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**THE MECHANISM UNDERLYING GREEN HOUSING
PURCHASE BEHAVIOR IN HO CHI MINH CITY: THE MEDIATING ROLE
OF ATTITUDE AND THE MODERATING ROLE OF PRICE CONSCIOUSNESS**

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The Mechanism Underlying Green Housing Purchase Behavior in Ho Chi Minh City: The Mediating Role of Attitude and the Moderating Role of Price Consciousness

Abstract

In the context of sustainable urban development and the rapid growth of green buildings in Vietnam, understanding the mechanism underlying green housing purchase behavior is important to both consumer behavior theory and the practical development of the green real estate market. The literature review identifies three interrelated groups of research gaps. Theoretically, the Theory of Planned Behavior (TPB) explains the proximal antecedents of intention well but does not fully clarify the antecedent layer through which attitude is formed or the conditions that may alter the extent to which attitude is translated into intention. Empirically, many studies stop at purchase intention; evidence on realized purchase behavior, the mediating role of attitude, serial indirect-effect chains, and the moderating role of price consciousness remains limited. Contextually, relatively few studies have simultaneously tested these mechanisms among individuals in Vietnam—particularly in Ho Chi Minh City—who have purchased or signed a contract to purchase green housing.

Against this background, the dissertation develops and tests a model that combines the relational logic of TPB with the hierarchical logic of the Value–Attitude–Behavior (VAB) theory. Environmental concern and environmental self-identity are treated as generalized psychological antecedents associated with attitude and intention; attitude, subjective norm, and perceived behavioral control are examined in relation to intention; and intention is treated as the proximal antecedent of purchase behavior. The dissertation also tests the mediating role of attitude, serial indirect effects through attitude and intention, and the moderating role of price consciousness in the relationship between attitude and intention. Price consciousness is understood in the sense of the price consciousness construct—the tendency to pay close attention to, search for, and compare prices in order to obtain a lower price—and is distinguished from affordability, willingness to pay a premium, and perceived value.

The study adopts a predominantly quantitative design, supported by a qualitative stage to review the model and refine the measurement instrument. Semi-structured interviews were conducted with 15 experts, followed by five focus group discussions with individuals who had purchased or signed a contract to purchase green housing. The preliminary quantitative study used 179 valid observations; this was the post-screening sample and exceeded the minimum of 175 observations under the 5:1 ratio for 35 observed variables. Cronbach's Alpha and exploratory factor analysis (EFA) led to the removal of indicator PC5, leaving 34 indicators. In the main survey, 442 questionnaires were distributed, 418 responses were received, and 400 valid observations remained after screening; this exceeded the minimum of 340 observations based on 10 observations per measurement item. Respondents were at least 25 years old, had a monthly household income of at least VND 20 million, had purchased or signed a contract to purchase a green apartment in Ho Chi Minh City, and were the sole or joint decision-maker in the transaction. Data were analyzed using partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4 with an explanatory–predictive orientation, including assessment of the measurement model, structural model, R^2 , f^2 , PLSpredict, direct and indirect effects, serial mediation, moderation, MICOM, and permutation-based multi-group analysis (MGA) by gender.

The results show that environmental concern and environmental self-identity are positively related to attitude and green housing purchase intention; attitude, subjective norm, and perceived behavioral control are also positively related to intention. Intention has a strong positive relationship with green housing purchase behavior ($\beta = 0.576$; $f^2 = 0.496$). The model explains 36.7% of the variance in attitude, 70.5% of the variance in intention, and 33.1% of the variance in behavior. The two serial paths $EC \rightarrow AT \rightarrow GPI \rightarrow GPB$ ($\beta = 0.065$) and $ESI \rightarrow AT \rightarrow GPI \rightarrow GPB$ ($\beta = 0.050$) are statistically significant, thereby clarifying the mechanism through which environmental orientations are translated into behavior. Price consciousness has no statistically significant direct relationship with intention and virtually no unique effect size ($f^2 = 0.001$), whereas the $PC \times AT$ interaction is negative ($\beta = -0.259$; $f^2 = 0.219$), indicating that the greater the emphasis on price, the weaker the positive relationship between attitude and intention. PLSpredict indicates out-of-sample predictive relevance for attitude, intention, and behavior; multi-group analysis after establishing full measurement invariance found no statistically significant differences between men and women.

