.875	0.852	0.911	0.773
	PI2	0.839			
	PI3	0.922			
Subjective norms	SN1	0.902	0.817	0.891	0.732
	SN2	0.883			
	SN3	0.777			
Willingness to pay	WTP1	0.924	0.918	0.948	0.859
	WTP2	0.944			
	WTP3	0.912			

**Table 2.**  
Construct reliability  
and validity

**Source:** Table by authors

Constructs	1	2	3	4	5	6	7	8
1. Attitude toward eco-friendly house								
2. Environmental sensitivity	0.762							
3. Environmental knowledge	0.689	0.77						
4. Perceived behavioral control	0.482	0.719	0.841					
5. Performance expectancy	0.833	0.618	0.547	0.409				
6. Purchasing intention	0.868	0.753	0.682	0.491	0.802			
7. Subjective norms	0.787	0.75	0.882	0.752	0.671	0.778		
8. Willingness to pay	0.551	0.709	0.759	0.843	0.454	0.539	0.740	

**Table 3.**  
Discriminant validity  
(HTMT)

**Source:** Table by authors

#### 4.3 Assessment of structural model

According to the suggestion of [Hair et al. \(2022\)](#) and [Cain et al. \(2016\)](#), this study tested the multivariate skewness and kurtosis of collected data. However, results confirmed that the collected data has no multivariate normality based on the result of Mardia's multivariate skewness ( $\beta = 23.943, p < 0.01$ ) and Mardia's multivariate kurtosis ( $\beta = 146.097, p < 0.01$ ). In this circumstance, [Becker et al. \(2023\)](#) suggested that the path coefficients, the standard errors, *t*-values, *p*-values and for the structural model using a 10,000-sample re-sample bootstrapping procedure must be reported for the respective study ([Ramayah et al., 2018](#)). As [Hahn and Ang \(2017\)](#) criticized that *p*-values are not good criterion for testing the significance of hypothesis, they proposed to use a combination of criterions such as *p*-values, confidence intervals and effect sizes. [Table 4](#) shows the summary of the criterions to confirm the significance level of developed hypotheses in this study.

The results, [Table 4](#) demonstrating the hypothesized relationship between constructs, show that perceived behavioral control (PBC) has no impact on eco-friendly house purchasing intention (PI) of ( $\beta = -0.031, p > 0.05$ ): Thus, *H1* is not accepted. However, subjective norms (SN) have no significant association with purchasing intention of the eco-friendly house ( $\beta = 0.022, p < 0.05$ ): Thus, *H2* is not statistically supported. However, the results reveal that attitude toward the eco-friendly house (ATEFH) has influence on the purchasing intention (PI) ( $\beta = 0.322, p < 0.05$ ): Hence, *H3* is accepted. While the association between environmental knowledge (ENK) and purchasing intention (PI) is also statistically significant ( $\beta = 0.076, p < 0.05$ ): Therefore, *H4* is accepted. Performance expectancy (PE) has a strong and positive impact on purchasing intention (PI) ( $\beta = 0.571, p < 0.05$ ): Thus, *H5* is statistically supported. At the same time, the findings from PLS-SEM structural model analysis reveal that environmental sensitivity (ENS) positively influence the purchasing intention (PI) ( $\beta = 0.09, p < 0.05$ ): Thus, *H6* is statistically accepted. However, Willingness to Pay does not have a relationship with purchasing intention (PI) ( $\beta = -0.018, p > 0.05$ ): Therefore, *H7* is not statistically accepted.

#### 4.4 PLSpredict

The PLSpredict with a 10-fold method to test predictive relevance, which was proposed by [Shmueli et al. in 2019](#), provides case-level predictions on an item or construct level. Hence, PLSpredict is commonly recognized as a holdout sample-based approach. [Shmueli et al. \(2019\)](#) suggested that the predictive power of the structural model will be comparatively high if differences for all the items (PLS-LM) are lower. However, when the values of all

