

## Article

# Exploring the Mechanisms Influencing Users' Willingness to Pay for Green Real Estate Projects in Asia Based on Technology Acceptance Modeling Theory

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**Abstract:** In contrast to the extensive research on the impact of green buildings on character, property values, energy efficiency, and environmental quality, less emphasis has been placed on understanding the factors driving users' selection of green real estate projects, an essential element for the future business sustainability of such buildings. This study investigates the connection between various user motivations, such as perceived usefulness, perceived usability, a sense of responsibility, awareness of consequences, and perceived behavioral control, and their impact on Asian users' willingness to pay for green real estate projects. These users include those who have already invested in and are considering long-term investment in such projects. An empirical methodology, integrating these motivations with a technology acceptance model, is proposed to assess their willingness to pay either through renting or buying. The study applies structural equation modeling to analyze sample data against a hypothetical model, thereby testing the hypotheses. It concludes that, in influencing green real estate projects, the following apply: (1) perceived usefulness and perceived behavioral control significantly shape Asian users' attitudes towards financial commitment; (2) perceived usability directly influences their perceived usefulness; (3) awareness of consequences acts as a mediating factor in the relationship between perceived usability and behavioral control among these users. Moreover, the study offers strategic design recommendations for future green real estate projects, informed by the diverse motivational factors of Asian users, to guide their purchasing and selection decisions.

**Keywords:** green building; green real estate; user research; technology acceptance model; structural equation model; business sustainability



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## 1. Introduction

Green building, a global architectural paradigm, emphasizes environmental stewardship and resource efficiency throughout its life cycle and is gaining traction across continents due to its universal appeal and adaptability. In addition to ensuring healthy, comfortable, and energy-efficient spaces, this paradigm integrates green health concepts with sustainable development principles, resonating with international initiatives like the United Nations' Sustainable Development Goals. In its execution, green building employs a holistic and scientific approach, amalgamating an array of advanced technologies, including, but not limited to, greening strategies, natural ventilation, daylighting, energy-efficient building envelopes, solar energy exploitation, eco-friendly materials, and intelligent system management. This convergence aims to foster a symbiotic relationship between technology and the environment, as well as between human culture and architectural practice. Emphasizing a lifecycle perspective, this methodology seeks to minimize the consumption of natural resources and adverse environmental impacts during the design, construction,

operational, and decommissioning phases. Concurrently, it aims to amplify the wellbeing and comfort of occupants, thereby contributing to the societal goal of sustainable development. Contrasted with conventional real estate practices, which predominantly prioritize cost efficiency and functionality, often at the expense of environmental considerations and future sustainability, green real estate emerges as a paradigm of enduring commitment to ecological stewardship and resource prudence. This sustainable approach transcends the mere adoption of energy-efficient and eco-friendly architectural designs, material procurement, and construction methodologies. It extends to a comprehensive emphasis on the sustainability of the entire building lifecycle, encompassing judicious water management, stringent air quality control, meticulous waste minimization, and the integration of environmentally benign operational practices. Green real estate, therefore, represents a holistic endeavor to harmonize human habitats with the natural environment, reflecting a profound shift towards responsible and sustainable living spaces [1]. In the context of a burgeoning global green economy, there is an escalating cognizance regarding the influence of buildings on residential, commercial, and natural ecosystems. This awareness is catalyzing a paradigm shift towards sustainable methodologies within the construction sector on a worldwide scale [2]. Globally, nations like the United States and Germany are at the forefront of adopting eco-friendly building technologies, establishing a precedent that is increasingly gaining traction on a global scale. This shift, known as the “going green” movement, is prominently featured in the global green building (GB) initiative. The GB movement advocates for an array of strategies aimed at enhancing built environments and reducing ecological footprints [3]. A notable example is the concept of net-zero energy buildings (ZEB), which is gaining attention for its potential to address critical issues like energy consumption and environmental degradation [4]. In essence, GB involves adopting healthier and more resource-efficient methodologies in construction, renovation, operation, maintenance, and demolition processes [5]. The term “green building” can denote either the physical structure (noun) or the eco-friendly building approach (gerund). Particularly, sustainable low-energy office buildings are designed to exploit their structural and physical attributes, aiming to foster superior living and working conditions with minimal reliance on primary energy sources [6].

The burgeoning interest in green building (GB) within Asia in recent years has significantly propelled the region’s construction industry towards sustainable practices, contributing to the global proliferation of green building rating systems. Nations such as China, Singapore, Thailand, Japan, and South Korea have been at the forefront, vigorously advancing national research standards in this field. Their research efforts predominantly revolve around the development and delivery of GB programs, the intricacies of GB certification, energy efficiency measures, and the implementation of cutting-edge technologies [7]. Most renowned green building rating systems evaluate projects against a comprehensive set of eight categories: project management, site optimization, energy conservation, water efficiency, material selection, management of hazardous substances and emissions, storage, and the quality of the indoor environment [8]. Most renowned green building rating systems, such as the Leadership in Energy and Environmental Design (LEED) in the United States and the Building Research Establishment Environmental Assessment Method (BREEAM) in the United Kingdom, evaluate projects against a comprehensive set of categories [9]. These international standards have influenced Asian rating systems and are instrumental in setting a global benchmark for sustainable construction. Building on this momentum, these systems not only set national benchmarks but also award certifications to buildings that meet these standards. Prominent examples include China’s Green Building Label (GBL), the Building Environmental Assessment Method (BEAM) in Hong Kong, Japan’s Comprehensive Assessment System for Built Environment Efficiency (CASBEE), and the Building Construction Authority Green Mark Scheme in Singapore [10].

Furthermore, the evolution of green real estate projects in Asia showcases a progression towards more mature constructions, particularly those anchored in green building principles. A case in point is the SkyTerrace @ Dawson in Singapore. Launched in 2008 by

the Housing and Development Board (HDB) and executed by SCDA, this initiative marked a significant step in advancing public housing design. It incorporates key green building elements such as green roofs, rainwater harvesting, and reuse methods [11]. However, the focus of research has predominantly been on the architectural journey from design to completion rather than on understanding the willingness of users to pay for green real estate designs and the factors that influence this decision-making process.

The subtopic under “GB project delivery and development” is considered a need for researchers to focus on. Green communities aim to conserve natural resources, but it is still being determined whether residents have the motivation to maintain sustainable development independently [12]. Prominent concerns within extant research investigations involve the comparative analysis of green buildings and conventional buildings concerning several critical aspects, including energy efficiency, water efficiency, indoor environmental quality, thermal comfort, health, and productivity [13]. However, there is a notable gap in research on consumer preferences for green buildings, despite numerous studies on their impact on property values, energy efficiency, and environmental quality. This gap is essential to address for advancing sustainability in the built environment. Green buildings are often assessed for their environmental impact during the design, post-construction, and occupancy phases, but these assessments typically lack empirical evidence about the occupants’ perceptions and experiences [14].