Theoretically, the study does not propose a new theory; rather, it extends the application of the integrated TPB–VAB model to green housing purchase decisions characterized by high financial value, long deliberation periods, and multiple resource constraints. The study clarifies the environmental antecedent layer of attitude, extends the explanatory scope from intention to realized purchase behavior, and identifies price consciousness as a boundary condition in the translation of attitude into intention. Methodologically, the value of the study lies in selecting participants who had already completed or committed to a transaction, measuring intention retrospectively with reference to the pre-transaction point and behavior through self-reports of realized transactions, and combining scale refinement with model assessment spanning measurement, explanation, prediction, and group comparison. Practically, the findings provide a basis for developers, financial institutions, government authorities, certification organizations, and buyers to improve the transparency of information, certification, prices, and ownership costs; strengthen consumers' perceived control over the decision; leverage social influence; and support the translation of intention into purchase behavior.

Keywords: green housing; green housing purchase intention; green housing purchase behavior; TPB; VAB; price consciousness.

1. GENERAL INTRODUCTION TO THE DISSERTATION

1.1. Rationale for choosing the research topic

The buildings and construction sector plays an important role in socio-economic development but also consumes substantial energy and resources and generates considerable emissions. According to GlobalABC and UNEP (2024), the sector accounts for approximately 32% of global energy demand and 34% of CO₂ emissions related to energy and industrial processes. Greening building construction and operation is therefore an important component of the transition toward sustainable development.

In this context, green buildings and green housing are regarded as solutions that promote the efficient use of energy, water, and materials, reduce adverse environmental impacts, and improve quality of life. Green housing is not synonymous with housing that simply has abundant greenery; rather, it is associated with verifiable technical, operational, and certification criteria. Systems such as EDGE, LEED, and LOTUS provide a basis for assessing green attributes while helping reduce information asymmetry between developers and buyers.

Vietnam's green building market has grown rapidly in recent years. The expansion of supply makes it possible to extend research from the question of whether consumers intend to purchase to the question of how intention is formed and translated into purchase behavior. This issue is particularly important for housing because purchase decisions involve high value, long-term commitment, limited reversibility, and are simultaneously shaped by financial resources, credit, legal conditions, supply, selling prices, and information transparency.

Ho Chi Minh City was selected because it has a large real estate market, a substantial concentration of green buildings, and provides access to individuals who have directly experienced the green housing selection and transaction process. However, selecting this location does not imply that the findings automatically represent the entire Vietnamese market; the findings are interpreted primarily within the study context and require further testing in comparable markets.

From an academic perspective, the review identifies three groups of gaps. First, the theoretical gap concerns the antecedent layer of attitude and the boundary conditions of the attitude–intention relationship. TPB establishes attitude, subjective norm, and perceived behavioral control as direct antecedents of intention, but it does not specifically define environmental concern and environmental self-identity as distinct antecedents of attitude. The logic of VAB helps add this explanatory layer. At the same time, for a high-cost decision, the degree of emphasis placed on price may alter the extent to which a favorable attitude is translated into intention.

Second, the empirical gap is reflected in the fact that most green housing studies remain focused on intention, whereas realized purchase behavior has been tested less frequently. Evidence on the mediating role of attitude, serial indirect-effect chains from environmental orientations to behavior, and the moderating role of price consciousness is also inconsistent. Third, the contextual gap lies in the limited simultaneous testing of these mechanisms among individuals in Vietnam who have purchased or signed a contract to purchase green housing. These three groups of gaps directly underpin the research objectives, questions, and model.

1.2. Research objectives and research questions

1.2.1. Research objectives

The overall objective of the dissertation is to develop and test a model that combines the relational logic of TPB with the hierarchical logic of VAB in order to clarify the mechanism underlying green housing purchase intention and behavior among individuals who have purchased or signed a contract to purchase green housing in Ho Chi Minh City. The study also examines the mediating role of attitude, serial indirect relationships through attitude and intention, and the moderating role of price consciousness in the relationship between attitude and purchase intention.

1. To assess the direction and strength of the relationships of attitude, subjective norm, and perceived behavioral control with green housing purchase intention.
2. To assess the relationships of environmental concern and environmental self-identity with attitude and green housing purchase intention, while testing the mediating role of attitude and serial indirect effects on behavior.
3. To test the moderating role of price consciousness in the relationship between attitude and green housing purchase intention.

4. To assess the relationship between intention and green housing purchase behavior; examine the model's explanatory and predictive ability and gender-group differences; and, on that basis, propose managerial implications and directions for future research.