Hypothesis	Relationship	Std. beta	Std. error	<i>t</i> -values	<i>p</i> -values	BCI LL	BCI UL	<i>f</i> <sup>2</sup>	Effect size	Results
<i>H1</i>	PBC → PI	-0.031	0.035	0.888	0.187	-0.083	0.032	0.003	No effect	Not accepted
<i>H2</i>	SN → PI	0.022	0.035	0.619	0.268	-0.039	0.078	0.001	No effect	Not accepted
<i>H3</i>	ATEFH → PI	0.322	0.07	4.635	<i>p</i> < 0.001	0.212	0.441	0.261	Medium	Accepted
<i>H4</i>	ENK → PI	0.076	0.039	1.948	0.026	0.016	0.144	0.025	Small	Accepted
<i>H5</i>	PE → PI	0.571	0.082	6.974	<i>p</i> < 0.001	0.429	0.699	1.280	Large	Accepted
<i>H6</i>	ENS → PI	0.09	0.031	2.884	0.002	0.041	0.144	0.026	Small	Accepted
<i>H7</i>	WTP → PI	-0.018	0.03	0.592	0.277	-0.067	0.033	0.001	No effect	Not accepted

**Notes:** Perceived behavioural control (PBC); Subjective norms (SN); Attitude toward the eco-friendly house (ATEFH); Purchasing intention (PI); Environmental knowledge (ENK); Environmental sensitivity (ENS); Performance expectancy (PE) and Willingness to Pay (WTP). We use 95% confidence interval with a bootstrapping of 10,000

**Source:** Table by authors

**Table 4.**  
Hypothesis testing  
direct effects

items of PLS (RMSE) is higher than the values of all items of LM (RMSE), the respective model has high predictive error and no predictive power. On the other hand, a model will have moderate predictive power and moderate predictive error if most LM (RMSE) values are higher than PLS (RMSE) values. Finally, if the minority values of PLS (RMSE) are lower than LM (RMSE). Then, the respective structural model will have high predictive power and low predictive error. In this study, [Table 5](#) demonstrates that the values for most of the PLS (RMSE) items were higher than the LM (RMSE) items. As a result, this study's model has low predictive power.

#### 4.5. Fuzzy-set qualitative comparative analysis and necessity analysis

PLS-SEM is less insightful in predicting the causal relationship between variables as a symmetric approach. Hence, this study has also used fsQCA and necessity analysis as asymmetric approaches to understanding customers' purchasing intention (PI) of an eco-friendly house. To assess qualitative data from small samples, the set-theoretical technique known as the fsQCA is widely used method. However, this method also works effectively when examining medium-sized or larger samples ([Berg-Schlosser et al., 2009](#)). With fsQCA, a number of necessary criteria were discovered to generate an outcome. These sufficient conditions are also known as configurations, recipes or causal models ([Olya and Gavilyan, 2017](#); [Rasoolimanesh et al., 2021](#)). On the contrary, in this study, necessity analysis was used to determine the antecedent that, if any, is a must to produce an outcome ([Dul, 2016](#)). To determine the sufficient and necessary conditions, two criteria such as consistency and coverage, must be evaluated ([Ragin, 2009](#); [Seyfi et al., 2021](#)). Consistency and coverage, which must be greater than 0.8 and 0.2, respectively, are used to identify sufficient conditions, such as recipes, configurations or informal models ([Dul, 2016](#); [Ragin, 2009](#); [Rasoolimanesh, 2021](#)). Only when an antecedent has a consistency and coverage value of greater than 0.9 is it deemed to be a required condition for producing an outcome ([Dul, 2016](#)). fsQCA version 3.0 was used in this study to conduct fsQCA and necessity analysis. [Tables 6 and 7](#) display the fsQCA and necessity analysis outcomes, respectively. [Table 7](#) demonstrates 13 circumstances or configurations that are the possible way to generate the intention to purchase an eco-friendly home. According to the results in [Table 7](#), a higher level of positive PE along with a lower level of ENK, PBC, SN and WTP can generate a higher purchasing intention for an eco-friendly house (Configuration 1). In Configuration 2, the finding represents that a higher positive PE long with lower ENS, ENK, PBC and WTP can also generate a higher purchasing intention for an eco-friendly house. While Configuration 3 shows that despite having a lower level of ATEFH, ENS, ENK and SN, Configuration 3 can still generate a higher level of purchasing intention of an eco-friendly house among customers because of having high PE. Configuration 4 demonstrates that a higher WTP with a lower ATEFH, ENS, ENK and SN is sufficient to generate a higher purchasing intention for an eco-friendly house. While higher level ATEFH can generate a higher level of purchasing intention for an eco-friendly house despite having a lower level of