The present study addresses an under-explored area of GB: the factors influencing users’ choices in green real estate projects. While there has been a significant amount of research on various aspects of green building, such as its impact on architectural character, property value, energy efficiency, and environmental quality, this study focuses on the critically important yet relatively neglected topic of user motivation and willingness to pay for such projects. This study integrates several established concepts and theories in technology acceptance, motivation, and decision-making into a comprehensive framework. By incorporating the elements of perceived usefulness, perceived usability, sense of responsibility, consequence awareness, and perceived behavioral control, the study provides a valuable tool for understanding and predicting Asian user attitudes and behaviors towards green real estate projects. The study provides a solid theoretical foundation for understanding and predicting the attitudes and behaviors of Asian users of green real estate projects.

Therefore, this study aims to evaluate the relationship between user motivations—including perceived usefulness, perceived usability, sense of responsibility, awareness of consequences, and perceived behavioral control—and their influence on Asian users’ willingness to invest in green real estate design. Acknowledging that investment in green real estate encompasses both renting and buying, it is not feasible to generalize about “consumers”. The primary focus is on individuals in Asia who have invested or are considering investing in green real estate projects for long-term use. An empirical methodology, integrating the technology acceptance model (TAM) with structural equation modeling (SEM), is proposed to test the hypotheses. The study is divided into three sections: firstly, we construct a willingness-to-pay model for green buildings based on the TPB and develop a questionnaire from the model’s assumptions. Secondly, we fit the sample data and hypothesized model using AMOS 24.0 software, thereby establishing SEM. Lastly, we discuss the impact of various user motivations.

## 2. Model Construction and Underlying Assumptions

### 2.1. Factors Influencing Users’ Willingness to Pay

Critical success factors for achieving green buildings and green real estate can be classified into three categories: technological, managerial, and behavioral. Behavioral and cultural factors are also crucial to the development of green buildings [15,16]. Research endeavors pertaining to the performance of green buildings can likewise gain valuable insights through the adoption of a user-centric approach, which places emphasis on the assessment of user requirements and satisfaction levels [17]. User payment intention is an integral part of the

promotion and use of green real estate projects. If consumers do not accept green real estate ideas, designs, and materials, achieving the desired “green effect” is problematic.

Over the recent decades, scholars both nationally and internationally have utilized classical theories to explore factors influencing willingness to accept green buildings. A strong correlation exists between pro-environmental attitudes and the notable “forgiveness factor” often associated with green buildings. A study focusing on green housing in Hong Kong identified five key factors impacting consumer decisions in the purchase of green buildings [18]. These include the pricing of green buildings, environmental awareness, the use of green building materials and interiors, personal green consumption habits, and income levels.

Furthermore, Berardi [19] posited that green buildings serve to address a range of societal and economic imperatives. These include educational goals, inclusivity, community cohesion, affordability, economic viability, local economic impact, indoor environmental quality, cultural appreciation, and inspirational aspects. According to Tan and Goh [20], the primary determinants shaping consumers’ inclination to acquire a green residential property encompass their attitudes regarding green homes, perceived moral responsibilities, environmental considerations, perceived value, self-identity perceptions, and assessments of financial risk. Tan [21] found that households are motivated by four economic incentives: their beliefs about green homes, a healthy and sustainable environment, energy efficiency, and livability. Closer to the study in this paper, Liu et al. concluded that the key to promoting green homes lies in the attitudes, subjective knowledge, and social trust of the residents.

## 2.2. Theory of Planned Behavior

Understanding the attitudes of potential customers towards green properties is essential, as it directly influences their intention to purchase. The theory of planned behavior (TPB) suggests that an individual’s behavioral intention is the most immediate determinant of their action [22]. Within this framework, attitude is identified as a key driver of behavioral intention [23]. As noted by Mohd Suki [24], the attitude towards green products significantly affects the intention to purchase them. This finding is echoed in Costa et al.’s study [25], which found a positive correlation between attitudes towards green products and the willingness to pay for them. Consequently, residents’ attitudes towards green-labeled real estate are likely to positively influence their behavioral intention to use these buildings to a certain extent.

Conner and Armitage have provided both empirical and theoretical evidence for six variables within the theory of planned behavior (TPB): belief salience measures, past behaviors/habits, perceived behavioral control (PBC) and self-efficacy, moral norms, self-identity, and affective beliefs. Ajzen [26], drawing on expectation theory, developed the TPB to elucidate the general process of individual behavioral decision-making. Attitude is regarded as an individual’s favorable or unfavorable assessment of a specific behavior. The adoption of green real estate is influenced by users’ behavioral intentions, which are determined by three factors: attitudes towards green practices, subjective norms, and PBC. However, findings in green consumption research indicate that, due to the positive externalities of such consumption, users’ attitudes and subjective norms do not significantly impact their intention to consume green real estate. This study aims to develop an extended model based on the technology acceptance model, offering a more comprehensive explanation of users’ willingness to invest in green real estate projects in Asia.

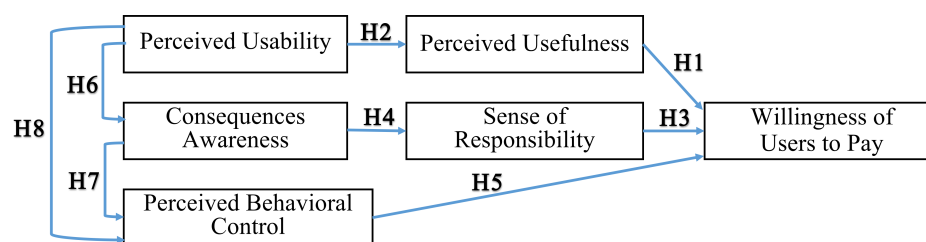
## 2.3. Technology Acceptance Model

The technology acceptance model (TAM) [27,28] is a well-established framework for elucidating user acceptance of information and computer technology, and is extensively applied in interpreting the acceptance of various technological innovations. The adoption of the theory of planned behavior (TPB) in this context is motivated by its dual importance: it is a widely used psychological theory for predicting individual behavioral intentions, and it is frequently cited in green consumerism research. The TPB is based on the causal sequence of belief–attitude–intention–behavior [29].



The TAM's validity and its effective explanation of end-user system usage are well established [30]. According to the TAM, people's beliefs about a technology's usefulness and usability are key predictors of their attitude toward it [31]. This attitude then determines their intention to use the technology, which in turn influences actual usage. The model suggests that the adoption of new technology is driven by the behavioral intention to use it. This intention is shaped by a desire to use the technology, which is influenced by both its perceived usefulness and usability. External factors may also affect these perceptions. Often, the intention to use a technology or service is used as a stand-in for actual usage, especially when direct measurement of usage is challenging [32].

In the model, "perceived usefulness" is defined as the degree to which a user believes that a technology will provide them with economic benefits. Conversely, "perceived usability" pertains to the ease with which an individual can use a specific technology. In this study, "perceived usefulness" relates to a user's view of the effectiveness or utility of a green real estate project compared to conventional real estate. "Perceived usability", on the other hand, refers to the direct benefits a user perceives from owning and using a green real estate property, such as environmentally friendly features. Therefore, this study proposes substituting the "behavioral attitudes" component in the TPB model with "perceived usefulness" and "perceived usability" to assess users' willingness to invest in green real estate projects in Asia. This modification is illustrated in Figure 1.



**Figure 1.** Theoretical model of the influence mechanism of users' willingness to invest in green real estate projects.