1.2.2. Research questions

- (1) How are attitude, subjective norm, and perceived behavioral control related to green housing purchase intention?
- (2) How are environmental concern and environmental self-identity related to attitude and intention, and does attitude mediate these relationships?
- (3) Does price consciousness change the strength of the relationship between attitude and green housing purchase intention?
- (4) How is intention related to green housing purchase behavior, and to what extent does the model demonstrate explanatory and predictive ability and stability across men and women?

1.3. Research focus and scope

The study focuses on the relationships involved in the mechanism underlying green housing purchase intention and behavior, including environmental concern (EC), environmental self-identity (ESI), attitude (AT), subjective norm (SN), perceived behavioral control (PBC), price consciousness (PC), green housing purchase intention (GPI), and green housing purchase behavior (GPB).

Participants in the main survey were individuals aged 25 or older with a monthly household income of at least VND 20 million. They had purchased or signed a contract to purchase an apartment in Ho Chi Minh City within a project certified under LEED, LOTUS, EDGE, an equivalent certification, or officially declared to meet green housing criteria. Respondents had to be the sole decision-maker or a joint decision-maker in the selection and purchase process. These conditions were verified through screening questions at the beginning of the questionnaire.

The geographical scope of the study is Ho Chi Minh City. The study uses cross-sectional, self-reported data; intention is measured retrospectively with reference to the time before contract signing, whereas behavior reflects a transaction that had already occurred. Accordingly, the findings are interpreted as statistical relationships consistent with the theoretical model and not as definitive evidence of causal relationships.

1.4. Research methods

Quantitative research is the primary method. The qualitative stage serves only a supporting role in reviewing construct content, the model, hypotheses, and the wording of the measurement scales; it is not intended to test hypotheses. Semi-structured interviews were conducted with 15 experts, including industry practitioners and researchers. These were followed by five focus group discussions, each with six participants who had purchased or signed a contract to purchase green housing, to assess the clarity and contextual appropriateness of the questionnaire.

The preliminary quantitative study was planned with a minimum sample size of 175 observations based on a 5:1 ratio for 35 observed variables. In practice, 208 questionnaires were distributed, 185 were returned, and 179 valid questionnaires remained after screening. Thus, $N = 179$ is the actual post-screening sample size rather than an arbitrarily selected figure. Cronbach's Alpha and EFA showed that PC5 had a negative item-total correlation even after reverse coding and was therefore removed; the remaining 34 observed variables were retained for the main study.

The main-study sample size was determined on the basis of 34 observed variables, using a ratio of 10 observations per measurement item, corresponding to a minimum of 340 observations. The study distributed 442 questionnaires, received 418 responses, excluded 18 responses that did not meet the requirements, and used 400 valid observations. ESI3, ESI4, PC1, PC3, and PC4 were reverse-worded items and were reverse-coded before analysis so that higher scores consistently reflected higher levels of the corresponding constructs.

PLS-SEM was not selected because of a small sample size. With 400 observations, the principal reason was the study's explanatory–predictive objective: assessing the R^2 of endogenous variables, f^2 effect sizes, out-of-sample predictive performance using PLSpredict, and simultaneously testing direct, indirect, serial mediation, and moderating relationships. Covariance-based structural equation modeling (CB-SEM) is generally more appropriate when the primary objective is confirmatory testing of an established theoretical model based on the covariance structure, whereas PLS-SEM is appropriate for the dissertation's emphasis on explained variance and prediction.

1.5. Contributions of the dissertation

1.5.1. Theoretical contributions

The theoretical contribution does not lie in proposing a new theory, but in applying and extending the explanatory logic of TPB and VAB to green housing purchase decisions—decisions characterized by high financial value, long deliberation periods, and multiple resource constraints. Integrating the two logics connects the environmental-orientation layer with the formation of attitude, intention, and behavior.

The dissertation clarifies that environmental concern and environmental self-identity may be related to attitude while also maintaining direct relationships with intention. It thereby extends the explanatory scope toward antecedents of attitude without equating these two constructs with “values” in the original sense of VAB. The model also extends the analysis from intention to realized purchase behavior and tests the two serial chains $EC/ESI \rightarrow AT \rightarrow GPI \rightarrow GPB$.

Another important contribution is the identification of price consciousness as a boundary condition of the attitude–intention relationship. Price consciousness does not operate as an independent antecedent with a meaningful relationship with intention; instead, it primarily changes the strength of the relationship between attitude and intention. This result helps explain why a favorable evaluation of green housing does not necessarily translate into strong intention in a high-investment-cost decision.