Item	PLS RMSE	LM RMSE	PLS-LM	Q <sup>2</sup> predict
PI1	0.655	0.650	0.005	0.650
PI2	0.704	0.711	-0.007	0.571
PI3	0.448	0.431	0.017	0.802

**Table 5.**  
PLS-Predict

Source: Table by authors

Configurations	Raw coverage	Unique coverage	Consistency
Configurations for high eco-friendly house purchasing intention = f (ATEFH, ENC, ENK, PBC, PE, SN, WTP)			
~ENK*~PBC*PE*~SN*~WTP	0.558613	0.00325191	0.949243
~ENS*~ENK*~PBC*PE*~WTP	0.549057	0.00105065	0.948733
~ATEFH*~ENS*~ENK*PE*~SN	0.538451	0.000950575	0.947192
~ATEFH*~ENS*~ENK*~SN*WTP	0.520289	0.0021013	0.915485
ATEFH*~ENS*~ENK*~PBC*PE	0.546056	0.00445288	0.986353
ATEFH*ENS*~PBC*PE*~WTP	0.555212	0.00695443	0.994088
ATEFH*ENK*PE*SN*~WTP	0.547506	0.00315189	0.995814
ATEFH*ENK*~PBC*PE*SN	0.549058	0.00850552	0.995735
ATEFH*ENS*ENK*PBC*PE	0.668235	0.00585389	0.991095
ENS*PBC*PE*SN*WTP	0.66028	0.0163602	0.970653
ATEFH*~ENS*~ENK*~PBC*~SN*~WTP	0.529445	0.00435275	0.951876
~ATEFH*~ENS*ENK*PBC*SN*WTP	0.502177	0.00115067	0.951284
ATEFH*ENS*ENK*PBC*SN*WTP	0.657628	0.0248662	0.970897
<i>Solution coverage: 0.890429</i>			
<i>Solution consistency: 0.889717</i>			

**Table 6.**  
Sufficient  
configurations for  
eco-friendly house  
purchasing intention

**Source:** Table by authors

Antecedents	Consistency	Coverage
ATEFH	0.915846	0.920682
ENC	0.873818	0.883364
ENK	0.856858	0.875741
PBC	0.813980	0.839083
PE	0.892730	0.909476
SN	0.861110	0.883249
WTP	0.824437	0.844028

**Table 7.**  
Results of necessity  
analysis for  
eco-friendly house  
purchasing intention

**Source:** Table by authors

ENS, ENK, PBC and PE according to Configuration 5. On the other hand, Configuration 6 shows that a higher level of ATEFH and ENS along with a lower level of PBC, PE and WTP can generate a higher purchasing intention for the eco-friendly house. While a lower level of WTP and a higher level of ATEFH, ENK, PE and SN are also sufficient to generate a higher purchasing intention for the eco-friendly house according to Configuration 7. A lower level of PBC and a higher level of ATEFH, ENK, PE and SN are also sufficient for producing a higher purchasing intention for the eco-friendly house (configuration 8). Configuration 9 demonstrates that a higher level of positive ATEFH, ENS, ENK, PBC and PE is sufficient to generate higher outcomes (purchasing intention of the eco-friendly house). Configuration 10 also shows that a higher level of ENS, PBC, PE, SN and WTP is capable enough to generate a higher purchasing intention for an eco-friendly house. While Configuration 11 represents that a higher level of positive ATEFH along with a lower level of ENS, ENK, PBC, SN and WTP is capable enough to generate a higher purchasing intention for an eco-friendly house. At the same time, Configuration 12 shows that it can produce high purchasing intention of eco-friendly houses among customers because of higher ENK, PBC, SN and WTP along with a lower level of ATEFH and ENS. Finally, Table 6 shows that higher levels of ATEFH, ENS, ENK, PBC, SN and WTP are also strong conditions for raising a higher purchasing intention for an eco-friendly house (Configuration 13).