#### 2.4. Hypothesis of the Study

This study makes the following assumptions about the relationship between the influencing factors of the comprehensive measurement model of users' willingness to pay for green real estate projects in Asia (H1–H8 in Figure 1 represent the hypothesized paths between the latent variables, respectively).

Perceived usefulness in this study is linked to the user experience of green real estate projects. Perceived value (PV) is critical in shaping purchase intentions [33], and in the realm of green purchasing, Chen and Chang [34] discovered that green PV positively influences green purchase intentions. The technology acceptance model (TAM) posits that perceived usefulness and perceived usability collectively form people's attitudes towards technology usage. These attitudes, along with perceived usefulness, affect behavioral intentions, which in turn shape actual behavior. Perceived usefulness is also seen as beneficial at an economic or social level, positively impacting individuals' willingness to act [35]. Existing research has found that perceived usefulness, enjoyment, and price are the three central values influencing the relationship with use, which is reflected explicitly in the GB domain [36]. In comparison to conventional buildings, green buildings' thermal comfort levels have been extensively researched, with a clear link established between comfort and satisfaction. For a green building to exceed conventional buildings in comfort and satisfaction, it must significantly enhance indoor environmental quality [37]. Users' beliefs about the health benefits, quality of life improvements, cost reductions, and energy savings of green real estate are connected to their perceptions of the project's usefulness. As green real estate projects are emerging technologies, their adoption depends on their perceived benefits in production and living environments. Therefore, this study proposes Hypothesis 1.

**Hypothesis 1 (H1).** *Asian users' perceived usefulness of green real estate projects positively affects Asian users' willingness to pay for green real estate projects.*

Perceived usability relates to the internal characteristics of a green real estate project. The International Organization for Standardization's ISO 9241-11 guideline [38] defines "Usability" as "the extent to which a given user can use the product to achieve specific effectiveness, efficiency, and satisfaction goals in a given usage environment". The theory of planned behavior (TPB) operates on the foundational premise that behavioral intention serves as the primary predictor of actual behavior. Behavioral intentions, characterized by the willingness to accept specific actions, are in turn influenced by a composite interplay of individuals' attitudes and perceived usefulness [39]. In a broader context, usability is intrinsically linked to user engagement [40]. For instance, Kibert [41] has advocated for the incorporation of certain standard design elements in green properties, such as natural ventilation, the use of low-toxicity décor and furnishings, enhanced natural daylighting for superior lighting quality, operable windows, fans to facilitate personal control over environmental conditions, and mitigation of exposure to outdoor sounds. These design features not only augment the overall user experience but also contribute positively to user willingness and the time spent using the property, consequently enhancing its usability. The extent to which users take notice of and engage with these features within green real estate projects is a matter that pertains to their perceived usability of such projects. Therefore, this study proposes Hypothesis 2.

**Hypothesis 2 (H2).** *Asian users' perceived usability of green real estate projects positively affects the perceived usefulness of green real estate projects.*

A sense of responsibility among users is linked to their environmental perception and awareness. Social identity theory [42] lays the foundation for understanding the positive relationship between the degree of environmental concern in individuals and their willingness to spend more on green initiatives. Perceived morals (PMs), also known as personal norms or ethical codes, refer to an individual's judgment about the moral rightness or wrongness of performing a certain behavior [43]. This means that individuals may feel a moral duty to act in specific ways when faced with ethical decisions. Growing environmental awareness has led to increased interest in green consumption, significantly enhancing the market value of green products. Liu et al. [44] have underscored the importance of including perceived moral obligations in the TPB framework, particularly regarding sustainable building practices. Chen and Tung [45] argued that perceived moral obligation positively affects consumers' tendencies to choose eco-friendly buildings. Similarly, Barbarossa and Pelsmacker [46] demonstrated the positive impact of moral obligation on consumers' willingness to buy eco-friendly products. Furthermore, according to the normative activation theory (NAT) [47], individuals are more likely to opt for environmentally responsible products if they feel a sense of duty in their decision-making. The stronger the sense of environmental responsibility in individuals, the more likely they are to invest in eco-friendly real estate, even if it means incurring additional costs. Hence, an increased sense of responsibility is likely to positively influence an individual's willingness to financially support green real estate projects.

**Hypothesis 3 (H3).** *Asian users' awareness of an environmental sense of responsibility positively influences Asian users' willingness to pay for green real estate projects.*

Consequence awareness involves an individual's understanding of how their actions impact both their personal and external environments. This awareness is crucial in evaluating the significance and value of investing in green real estate projects. The construction phase in the real estate sector is known for its high resource consumption [48]. Additionally, concepts of benevolence and social altruism link consequence awareness beliefs to concerns about environmental responsibility [49], establishing a connection between consequence

awareness and environmental responsibility. Awareness of the potential impacts of one's actions on others moderates the relationship between ethical considerations and behavior. The normative activation theory (NAT) posits that consequence awareness significantly influences the attribution of responsibility [50,51]. Without an understanding of the consequences of their actions, individuals may not feel responsible for those outcomes or consider the efficacy of their actions. Therefore, the more Asian users are aware of the negative impacts of environmental deficiencies, the more likely they are to develop a personal sense of responsibility towards the environment, influencing their attitudes and behaviors towards green real estate.

**Hypothesis 4 (H4).** *Asian users' consequence awareness of green real estate projects positively affects their sense of responsibility in green real estate projects.*

Perceived behavioral control (PBC) relates to how external factors, including environmental features and information interference, affect green real estate projects. It provides a plausible explanation for the complexity of behavioral prediction [52]. Price tolerance for PBC is a good reference point. Smith and Paladino [53] identify project cost as a crucial factor in payment behavior, noting that price and accessibility are major barriers. Green projects typically have higher initial costs than standard buildings, with a study showing that "green label" condos command a 4.7% price premium [54]. Thus, it is essential to analyze the users' perception of control over the green project, taking into account the diminishing influence of users on external factors such as price, location, and amenities, which also relate to the developer's pricing strategy. Additionally, societal and familial information influences PBC. The perceived control of a behavior directly impacts behavioral intention [55], highlighting how perceived constraints shape willingness to invest in green real estate, particularly among Asian users.

**Hypothesis 5 (H5).** *Asian users' perceived behavioral control of green real estate projects positively affects Asian users' willingness to pay for green real estate projects.*

Furthermore, the correlation between perceived usability, consequence awareness, and PBC is also worth exploring. The perceived usefulness of green real estate projects appeals to people's perceived consequence awareness of the environment and themselves, which means that the more people recognize the usefulness of green real estate projects, the stronger the awareness of the consequences. At the same time, the more efficient and effective green real estate projects are in terms of environmental protection, the more consumers will recognize and avoid the negative consequences of ordinary real estate projects. Therefore, a positive correlation exists between perceived usefulness and consequence awareness, and Hypothesis 6 is proposed.

**Hypothesis 6 (H6).** *Asian users' perceived usability of green real estate projects positively affects consequence awareness of green real estate projects.*

The normative activation theory (NAT) links consequence awareness to the recognition of negative effects on oneself or the external environment. A user's heightened awareness of consequences increases their likelihood to invest in green real estate projects and strengthens their perceived behavioral control (PBC) over these projects. Concurrently, the stronger a user's perceived behavioral control is in using and purchasing green real estate, the greater their desire for others to adhere to environmental protection rules, fostering a better ecological environment. Consequently, Hypothesis 7 is proposed.