1.5.2. Methodological contribution

The methodological contribution lies first in selecting individuals who had purchased or signed a contract to purchase green housing rather than surveying only those with purchase intentions. Within the same participant group, intention was measured retrospectively with reference to the point immediately before the transaction, whereas behavior reflected realized choices and actions reported by respondents. This design preserves a temporal distinction between intention and behavior within a cross-sectional study.

The adapted measurement scales were refined through expert interviews, focus group discussions, and a preliminary quantitative study before formal testing. The PLS-SEM procedure progressed from assessment of the measurement model and structural model to explanatory ability, effect sizes, out-of-sample prediction, measurement invariance, and multi-group analysis, providing a relatively comprehensive analytical sequence.

1.5.3. Practical contributions

The findings provide a basis of reference for real estate developers and distributors, financial institutions, government authorities, certification organizations, and buyers. For businesses, broad “green” messages should be translated into specific, verifiable evidence on energy and water efficiency, living-environment quality, operating costs, legal status, and certification, while also supporting consumers who have already formed an intention in completing the transaction.

The moderating role of price consciousness indicates that pricing implications should not be interpreted simply as lowering prices to directly increase intention. The focus should instead be on transparency regarding selling prices, total cost of ownership, and long-term benefits so as to limit the extent to which excessive emphasis on low prices weakens the translation of a favorable attitude into intention.

For buyers, the findings emphasize the need to jointly assess the initial price, total cost of ownership, long-term benefits, financial capacity, legal status, certification, and the reliability of information about green attributes. For government authorities and certification organizations, greater transparency, verifiability, and ease of interpretation of certification criteria are needed.

1.6. Structure of the dissertation

The dissertation consists of five chapters:

- Chapter 1: Research Overview;
- Chapter 2: Theoretical Background and Research Model;
- Chapter 3: Research Design;
- Chapter 4: Research Findings;
- Chapter 5: Conclusions and Managerial Implications.

2. THEORETICAL BACKGROUND AND LITERATURE REVIEW ON THE FORMATION OF GREEN HOUSING PURCHASE BEHAVIOR

2.1. Basic concepts related to the research

Green housing refers to housing that is designed, constructed, and operated to use energy, water, materials, and other resources efficiently; reduce adverse environmental impacts; and improve residents’ health, comfort, and quality of life. The concept should be associated with verifiable technical, operational, or certification criteria and should not be equated with the simplistic notion of housing with abundant greenery.

Green housing purchase behavior reflects realized choices and transactions, such as having purchased or signed a contract to purchase an apartment that meets green housing criteria. Green housing purchase intention reflects the extent of consumers’ intention, willingness, and plans to select green housing before the transaction. Measuring both intention and behavior extends the analysis beyond intention and enables examination of the process through which intention is translated into action.

Attitude refers to a favorable or unfavorable evaluation of purchasing green housing. Subjective norm reflects perceived pressure or support from family members, relatives, and reference groups. Perceived behavioral control reflects the extent to which an individual feels that the purchase decision is feasible and within his or her control. Environmental concern reflects the extent to which an individual pays attention to and is concerned about environmental issues; environmental self-identity reflects the extent to which an individual views an environmentally friendly lifestyle as part of his or her self-identity.

Price consciousness is operationalized using the price consciousness construct, which reflects a tendency to prioritize low prices and to search for and compare prices in order to save costs. This construct is distinct from affordability, overall financial resources, willingness to pay a premium, and perceived value. This distinction is particularly important when interpreting the moderating role of price consciousness in a high-value transaction such as a housing purchase.

2.2. Theoretical foundations and basis for TPB–VAB integration

Ajzen's (1991) Theory of Planned Behavior (TPB) holds that intention is formed by attitude, subjective norm, and perceived behavioral control, and that intention is the most proximal antecedent of behavior. This framework is well suited to explaining factors proximal to intention, but it does not specifically define environmental concern and environmental self-identity as distinct antecedents of attitude.

The Value–Attitude–Behavior (VAB) theory of Homer and Kahle (1988) provides a hierarchical logic in which more general orientations may be related to behavior through attitude. The dissertation applies this logic by treating environmental concern and environmental self-identity as generalized psychological antecedents associated with attitude, without equating them with values in the original sense of VAB.

Integrating TPB and VAB therefore permits a multi-layered explanation: environmental orientations are related to attitude; attitude, together with subjective norm and perceived behavioral control, is related to intention; and intention is related to behavior. The dissertation does not specify direct PBC → AT or SN → AT paths in order to preserve the core structure of TPB, in which PBC and SN are direct antecedents of intention; the antecedent layer of attitude is extended according to VAB logic through EC and ESI.