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While [Table 7](#) presents the findings of necessity analysis, this shows that ATEFH is a necessary condition for almost every configuration to generate a higher purchasing intention for an environmentally friendly house. According to this study, the consistency and coverage for ATEFH are more than 0.9 ([Table 7](#)). Therefore, ATEFH is necessary for most of the configuration generating a higher purchasing intention of an eco-friendly house.

## 5. Discussion

This study investigated the factors influencing customers' purchasing intention of the eco-friendly house. The results of the PLS-SEM analysis revealed that perceived behavioral control does not have a significant influence on eco-friendly house purchasing intention. This finding aligns with previous studies conducted by [Pacho \(2020\)](#), [Cavite et al. \(2022\)](#) and [Chi et al. \(2019\)](#). These collective findings suggest that there may be a lack of awareness or limited knowledge among customers regarding eco-friendly houses and their associated benefits. Additionally, the limited availability or accessibility of eco-friendly houses in Bangladesh, possibly due to population density, could contribute to this result. Another contributing factor could be economic constraints faced by the people of Bangladesh, particularly among middle-class families who may need to save money for a significant period of time to afford a new house. Consequently, they may prioritize finding a house at a reasonable cost without giving much consideration to environmental sustainability.

This study has also found that subjective norms (SN) do not have an effect on eco-friendly house purchasing intention. However, this finding is supported by previous studies conducted by [Lajuni et al. \(2018\)](#), [Nimri et al. \(2020\)](#) and [Kumar et al. \(2022\)](#). The lack of social influence on house purchasing decisions among Bangladeshi customers can explain this result. Given that people in Bangladesh often require a long time to save money to buy their dream house, they are less likely to prioritize social influence during making housing purchasing decision. Furthermore, cultural factors may significantly shape behaviors and preferences in terms of house purchasing. In Bangladesh, cultural norms and values tend to prioritize factors such as affordability, location or size of the house, over eco-friendliness. As a result, individuals prefer to avoid social influence when making decisions about investing their limited resources in housing.

At the same time, this study has uncovered that customers with a positive attitude toward eco-friendly houses also strongly intend to purchase eco-friendly houses. This is because customers who believe in environmental sustainability also intend to purchase eco-friendly houses. Moreover, People in developing countries such as Bangladesh are more concerned about environmental sustainability because of overgrowing pressure on the environment for unplanned urbanization and overuse of natural resources in various development projects. This finding is also supported by [Yeow and Loo \(2022\)](#).

Results also confirmed that knowledge of customers about the environment and its contribution to human life is significant for generating customers' eco-friendly house purchasing intention. This shows that environmentally educated individuals in developing countries bear green purchasing intentions. Hence, this clearly indicates that environmentally knowledgeable individuals strongly intend to purchase eco-friendly houses. This finding is supported by [Shah et al. \(2021\)](#).

This study found a substantial relationship between performance expectancy and the intention to buy environmentally friendly homes. This shows that customers' decisions to buy green homes are influenced by their expectations of the performance of eco-friendly homes ([Shahzad et al., 2022](#)). In this circumstance, individuals would like to know about the performance of eco-friendly houses from the existence residents and match the performance with their expectations before purchasing decision making.

While the finding has also confirmed that environmentally sensitive customers bear a strong intention for environmentally sustainable purchases. This represents that environmentally sensitive customers are more concerned about environmental health, which generate their eco-friendly house purchasing intention. This finding is supported by Sun *et al.* (2022b). However, the association between willingness to pay (WTP) and eco-friendly house purchasing intention is not statistically significant. This finding aligns with previous research conducted by Yadav and Pathak (2017). The result may indicate that Bangladeshi customers have limited financial capacity to prioritize eco-friendly features in their house purchasing decisions. Eco-friendly houses often entail additional costs compared to conventional houses. Additionally, the lack of understanding of the long-term benefits associated with eco-friendly features among Bangladeshi customers could contribute to this finding. It is also possible that customers prioritize other factors over eco-friendliness when making house purchasing decisions, such as location, size, amenities or proximity to workplaces.