**Hypothesis 7 (H7).** *Asian users' consequence awareness of green real estate projects positively affects their perceived behavioral control of green real estate projects.*

Users also consider the health benefits of long-term residence in green real estate compared to standard real estate. Based on the research showing that green buildings have led to improvements in users' health and productivity levels [56,57], the personal benefits of holding a green real estate project for an extended period deserve to be taken into account. Popescu et al. [58] additionally posit that energy retrofit measures in green real estate yield advantages that extend beyond enhanced energy efficiency. These measures can also augment the property's intrinsic value, thereby facilitating a reduction in the investment payback period associated with energy efficiency enhancements. Therefore, perceived usability should have a role in PBC, but it needs to be directly realized. The analysis of mediating effects is imperative for assessing both the presence of a variable's mediating role and the extent to which it fulfills this role. Baron and Kenny's [59] causal step approach has been used to test for mediating effects. The independent variable (perceived usability) influences the dependent variable (PBC) through the mediator variable (perceived awareness of consequences), which represents a non-zero mediation effect, and therefore Hypothesis 8 is proposed.

**Hypothesis 8 (H8).** *The perceived usability of green real estate projects by Asian users influences their perceived behavioral control through consequence awareness to create a mediating effect.*

### 3. Methods

#### 3.1. Questionnaire Design

This study used a quantitative pairwise research methodology to develop a questionnaire for measuring the willingness to pay of Asian users for green real estate design by reviewing the experience in related literature. The questionnaire consists of two parts. Part 1 investigates the demographic information of the respondents. Part 2 collects data on respondents' willingness to pay, perceived usefulness, perceived usability, sense of responsibility, consequence awareness, and perceived behavioral control. Respondents were asked to rate these items. Each item was rated using a five-point Likert scale (1: strongly disagree, 2: disagree, 3: neither agree nor disagree, 4: agree, and 5: strongly agree).

Specifically, the questionnaire questions were adapted from previous literature, for example, the research questions on perceived usefulness were set regarding the User Experience Usability Metrics (UMUX) [60] and the UMUX-LITE based on factor and item analysis [61]; perceived usefulness research questions were set concerning the computer system usability questionnaire (CSUQ) [62] and the system usability scale (SUS) [63]. The sources of the scales are presented in Table 1. The questionnaire was considered by five experts with more than five years of experience in the real estate development and market management industry. The specific questionnaire can be found in Appendix A.

**Table 1.** Definition of variables and sources of reference scales.

Research Variable	Operability Definition	Reference Scale
Willingness of Users to Pay	Asian users willing to rent or buy green real estate projects.	Kang et al. [64] Ajzen and Driver [65]
Perceived Usefulness	Asian users perceive green real estate programs as useful based on user experience.	Lewis et al. [61] Finstad [60]
Perceived Usability	Asian users perceive the availability of green real estate projects based on their internal characteristics.	Lewis [62] Brooke [63]
Sense of Responsibility	Asian users are environmentally responsible and considerate of the green credibility of their real estate brands.	Taufique et al [66] Kaiser et al. [67]
Consequences Awareness	Asian users perceive the significance and value of behavior in the future from a personal and social perspective.	Hansla et al. [49] Schwartz [51]
Perceived Behavioral Control	The extent to which Asian users are confronted with the consideration of external factors and the degree to which they are disturbed by external information about green real estate.	Terry and O'Leary [68] Ajzen and Madden [55]

### 3.2. Research Methodology

Since the 1980s, structural equation modeling (SEM) has been used in a wide range of research areas and is effective in psychological and behavioral research [69]. SEM serves as a pivotal analytical technique for investigating the connections between latent and observable variables through the examination of collected data. It stands as a vital tool for delineating the relationships among pivotal factors. Moreover, SEM finds extensive utility in the realm of multivariate data analysis, addressing the limitations inherent in conventional statistical methods. Consequently, this study employed SEM as the analytical approach to assess H1–H7.

This study utilized SPSS 28.0 and AMOS 24.0 software to conduct structural equation modeling (SEM) analysis to test the hypotheses within the theoretical framework. SEM, a widely accepted multivariate analysis technique in the fields of psychology and behavioral research, was chosen for its appropriateness, as endorsed by Hoyle [70]. SEM offers distinct advantages for this research: firstly, it accommodates both latent and observed variables, aligning with the variables under investigation; secondly, it integrates factor and path analyses, facilitating a comprehensive examination of the proposed integrated framework. Furthermore, SEM serves a dual purpose, functioning as a tool for assessing measurement scale reliability and validity in its measurement modeling component and as a means for hypothesis testing in its structural modeling component.

Meanwhile, mediation modeling is an essential research approach for exploring the impact of mediating variables on the relationship between independent and dependent variables [71]. This methodology is grounded in the foundational premise that the independent variable exerts its influence on the dependent variable through an intermediary variable. The evaluation of the mediation model commonly involves the utilization of the bootstrap sampling method, which is a non-parametric statistical technique utilized for estimating the distribution, standard error, and confidence interval of a statistical measure [72]. Accordingly, this study will employ the mediation model to investigate the hypothesis denoted as H8.

### 3.3. Data Collection

The questionnaire was distributed through two channels. The first was an online survey using a “snowball” sampling method, whereby a link to the questionnaire was sent to users aged 18 and over through WeChat, Line, Kakao, and other Asian online platforms, which basically guaranteed that the respondents would be from Asian countries. At first, respondents were randomly selected based on social media. The respondents subsequently disseminated the questionnaire to additional individuals who met the broader criteria of the sample, including their acquaintances and family members. This method ensures the sample’s characteristics, but the recovered questionnaires’ utilization rate is low.

The second survey method was to distribute the questionnaire through various real estate forums and online through social media platforms and agencies in different Asian countries. The questionnaire survey method, while affording a reasonable degree of control over the sample, is characterized by its time-intensive nature and demands for additional effort. Consequently, this study adopted a hybrid approach, combining both survey methods.

In the questionnaire, all participants were explicitly apprised of the survey’s objectives and the policy equating lease and purchase rights, which served as a proxy for user intention to pay. Subsequently, respondents proceeded to complete the questionnaire after providing their informed consent to participate in the research.



The survey lasted three months, from July 2023 to October 2023, and covered people of different genders, ages, and educational backgrounds, most of whom were potential users. They all came from China, Korea, Singapore, Thailand, Japan, and other Asian countries. In this study, 500 self-administered questionnaires distributed online resulted in 385 completed questionnaires (77% response rate). In the data screening phase, the standard deviation for the scores across 33 items was computed, and questionnaires displaying a standard deviation of 0 or containing incomplete data were omitted from the dataset. Subsequently, 356 questionnaires remained eligible for inclusion in the final data analysis. Kline [73] suggested that the sample size must be at least ten times each item's size. With 33 items in this study, the sample size needed to be at least 330, thus meeting the requirement.