2.3. Literature review and main research approaches

A bibliometric analysis for the 2021–2025 period shows that TPB, attitude, purchase intention, purchase behavior, and green buildings are central topics. Research on green housing and sustainable consumption can be summarized into three main approaches: explaining intention through TPB constructs; extending the model with environmental factors, identity, values, and economic conditions; and examining the intention–behavior gap.

Previous studies generally report that attitude, subjective norm, and perceived behavioral control are related to green product purchase intention. Environmental concern and environmental self-identity may be directly related to intention or indirectly related to it through attitude, although the strength and mechanisms are not fully consistent across contexts. Regarding price consciousness, previous studies often treat price or price perceptions as barriers or direct factors; evidence treating price consciousness as a moderator of the attitude–intention relationship in the green housing context remains limited.

2.4. Research gaps

The theoretical gap centers on two issues. First, TPB does not clearly establish the generalized psychological antecedent layer of attitude; environmental concern and environmental self-identity therefore need to be incorporated into a structure integrated with VAB. Second, the attitude–intention relationship may vary under economic conditions, yet price consciousness has not been adequately tested as a boundary condition in the green housing purchase context.

The empirical gap is reflected in the fact that many studies still treat intention as the final outcome variable. Evidence on realized purchase behavior, the mediating role of attitude, the EC/ESI → AT →

GPI → GPB serial paths, and the downstream transmission of the moderation mechanism through intention to behavior remains limited. The dissertation therefore simultaneously tests direct, indirect, serial mediation, and moderating relationships.

The contextual gap concerns individuals who have actually participated in green housing transactions in Vietnam. Behavioral relationships observed in other markets do not necessarily occur with the same magnitude under Vietnamese conditions, where income, credit, affordability, supply, and information transparency have distinctive characteristics. Ho Chi Minh City is used as a specific testing context, not as a basis for claiming statistical representativeness for the entire country.