On the other hand, the results of the fsQCA were found to be more diverse because they were case-based analyses. PLS-SEM can assess the principal (net) effects of antecedents on outcomes, whereas fsQCA analysis can identify various sufficient combinations of antecedents (Seyfi *et al.*, 2021). As a result, the outcomes of these two approaches are complementary. Through fsQCA analysis in this study, 13 sufficient combinations of antecedents were identified which can predict eco-friendly house purchasing intention (Table 7). The findings from fsQCA analysis indicate that nine combinations out of 13 combinations contain performance expectancy as a highly influential antecedent to generating eco-friendly house purchasing intention. This demonstrates that most of the people who participated in this study expect that eco-friendly houses must perform according to their expectations. This result of fsQCA is also supported by the PLS-SEM result. Findings of fsQCA analysis highlight that 7 configurations (out of 13) contain attitude toward the eco-friendly house (ATEFH) as influential antecedent for generating eco-friendly house purchasing intention. The result highlights that customers' attitude toward eco-friendly houses is still a crucial factor for leading customers to eco-friendly house purchasing intention. PLS-SEM confirmed the same result in this study. Environmental knowledge (ENK) and subjective norms (SN) are also influential antecedents for generating high intention among customers to purchase eco-friendly houses. Those antecedents are contained by five configurations out of 13 combinations generated by fsQCA. This describes that environmental education and social pressure are highly remarkable contributors to raising eco-friendly house purchasing intention among customers. Although PLS-SEM analysis supports the ENK, the influence of SN on eco-friendly house purchasing intention is not supported. While fsQCA analysis identified four groups (configurations) of customers (same or separate groups) out of 13 groups (configurations) in this study, who think that perceived behavioral control, willingness to pay and environmental sensitivity are the factors influencing their intention to purchase environmentally sustainable houses. However, the results from PLS-SEM does not support those findings of fsQCA. Hence, these findings of fsQCA contradict the findings of PLS-SEM. Moreover, according to the fsQCA analysis in this study, attitude toward the eco-friendly house (ATEFH) (both consistency and coverage are more than 0.90) was found as a necessary condition in configurations for generating a high eco-friendly house purchasing intention (Table 7). Hence, a positive attitude is a necessary antecedent for generating eco-friendly house purchasing intention.

## 6. Research implication

### 6.1 Theoretical implication

Theoretically, this study is significant since it uses the extended TPB (ETPB) model to examine buyers' intentions to purchase eco-friendly homes. Few researchers have previously



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used the ETPB model to analyze eco-friendly house purchasing intention. Hence, the findings of this study are remarkable in justification of the application of the TPB model in extended form for addressing eco-friendly house purchasing intention. That is why, this study's findings will add to consumers' green purchasing literature. This study has significantly advanced the analysis of the ETPB model using complimentary approaches of PLS-SEM and fsQCA methodologies. According to our concern, this is the first study which used both methods simultaneously to analyze customers' eco-friendly house purchasing intentions. Hence, this study will enrich pro-environmental behavioral intention literature by establishing a new study approach for a more insightful outcome. This study, therefore, will contribute empirically to the pro-environmental behavior literature. From the finding of PLS-SEM, it is seen that there is no relationship between perceived behavioral control (PBC) and intention to purchase an eco-friendly house. At the same time, the association between willingness to pay (WTP) and intention to purchase an eco-friendly house is also insignificant. However, PBC and WTP are significant antecedents to produce the intention to buy an environmentally friendly home, according to fsQCA study. Hence, the findings will add a new dimension to pro-environmental behavioral intention literature for future reference. Finally, according to PLS-SEM, attitude toward eco-friendly houses and performance expectancy are the most influential variables in predicting customers' eco-friendly house purchasing intention. While fsQCA analysis also identifies that attitude toward the eco-friendly house is necessary condition for generating eco-friendly house purchasing intentions. Hence, together, PLS-SEM and fsQCA recognized that customers' attitude regarding eco-friendly home is the most effective predictor of their intentions toward eco-friendly homes purchasing intention. Hence, both approaches have proved that they are complementary to each other.