### 3.4. Measurement Model

#### 3.4.1. Reliability Analysis

Reliability analysis pertains to the extent of consistency observed in various test measurements. In academic research, Cronbach's alpha is the predominant method employed to assess internal consistency. The  $\alpha$  coefficient's range spans from 0 to 1, with higher values indicating stronger internal consistency within the scale [74]. If the  $\alpha$  coefficient is more significant than 0.7, then the analysis is highly reliable [75]. In this study, SPSS 28.0 software was used for the reliability test. The Cronbach's alpha coefficients for the variables ranged from 0.917 to 0.93, as shown in Table 2. The overall Cronbach's alpha coefficient of the questionnaire was 0.920, which met the overall and local requirements, indicating that the questionnaire had satisfactory reliability.

**Table 2.** Reliability analysis.

Variable		Cronbach's Alpha	N of Items
Perceived Usefulness	PUF	0.917	5
Perceived Usability	PUA	0.915	5
Sense of Responsibility	SR	0.919	5
Consequence awareness	CA	0.907	5
Perceived Behavioral Control	PBC	0.935	5
Willingness of Users to Pay	WUP	0.929	5

#### 3.4.2. Validation Factor Analysis

The goodness-of-fit test is a statistical procedure employed to assess whether the sample data align with the expected normal distribution [76]. It is also a statistical method of making inferences about observations to determine whether the sample group is truly representative of the whole population [77]. Therefore, they determine the relationship between actual and predicted values in the model. From Table 3, it can be seen that CMIN/DF is 1.478, which is less than the criterion of below 3. Meanwhile, TLI and CFI meet the criterion of 0.9 or more, and RMSEA is 0.037, which is less than 0.08. Each fitting indicator meets the general research criteria, so this model has a good fit.

**Table 3.** Goodness-of-fit test results.

CMIN	DF	CMIN/DF	TLI	CFI	RMSEA
709.344	480	1.478	0.972	0.975	0.037

A survey questionnaire is designed to facilitate measurements of adequate validity, enabling the derivation of meaningful conclusions. Enhanced validity levels correspond to heightened survey authenticity, as highlighted by Taherdoost [78]. Validity assessment primarily encompasses content and structural validity, with the latter encompassing

convergent and discriminant validity. To enhance the questionnaire’s validity assessment, this study employs AMOS 24.0 to perform a confirmatory factor analysis rooted in exploratory factor analysis. This analysis evaluates the scale’s validity through measures such as composite reliability (CR) and average variance extracted (AVE), as proposed by Bagozz [79]. As can be seen from Table 4, the standardized factor loadings of each measure were more significant than 0.6 or more. All CR scores were greater than the threshold value of 0.70 [80], and AVE was more significant than 0.5, indicating good convergent validity.

**Table 4.** Convergent validity test results.

			Estimate	CR	AVE
PUF1	←	PUF	0.912	0.919	0.696
PUF2	←	PUF	0.806		
PUF3	←	PUF	0.776		
PUF4	←	PUF	0.839		
PUF5	←	PUF	0.832		
PUA1	←	PUA	0.750	0.917	0.689
PUA2	←	PUA	0.842		
PUA3	←	PUA	0.778		
PUA4	←	PUA	0.877		
PUA5	←	PUA	0.893		
SR1	←	SR	0.763	0.921	0.701
SR2	←	SR	0.758		
SR3	←	SR	0.885		
SR4	←	SR	0.859		
SR5	←	SR	0.908		
CA1	←	CA	0.858	0.909	0.667
CA2	←	CA	0.769		
CA3	←	CA	0.832		
CA4	←	CA	0.781		
CA5	←	CA	0.839		
PBC1	←	PBC	0.861	0.941	0.761
PBC2	←	PBC	0.830		
PBC3	←	PBC	0.887		
PBC4	←	PBC	0.927		
PBC5	←	PBC	0.853		
WUP1	←	WUP	0.848	0.930	0.627
WUP2	←	WUP	0.823		
WUP3	←	WUP	0.689		
WUP4	←	WUP	0.748		
WUP5	←	WUP	0.893		
WUP6	←	WUP	0.810		
WUP7	←	WUP	0.712		
WUP8	←	WUP	0.790		

### 3.4.3. Correlation Analysis and Differential Validity

In the preceding section, we established the structure of dimensions and their associated items via validity and reliability analyses. The dimension scores were computed as the average of the scores from the questions within each respective dimension, followed by the execution of correlation analysis. Correlation analysis primarily serves to examine the relationships between variables. The correlation coefficient’s range falls between  $-1$  and  $1$ , where a larger absolute value signifies a more pronounced association between the variables.

In assessing discriminant validity, the comparison involved examining whether the square root of the AVE for a specific construct exceeded the correlations between that construct and others. When the square root of the AVE of a construct surpassed the non-diagonal elements within the corresponding rows and columns of the correlation matrix, it indicated that the indicator was more closely associated with that particular construct than with others. As demonstrated in Table 5, the diagonal entries are represented in bold and signify the square root of the AVE. Given that all diagonal entries are greater than the non-diagonal entries, it suggests that discriminant validity is adequately established for all constructs.

**Table 5.** Correlation analysis and differential validity test results.

	Correlations					
	PUF	PUA	SR	CA	PBC	WUP
PUF	0.834					
PUA	0.597 **	0.830				
SR	0.211 **	0.205 **	0.837			
CA	0.401 **	0.420 **	0.043	0.817		
PBC	0.494 **	0.401 **	0.288 **	0.464 **	0.872	
WUP	0.367 **	0.405 **	0.145 **	0.387 **	0.334 **	0.792

\*\* Correlation is significant at the 0.01 level (2-tailed).

The above questionnaire's reliability and validity analysis showed that the questionnaire's reliability, validity, and correlation are good enough for structural equation modeling.

#### 4. Results

##### 4.1. Descriptive Statistical Analysis

This study's intended participants were prospective buyers of environmentally friendly residential properties in the Asian region who were aged 18 or older. To ensure the accuracy of the questionnaire and to address any potential issues related to wording and measurement, a pre-test was administered to a sample of 30 respondents before the main data collection phase. It is important to note that the results from the pre-test were not included in the final sample size used for analysis.

The gender distribution of participants was 150 (42.1%) males and 206 (57.9%) females. The user group was concentrated in the 30–39 (34%) and 40–49 (27%) age ranges. Regarding property ownership, 75.0% of respondents currently own property, while 25.0% do not. The percentage of respondents with experience purchasing green real estate is 36.8%. Out of the total number of respondent users, eight have not used property due to living in self-built houses in the countryside for a long time or not generating commercial activities. The number of users with experience using a green property was a pleasant surprise at 69.9%. For more information, see Table 6's respondents' profiles.

**Table 6.** Basic data statistics.

Basic Data Statistics		Frequency	Percentage
Gender	Male	150	42.1%
	Female	206	57.9%
Age	18–29	50	14.0%
	30–39	121	34.0%
	40–49	96	27.0%
	50–59	57	16.0%
	60 years and over	32	9.0%
Educational Background	High school diploma	50	14.0%
	Bachelor degree	136	38.2%
	Master's degree	92	25.8%
	Doctor's degree	64	18.0%
	Other	14	3.9%
Green Real Estate Homeownership	Have not purchased any real estate	89	25.0%
	Purchased only regular real estate	136	38.2%
	Purchased only green real estate	28	7.9%
	Purchased both regular and green real estate	103	28.9%
Use of Green Real Estate	Have not used any real estate	8	2.2%
	Used only ordinary real estate	99	27.8%
	Used only green real estate	61	17.1%
	Used both regular and green real estate	188	52.8%

#### 4.2. Structural Equation Modeling (SEM)

SEM is a statistical approach employed to examine the interrelationships among variables by utilizing their covariance matrices. It utilizes a posteriori reasoning to formulate a model that resembles prior research findings. Once the model is established, its viability is assessed through an evaluation of its overall fit and the significance of individual paths within the model. Subsequently, the influence of independent variables on the dependent variable is systematically determined.