### *6.2 Managerial implication*

The managers of real estate companies and other organizations in charge of providing housing supplies will have greater understandings regarding environmentally sustainable houses thanks to this study. According to the finding, customers' attitude toward eco-friendly house is one of the most critical antecedents for generating customers' intention to purchase eco-friendly houses. Hence, management can connect customers socially through promotional campaigns by highlighting the contribution of eco-friendly homes in reducing environmental pollution. As a result, environmentally sensitive customers will feel the need for eco-friendly houses. According to the finding, the performance of an eco-friendly house is a crucial issue to customers during purchasing eco-friendly houses. This is also a clear insight for managers that the performance of an eco-friendly house must be in line with the expectation of customers. Hence, organizations should apply sustainable and durable technologies in eco-friendly homes to attract new customers. According to the study, environmental knowledge and sensitivity are the variables which influence customers' eco-friendly house purchasing intention. Hence, management must need to make people environmentally educated through marketing campaigns. Moreover, organizations can highlight how unplanned conventional housing can be deadly for the environmental sustainability. They can also highlight how eco-friendly housing contributes to reducing the environmental pollution. However, this study's findings have shown that perceived behavioral control and willingness to pay has no significant contribution to generating eco-friendly house purchasing intention of customers in a developing country. Hence, this is an insight for the managers that price is no longer a more significant concern than the environment to the environmentally sensitive customers when they purchase eco-friendly houses. Therefore, the results of this study will provide managers of real estate firms with useful advice for initiating eco-friendly housing markets in the developing countries.

As a result, they can deal with the future sustainable housing demand in the developing countries' markets.

Although this study has made a remarkable contribution to identifying customers' eco-friendly house purchasing intention, it still has a few limitations. The primary flaw in this study might be comparable to that in other cross-sectional studies (Alonso-Vazquez *et al.*, 2019; Esfandiar *et al.*, 2021) in that it has to do with the sample's generalizability and the temporal aspect of this study. Moreover, the sample was taken from one geographic location holding the same culture, belief and perception for analyzing and predicting the findings in this study. Hence, the finding of this study may not be applicable in different demographic locations because of data collection from few limited locations. Therefore, to find a more universally representative results, future studies may compare samples from various national boundary. The data collection of this study was from single source. Hence, single person answer all of the questions (customers). However, future study may use multisource data collection method where both sellers and buyers will participate to make the finding more representative. In this study, customers' intentions to buy eco-friendly homes are predicted using the TPB model, which is inappropriate for predicting technology-related factors properly. In this circumstance, future studies can include technology acceptance model (TAM) with TPB to predict eco-friendly house purchasing intention more accurately. Closed-ended questions were employed in this study to gather data. The close-ended questionnaire has limitations. Respondents are only allowed to express their opinions within controlled options. Hence, researchers sometimes fail to discover more profound insights into respondents' expressions. Therefore, future research will probably use the open-ended questionnaire method to reflect the respondents' answers better to predict the adoption intention of eco-friendly houses more appropriately. In terms of data collection, this study did not concentrate on a specific age range of participants. Therefore, questions may arise on how different aged groups customers can reflect the same view and how reliable the finding will be. Hence, future studies may focus on the same age group of customers (young buyers) to identify a specific target customer group for the eco-friendly house.

## 7. Conclusion, limitations and future research

The concept of sustainability is gaining momentum as many nations strive to achieve their sustainable development goals. Given the significant contribution of housing construction and maintenance to environmental impact, understanding customer behavior toward eco-friendly houses is crucial for achieving environmental sustainability. Therefore, this study aims to justify customers' intentions to purchase eco-friendly houses. The study employs PLS-SEM and fsQCA as complementary approaches for data analysis, enhancing the accuracy of the findings compared to previous studies (Masukujjaman *et al.*, 2022; Lajumi *et al.*, 2018). The PLS-SEM results identify the significant antecedents that influence customers' intentions to purchase eco-friendly houses, whereas the fsQCA findings reveal complex relationships that are essential for generating high intentions and offer various options to increase customers' interest in eco-friendly housing. This combined analysis approach enhances the accuracy of the findings, which was not ensured in previous studies. Further research is also required to improve the accuracy of findings and measure future demand for eco-friendly houses. The findings of this study indicate that performance expectancy is the most influential antecedent in predicting eco-friendly house purchasing intention among the people of Bangladesh, while a previous study found that attitude was the most significant antecedent (Masukujjaman *et al.*, 2022). This suggests that individuals in South Asia prioritize the perceived benefits of eco-friendly homes when making purchasing decisions. As resources for housing investment are scarce in Bangladesh, individuals evaluate whether eco-friendly houses meet their