Before the empirical test, the structural equation model was constructed, and then AMOS 24.0 was used to perform the calculations using the maximum likelihood method to obtain Figure 2 and Table 7. The goodness of fit was tested according to the criteria of the previous studies [81]. The goodness-of-fit index quantifies the level of congruence between the postulated theoretical model and the empirical data. A higher goodness-of-fit score signifies a greater alignment between the theoretical model and the observed data, as articulated by Hatcher and O'Rourke in 2013 [82]. From Table 7, it can be seen that the CMIN/DF is 1.718, which is less than the standard of less than 3; the TLI and CFI are both above the standard of 0.9; and the RMSEA is 0.045, which is less than the standard of 0.08. The model fitting indexes satisfy the independent level of recommended fitting and the combination rule, so they have favorable fitting ability and excellent fitness.

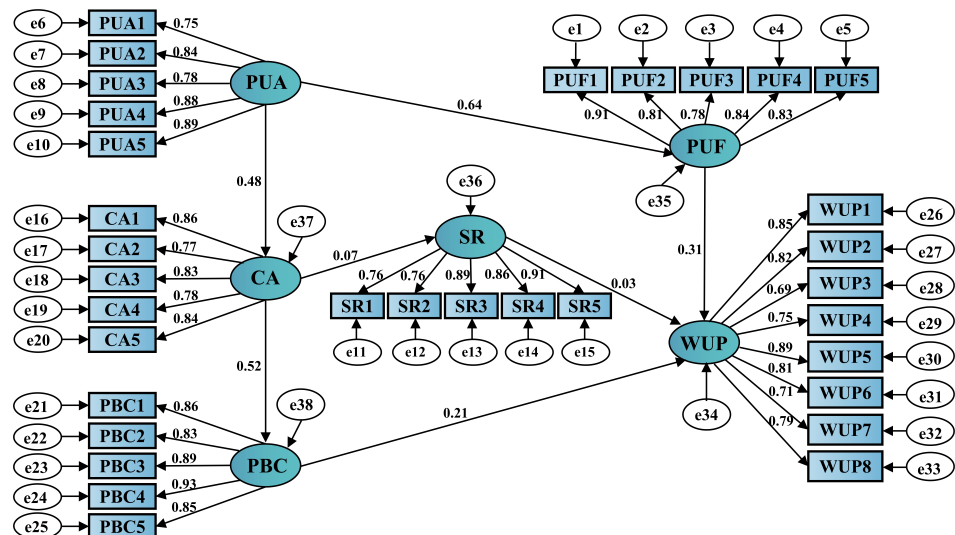


Figure 2. Structural equation modeling.

Table 7. Measurement model fit indices.

CMIN	DF	CMIN/DF	TLI	CFI	RMSEA
838.616	488	1.718	0.958	0.961	0.045

#### 4.3. Model Evaluation

Path coefficients represent standardized iterations of linear regression weights and are employed in SEM to explore potential causal connections among statistical variables [83]. Standardized path coefficients are computed by multiplying the cyclic coefficients with the standard deviations of the corresponding predictor variables, enabling comparisons to assess the relative impact of these variables within the regression model. Alongside standardized path coefficients, studies typically report the *p*-value for the path coefficient test to ascertain its statistical significance. From Table 8, it can be obtained that, in H1–H7, CA is not significant for SR ( $CR = 1.203$ ,  $p = 0.229 > 0.05$ ) and SR is not significant for WUP ( $CR = 0.61$ ,  $p = 0.542 > 0.05$ ). As a result, hypotheses H3 and H4 were not valid.

Comparatively, the other paths have  $p < 0.05$ , and the standardized path coefficients are positive. Thus, H1, H2, H5, H6, and H7 all have significant positive effects [84], and the hypothesis is valid.

**Table 8.** Path coefficients.

			STDEstimate	Estimate	S.E.	C.R.	<i>p</i>
CA	←	PUA	0.482	0.575	0.069	8.297	***
PUF	←	PUA	0.643	1.045	0.092	11.377	***
SR	←	CA	0.069	0.075	0.062	1.203	0.229
PBC	←	CA	0.523	0.663	0.069	9.575	***
WUP	←	PUF	0.314	0.231	0.04	5.735	***
WUP	←	SR	0.032	0.029	0.048	0.61	0.542
WUP	←	PBC	0.208	0.164	0.042	3.872	***

\*\*\*  $p < 0.001$ .

#### 4.4. Mediation Effect Test

This study systematically examined the mediating effect of perceived usability on perceived behavioral control by Asian users of green real estate projects using the bootstrap sampling method (Table 9). After 5000 iterations of sampling using the bootstrap sampling method, whether the 95% confidence interval of bias-corrected contained 0 was observed to determine whether the indirect effect was significant. Based on the results of the analysis, it can be seen that the value of the indirect effect of PUA on PBC through CA is 0.252, and the 95% confidence interval does not contain 0, indicating that CA as a mediating variable has a mediating effect in the relationship of PUA on PBC.

The obtained  $p$ -value of 0.000 falls below the conventional significance threshold of 0.05 for mediation effects, underscoring the statistical significance of the mediating effect, denoted as (PUA → CA → PBC) within this study. This underscores the central role played by the mediating variable (CA) in elucidating the association between the independent variable (PUA) and the dependent variable (PBC). Therefore, H8 is valid.

**Table 9.** Mediation effect test results.

	STD.Estimate	Lower	Upper	<i>p</i>
PUA → CA → PBC	0.252	0.180	0.327	0.000

#### 4.5. Hypothesis Verification

This study aims to establish a theoretical framework of the factors influencing users' willingness to pay for green real estate projects and to draw conclusions by identifying the key factors influencing users' willingness to pay for green real estate through structural equation modeling to provide reference design suggestions for future green real estate project development and design. In the validation analysis of the structural equation model and the experimental results, it was found that the relationship of the theoretical model based on the mechanism of influencing the users' willingness to pay for green real estate projects supported six out of eight hypotheses and did not have a significant positive effect on two hypotheses. The results are shown in Table 10.

This allows for the verification of H1, suggesting that Asian users' perceived usefulness of green real estate projects positively affects Asian users' willingness to pay for green real estate projects. H2 can also be validated to show that Asian users' perceived usability of green real estate projects positively affects the perceived usefulness of green real estate projects. H5 is also valid, which implies that Asian users' perceived behavioral control of green real estate projects positively affects Asian users' willingness to pay for green real estate projects. H6 can be validated to show that Asian users' perceived usability of green real estate projects positively affects consequence awareness of green real estate projects.