expectations. This finding is supported by both PLS-SEM and fsQCA analyses. Additionally, attitude was found to have a significant impact on generating eco-friendly house purchasing intention (second most important). This implies that individuals' thoughts and perceptions about eco-friendly houses compared to conventional houses play a significant role in their future purchasing decision-making. However, environmental knowledge and sensitivity were found to have a relatively smaller effect on generating eco-friendly house purchasing intention. In contrast, a previous study highlighted the influence of both environmental knowledge and environmental concern on green home purchasing intention (Rashid and Shaharudin, 2017). This indicates that customers' knowledge and environmental concerns are critical factors worldwide. Therefore, these findings suggest that while environmental pollution is a major concern for the people of Bangladesh, they prioritize the perceived benefits and pre-adoption attitudes toward eco-friendly houses. These insights can provide valuable information to other countries, such as India and Pakistan, which share economic and cultural associations with Bangladesh, to understand the future demand for eco-friendly houses among their citizens.

Although this study has made a remarkable contribution to identifying customers' eco-friendly house purchasing intention, it still has a few limitations. The primary flaw in this study might be comparable to that in other cross-sectional studies (Alonso-Vazquez *et al.*, 2019; Esfandiari *et al.*, 2021) in that it has to do with the sample's generalizability and the temporal aspect of this study. Moreover, the sample was taken from one geographic location holding the same culture, belief and perception for analyzing and predicting the findings in this study. Hence, the finding of this study may not be applicable in different demographic locations because of data collection from few limited locations. Therefore, to find a more universally representative results, future studies may compare samples from various national boundary. The data collection of this study was from single source. Hence, single person answer all of the questions (customers). However, future study may use multisource data collection method where both sellers and buyers will participate to make the finding more representative. In this study, customers' intentions to buy eco-friendly homes are predicted using the TPB model, which is inappropriate for predicting technology-related factors properly. In this circumstance, future studies can include TAM with TPB to predict eco-friendly house purchasing intention more accurately. Closed-ended questions were used in this study to gather data. The close-ended questionnaire has limitations. Respondents are only allowed to express their opinions within controlled options. Hence, researchers sometimes fail to discover more profound insights into respondents' expressions. Therefore, future research will probably use the open-ended questionnaire method to reflect the respondents' answers better to predict the adoption intention of eco-friendly houses more appropriately. In terms of data collection, this study did not concentrate on a specific age range of participants. Therefore, questions may arise on how different aged groups customers can reflect the same view and how reliable the finding will be. Hence, future studies may focus on the same age group of customers (young buyers) to identify a specific target customer group for the eco-friendly house.

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Appendix 1

Authors	Title	Country	Theory	Findings
Rashid and Shaharudin (2017)	"Customer's purchase intention for a green home"	Malaysia	Stakeholder theory	Environmental concern, environmental knowledge, trust, expertise and role of government have positive association with green home purchasing intention
Kim <i>et al.</i> (2022)	"Psychological benefits of purchasing home meal replacement in the context of eco-friendly tv home shopping broadcast: the moderating role of personal norm"	South Korea	Theory of planned behavior	Warm glow, self-expressive benefits and nature experiences have influence on attitude. While attitude, subjective norms, perceived behavioral control have association with eco-friendly house purchasing intention
Jose and Sia (2022a)	"Theory of planned behavior in predicting the construction of eco-friendly houses"	India	Extended theory of planned behavior	Subjective norms, attitude, perceived behavior control have influence on eco-friendly house purchasing intention
Lavuri and Susandy (2020)	"Extending the theory of planned behaviour: factors fostering millennials' intention to purchase eco-sustainable products in an emerging market"	India	Extending the theory of planned behavior	Environment knowledge, environmental concern significantly influences green attitude of customers, subjective norms and perceived behaviour factors and attitude also significantly impact green purchasing intention
Chanda <i>et al.</i> (2023a)	"Factors influencing customers' green purchasing intention: evidence from developing country"	Bangladesh	Extended theory of planned behavior	Results confirmed that environmental knowledge generate positive attitude toward eco-friendly products only when environmental knowledge raise environmental sensitivity among customers. Moreover, attitude, subjective norm and perceived behavioral intention generate green purchasing intention
Masukujjaman <i>et al.</i> (2022)	"Green home buying intention of Malaysian millennials: an extension of theory of planned behavior"	Malaysia	Extending the theory of planned behavior	Attitude, perceived behavioral control subjective norms, perceived value, reasonable pricing and green building knowledge had a positive and significant effect on green home buying intention

(continued)

**Table A1.**  
Selected previous  
studies on green  
purchase intention

Table A1.