H7 is also valid, which means that Asian users' consequence awareness of green real estate projects positively affects perceived behavioral control of green real estate projects. H8 establishes that Asian users' perceived usability of green real estate projects has a mediating effect on perceived behavioral control, and consequence awareness serves as a mediating variable.

**Table 10.** Verification results of hypotheses.

Hypothesis	Content	Result
Hypothesis 1 (H1)	Asian users' perceived usefulness of green real estate projects positively affects Asian users' willingness to pay for green real estate projects.	Valid
Hypothesis 2 (H2)	Asian users' perceived usability of green real estate projects positively affects the perceived usefulness of green real estate projects.	Valid
Hypothesis 3 (H3)	Asian users' awareness of an environmental sense of responsibility positively influences Asian users' willingness to pay for green real estate projects.	Invalid
Hypothesis 4 (H4)	Asian users' consequence awareness of green real estate projects positively affects their sense of responsibility in green real estate projects.	Invalid
Hypothesis 5 (H5)	Asian users' perceived behavioral control of green real estate projects positively affects Asian users' willingness to pay for green real estate projects.	Valid
Hypothesis 6 (H6)	Asian users' perceived usability of green real estate projects positively affects consequence awareness of green real estate projects.	Valid
Hypothesis 7 (H7)	Asian users' consequence awareness of green real estate projects positively affects their perceived behavioral control of green real estate projects.	Valid
Hypothesis 8 (H8)	The perceived usability of green real estate projects by Asian users influences their perceived behavioral control through consequence awareness to create a mediating effect.	Valid

In contrast, H3 does not hold, indicating that awareness of environmental responsibility among Asian users does not have a positive influence on the willingness of Asian users to pay for green real estate projects. H4 is invalid, indicating that Asian users' awareness of the consequences of green real estate projects does not positively influence the accountability of green real estate projects.

Figure 2 shows that, among the key influencing factors, perceived usefulness is weighted more heavily, suggesting that Asian users value the long-term benefits to physical and mental health and experience when paying for green real estate projects. Real estate developers should thoroughly consider this factor. In addition, perceived behavioral control is another factor valued by Asian users, indicating that users are less likely to be influenced by external factors when paying for green real estate. Property developers should also take full advantage of this factor to realize the commercial sustainability value of green real estate projects.

## 5. Discussion

A growing body of research focuses on users' and potential users' perceptions, attitudes, and acceptance of green real estate and buildings. Nevertheless, few empirical studies have linked them to user motivation. To address this issue, this study focuses on the relationship between users' motivational factors (perceived usefulness, perceived usability, sense of responsibility, consequence awareness, and perceived behavioral control) and the quantitative relationship between users' intention to pay for green real estate design in Asia, with two main results. One result is that including perceived usefulness, perceived usability, and perceived behavioral control in the original TAM is meaningful in explaining users' attitudes toward green real estate and willingness to pay for green real estate. Another result is that, although consequence awareness, mediated by a sense of responsibility, does not correlate with users' willingness to pay for green real estate, consequence awareness

can be the basis for a correlation between perceived usability and perceived behavioral control. They can provide factor-specific theoretical and empirical support for the future promotion of green real estate projects in Asia.

Perceived usability and perceived usefulness are mutually reinforcing processes and critically impact Asian users' willingness to pay for green real estate. Specifically, after perceiving the usability features of a green real estate project, Asian users deepen their understanding of the features through experiential behaviors such as living, working, and visiting, resulting in the perception of usefulness. Similar to the findings of Alshurafat et al. [85], the results of this study imply that perceived usability and perceived usefulness are significant predictors of attitudes toward use and willingness to pay. As a result, Asian users are willing to pay for green real estate based on perceived usefulness, and this further generates the likelihood of action, which is consistent with previous research [86].

The role of perceived behavioral control on users' willingness to pay for green real estate in Asia was also emphasized. Based on the benefits and expectations of homeownership and rental use associated with a green real estate project, users will somewhat discount external factors, the most important of which is price. This is consistent with the results of the current study that users can accept the premium price of green real estate, usually in the range of 7–10% [87]. The arguments of this study are also consistent with other studies on the role of TPB in the willingness to invest in and use green projects [88]. In addition, based on perceived behavioral control, Asian users' willingness to pay for green real estate will be less affected by policies and recommendations. Portnov et al. even suggested that policy incentives for the paying population may produce emotional and opposing responses.

Comparatively, it is essential to note that the relationship between the sense of responsibility and the willingness of Asian users to pay for green real estate is not significant. Users' positive perceptions and attitudes towards a sense of responsibility do not necessarily lead to their willingness to pay for green initiatives in real estate projects. It has long been established that attitudes are weakly related to behavior when broad measures of attitudes are used to predict specific behaviors [89]. Indeed, the relationship between users' attitudes toward social responsibility and paying behavior is complex and depends on product quality, company motivations, and user characteristics [90,91]. Although Asian users may be willing to pay increased costs for green real estate, other factors come into play when paying for it, rather than being influenced by a sense of responsibility, which is in line with Li et al.'s [92] study.

Overall, the theory and its implications, as evidenced by the data results of this study, are threefold. Perceived usefulness and perceived behavioral control are the primary drivers of Asian users' attitudes toward paying behaviors in green real estate projects. This finding emphasizes the importance of these factors in shaping user preferences and choices. Perceived usability plays a crucial role, as it influences perceived usefulness. This highlights the significance of ensuring that green real estate projects are user-friendly and accessible to potential Asian users. Consequence awareness mediates between perceived usability and perceived behavioral control among Asian users. This nuanced finding provides a deeper understanding of how these factors interact and impact user decisions.

Furthermore, it needs to be explored that consequence awareness does not work for the sense of responsibility but does work for perceived behavioral control. It may be because consequence awareness is categorized into perceived consequences for the external environment and perceived consequences for oneself. However, perceived consequences for the external environment had less effect on the sense of responsibility. This corresponds with Howell's [93] suggestion that environmental values influence green consumption. In contrast, the perceived consequences of self have a strong stimulus on the personal will of Asian users, which can make Asian users reduce the possibility of being interfered with by external factors, thus promoting the formation of perceived behavioral control. Meanwhile, the source of perceived consequences is the perceived usability of Asian users based on their knowledge of the characteristics of green real estate projects.

## 6. Conclusions

Grounded in the theory of planned behavior (TPB), this investigation endeavors to elucidate the factors propelling users' willingness to remunerate for green real estate ventures in Asia. Employing a structured questionnaire administered to 356 individuals and subsequent analysis through structural equation modeling, this study discerns pivotal determinants affecting users' financial commitment, notably perceived usefulness, usability, behavioral control, and awareness of consequences. The findings illuminate the quintessential influence of perceived usefulness and behavioral control in molding payment-related attitudes, the foundational role of perceived usability in augmenting perceived usefulness, and the intermediary effects of perceived usability and awareness of consequences on behavioral control.

Moreover, the study furnishes targeted design and marketing stratagems for developers to captivate Asian clientele towards green real estate investments. Amidst a milieu of sustainable development and corporate metamorphoses within the real estate sector, the research underscores the necessity to transcend conventional energy conservation and eco-friendly practices. Instead, it advocates for integrating user-centric green innovations such as intelligent home systems and ecologically mindful interface designs. Furthermore, the strategic infusion of culturally resonant design elements, like Feng Shui or Vastu Shastra, is recognized as instrumental in augmenting project allure through a synthesis of effective communication and cultural reverence.