Authors	Title	Country	Theory	Findings
Amit Kumar (2021)	"Framing a model for green buying behaviour of Indian consumers: from the lenses of the theory of planned behaviour"	India	Theory of planned behaviour	Subjective norm, Subjective and attitude have influence on Indian consumers' green buying behaviour
Wang (2022)	"Determinants of consumers purchase attitude and intention toward green hotel selection"	China	Theory of planned behaviour	Environmental knowledge and environmental concern have impact attitude Toward Green Hotel Selection while Attitude, subjective norm, attitude and perceived behavioural control have influence on Green Hotel Selection
Li <i>et al.</i> (2021c)	"Bridging green gaps: the buying intention of energy efficient home appliances and moderation of green self-identity"	Bangladesh	Extended theory of planned behavior	Environmental concern, environmental knowledge, subjective norms, eco-labeling have association with attitude. While attitude, subjective norm and perceive behavioral control have relationship with Energy Efficient Home Appliances purchasing intention
Lajuni <i>et al.</i> (2018)	"Green homes need green homeowners: investigating the predictive power of environmental concern through the lens of theory of planned behavior"	Malaysia	Extended theory of planned behavior	Attitude toward green homes, social norms, perceived behavioral control, perceived self-identity have significant association with green home purchasing intention

Source: Appendix by authors

Appendix 2

Constructs	Items	Questions	Sources
Purchasing intention	PI1	I would buy eco-friendly house in the near future	Prakash and Pathak (2017)
	PI2	I intend to buy eco-friendly house because it is more environmentally friendly	
Perceived behavioral control	PI3	I plan to buy eco-friendly house to support environmental sustainability	Hamzah and Tanwir (2021)
	PBC1	I believe I have the ability to purchase eco-friendly house	
	PBC2	If it were entirely up to me, I am confident that I will purchase eco-friendly house	
	PBC3	I see myself as capable of purchasing eco-friendly house in the future	
Attitude toward the eco-friendly house	PBC4	I feel that purchasing eco-friendly house is totally within my control	Hamzah and Tanwir (2021)
	ATEFH1	Purchasing eco-friendly house is beneficial	
	ATEFH2	Purchasing eco-friendly house cars is worthwhile	
Environmental knowledge	ATEFH3	Purchasing eco-friendly house is satisfactory	Zafar et al. (2021)
	ENK1	I have better knowledge and information about environmental issues	
	ENK2	I know more about the benefits of eco-friendly house than the average person	
	ENK3	I know how to select house before purchasing with a view to reducing the amount of waste dumping	
	ENK4	I know that I would like to buy the house is environmentally safe	
	SN1	If I bought eco-friendly house, most people who are important to me would agree with my decision	
Subjective norm	SN2	If I bought eco-friendly house, most people who are important to me would appreciate my green purchase	Hamzah and Tanwir (2021)
	SN3	If I bought eco-friendly house, most people who are important to me would support my purchase decision	
	ENS1	I am worried about the worsening quality of the environment in Bangladesh	
Environmental sensitivity	ENS2	Bangladesh's environment is my major concern	Jaiswal and Kant (2018)
	ENS3	I am emotionally empathic and sensitive about environmental protection issues of Bangladesh	
	ENS4	I often think about how the environmental quality in Bangladesh can be improved	
	PE1	I would like to find used technology in eco-friendly house easy to use	
Performance expectancy	PE2	It would be easy for me to become skilful at using technology in eco-friendly house	Jain et al. (2022)
	PE3	I have the resources necessary to use in eco-friendly house	
Willingness to pay	WTP1	It is acceptable for me to pay more money for the house that is built and maintained with environmentally friendly way	Prakash and Pathak (2017)
	WTP2	I feel proud to have environmentally friendly house though it is more costly than conventionally houses	
	WTP3	I would be willing to spend more money in order to buy eco-friendly house	

Source: Appendix by authors

Table A2.  
Measurement item

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