This study contributes to the field by presenting an empirical methodology to investigate users' motivation and willingness to pay for green real estate projects. The method combines established models, such as the TAM, with factors particularly relevant to green real estate. This approach ensures the study's theoretical framework is well-suited to the research questions. In addition to the academic contribution, the study provides practical implications by suggesting a reference design for future developers of green real estate projects targeting Asian users. This provides actionable insights from the theoretical framework and bridges the gap between academic research and practical applications in green real estate development.

Notwithstanding its insightful contributions to understanding the fiscal propensities towards green real estate in Asia, the study acknowledges limitations in its scope: primarily, its focus on a subset of users either with or contemplating green investments does not encapsulate the entire spectrum of potential users. Future inquiries should endeavor to widen the ambit of investigation, delving into a more heterogeneous array of demographics and locales to enrich the comprehension of user willingness to pay. This expansion will enhance the research's relevance and transferability. Additionally, the reliance on cross-sectional data prompts a call for future studies to harness financial disclosures of publicly traded entities, stock data, and national panel statistics to perpetuate and deepen the investigative narrative. Through such an enriched lens, a more nuanced appreciation of the global tendencies and preferences in green real estate can be achieved, furthering the quest for sustainable development.

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## Appendix A. Questionnaire

Questionnaire on Mechanisms Influencing User Willingness to Pay for Green Real Estate Design in Asia.

### The Purpose of This Research

The purpose of this study is to assess the impact of user motivation and intention to pay for green real estate design in Asia and to examine whether purchase intention affects their willingness to purchase these real estate projects. The target respondents of this questionnaire are mainly those who have paid or are considering paying for green real estate projects in Asia to use them in the long term. This study aims to sample 450 people of different backgrounds. It is up to you to decide whether to participate or not. You can withdraw your participation at any time without giving any reason or facing any negative consequences.

### Confidentiality

All the information that I collect about you during the course of the research will be kept strictly confidential and will only be accessible to my supervisor and assessors of the dissertation. Once you have given consent, any personal data to represent your credibility as a source will be anonymized. Personal data will be held securely for the duration of this research project and destroyed once the dissertation has been assessed.

1. Have you read the consent form and are willing to continue to participate in the questionnaire?

Yes or no.

Before starting the questionnaire, please answer the following guiding questions:

2. Have you paid for or are you considering paying for a green real estate project and using it for the long term in Asia?
  - Yes, please continue to answer the following questionnaire.
  - No, you have finished the questionnaire.

Questionnaire on Mechanisms Influencing User Willingness to Pay for Green Real Estate in Asia							
<b>Personal Basic Information</b>	<b>Items</b>	<b>Options</b>					
	Gender	1	Male			<input type="radio"/>	
		2	Female			<input type="radio"/>	
	Age	1	18-29			<input type="radio"/>	
		2	30-39			<input type="radio"/>	
		3	40-49			<input type="radio"/>	
		4	50-59			<input type="radio"/>	
		5	60 years and over			<input type="radio"/>	
	Educational Background	1	High School Diploma			<input type="radio"/>	
		2	Bachelor degree			<input type="radio"/>	
		3	Master's degree			<input type="radio"/>	
		4	Doctor's degree			<input type="radio"/>	
		5	Other			<input type="radio"/>	
	Green Real Estate Homeownership	1	Have not purchased any real estate			<input type="radio"/>	
		2	Purchased only regular real estate			<input type="radio"/>	
		3	Purchased only green real estate			<input type="radio"/>	
		4	Purchased both regular and green real estate			<input type="radio"/>	
Use of Green Real Estate	1	Have not used any real estate			<input type="radio"/>		
	2	Used only ordinary real estate			<input type="radio"/>		
	3	Used only green real estate			<input type="radio"/>		
	4	Used both regular and green real estate			<input type="radio"/>		
<b>Category</b>	<b>Measurement items</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Willingness of Users to Pay	WUP1	I would like to buy or rent a green real estate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	WUP2	I would definitely buy or rent a green real estate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	WUP3	I would make an effort to buy or rent green real estate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	WUP4	I want to work or live in a green real estate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	WUP5	I think it is the right choice to buy or rent a green real estate instead of a regular one.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	WUP6	I'm willing to raise my budget for green real estate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	WUP7	I no longer consider paying for regular real estate as opposed to green real estate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	WUP8	I hope to convince family and friends to buy or rent green real estate as well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Perceived Usefulness	PUF1	I think buying or renting green real estate is good for my health.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	PUF2	I think buying or renting green real estate improves my quality of life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	PUF3	I think green real estate is more comfortable to experience than regular real estate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	PUF4	I think buying or renting green real estate can help me save money on energy consumption.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	PUF5	I think the user experience of green real estate was an important factor in my choosing it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Perceived Usability	PUA1	I think buying or renting a green real estate allows access to better environmental amenities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	PUA2	I think buying or renting a green real estate allows me to enjoy better natural light and ventilation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	PUA3	I think buying or renting green real estate allows for	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



		better control of environmental conditions and exposure to outdoor sounds.					
	PUA4	I think buying or renting green real estate reduces exposure to harmful building materials.	○	○	○	○	○
	PUA5	I think the internal characteristics of green real estate were an important factor in my choosing it.	○	○	○	○	○
Sense of Responsibility	SR1	I think buying or renting a green real estate allows you to be responsible for your surroundings.	○	○	○	○	○
	SR2	I believe that buying or renting green real estate can contribute to the sustainability of society	○	○	○	○	○
	SR3	I think buying or renting a green real estate allows me to be a neighbor to people who are equally responsible.	○	○	○	○	○
	SR4	I would like to be involved in any project on environmental and social responsibility.	○	○	○	○	○
	SR5	My knowledge and awareness of the need to protect the environment has led me to choose to buy or rent a green real estate.	○	○	○	○	○
Consequences Awareness	CA1	I think green real estate has greater appreciation than regular real estate.	○	○	○	○	○
	CA2	I think green real estate has more long-term residential value than regular real estate.	○	○	○	○	○
	CA3	I believe that health and productivity levels are enhanced by living and working in a green real estate.	○	○	○	○	○
	CA4	I think green real estate offers a higher return on investment than regular real estate.	○	○	○	○	○
	CA5	I think buying or renting green real estate can bring long-term meaning and value to my life.	○	○	○	○	○
Perceived Behavioral Control	PBC1	I can accept a premium over regular real estate for the same level of green real estate.	○	○	○	○	○
	PBC2	Accept that lowering the requirements for amenities and lots surrounding a green real estate project is acceptable.	○	○	○	○	○
	PBC3	It is acceptable to reduce the requirements for internal factors such as house types for green real estate projects.	○	○	○	○	○
	PBC4	I don't think buying or renting green real estate will be influenced by what others recommend or discourage.	○	○	○	○	○
	PBC5	I don't think buying or renting a green real estate property will be influenced by social views and policies.	○	○	○	○	○
(1: strongly disagree, 2: disagree, 3: neither agree nor disagree, 4: agree and 5: strongly agree)							

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