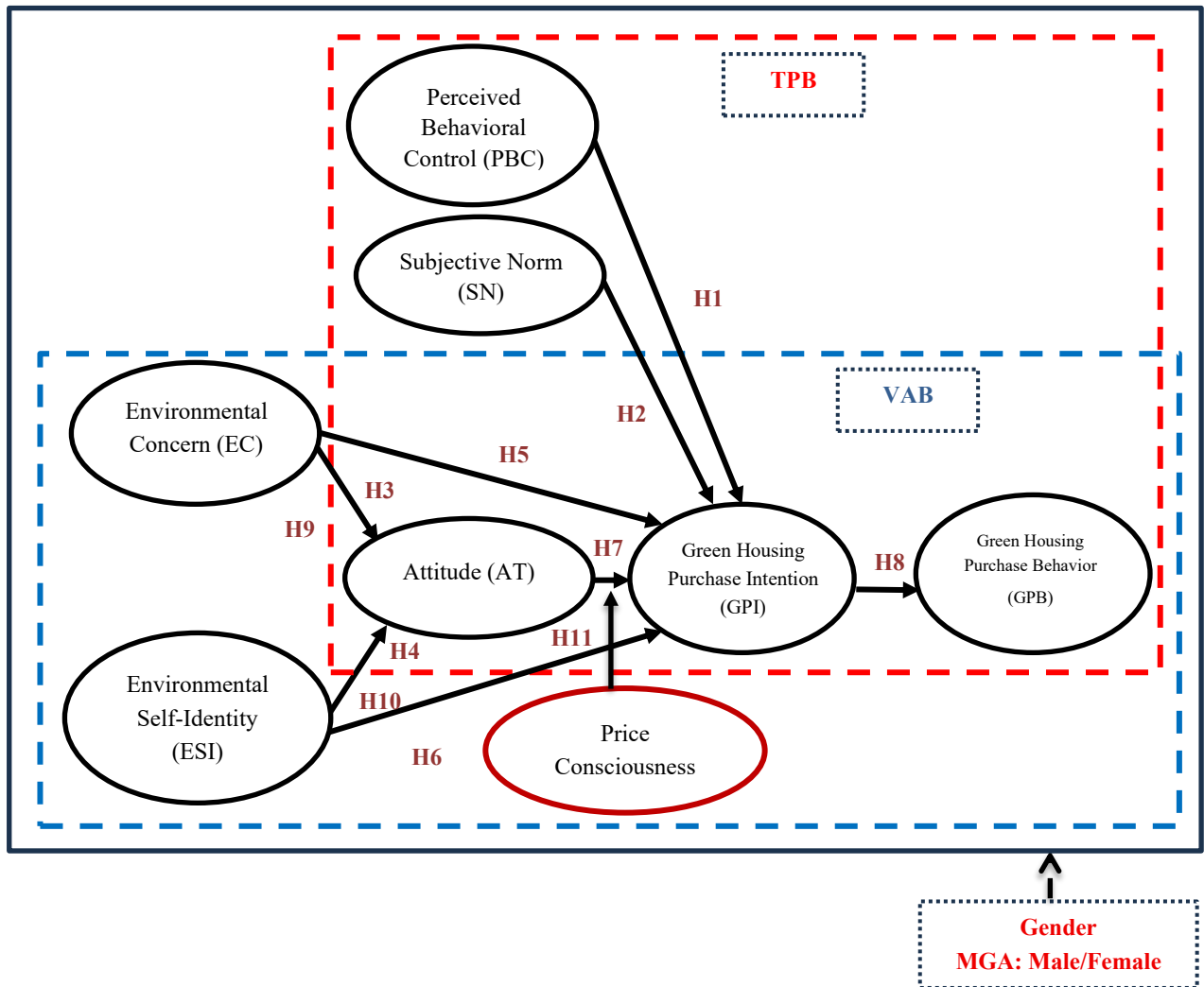


Figure 2.1. Conceptual Research Model

2.5. Research model and hypotheses

H1: Perceived behavioral control is positively related to green housing purchase intention.

H2: Subjective norm is positively related to green housing purchase intention.

H3: Environmental concern is positively related to attitude toward green housing.

H4: Environmental self-identity is positively related to attitude toward green housing.

H5: Environmental concern is positively related to green housing purchase intention.

H6: Environmental self-identity is positively related to green housing purchase intention.

H7: Attitude toward green housing is positively related to green housing purchase intention.

H8: Green housing purchase intention is positively related to green housing purchase behavior.

H9: Attitude and intention form a serial mediation chain in the relationship $EC \rightarrow AT \rightarrow GPI \rightarrow GPB$.

H10: Attitude and intention form a serial mediation chain in the relationship $ESI \rightarrow AT \rightarrow GPI \rightarrow GPB$.

H11: Price consciousness weakens the positive relationship between attitude and green housing purchase intention.

3. RESEARCH METHODOLOGY

3.1. Research process

The research process comprised the following steps: synthesizing relevant theories and prior studies; identifying research gaps, objectives, and the model; developing the preliminary measurement scales; conducting qualitative research to review the model and refine the scales; conducting the preliminary quantitative study; conducting the main quantitative study; assessing the measurement model and structural model; testing direct, indirect, mediating, moderating, and predictive relationships and conducting multi-group analysis; and finally discussing the findings, drawing conclusions, and proposing implications.

3.2. Supporting qualitative research

3.2.1. Expert interviews

Semi-structured interviews were conducted with 15 experts, including industry practitioners in real estate and green buildings as well as researchers. The interviews focused on the appropriateness of the constructs, relationships in the model, respondent selection criteria, and the translation and wording of the measurement scales for the housing purchase context. This stage did not test hypotheses; rather, it was intended to enhance content validity and the contextual appropriateness of the instrument.

3.2.2. Focus group discussions

Five focus group discussions were conducted, each involving six participants who had purchased or signed a contract to purchase green housing. Their views were used to assess the clarity and comprehensibility of the questions, the appropriateness of the question context, and respondents' ability to recall the pre-transaction point. The qualitative findings retained all eight research constructs and resulted in a questionnaire containing 35 observed variables.

3.2.3. Treatment of reverse-worded indicators

Several indicators of environmental self-identity and price consciousness were negatively worded. ESI3, ESI4, PC1, PC3, and PC4 were explicitly identified as reverse-worded indicators and were reverse-coded before reliability and model assessment. PC5 was removed in the preliminary stage after reverse coding because it still had a negative item-total correlation and reduced the internal consistency of the scale; thus, its removal was not due to an omitted reverse-coding procedure.

3.3. Quantitative research

3.3.1. Preliminary quantitative study

The preliminary sample size was planned according to the requirements of EFA, using a minimum ratio of five observations per measurement item. With 35 observed variables, the minimum sample size was 175. The study distributed 208 questionnaires, received 185, and retained 179 valid observations after screening. The scales were assessed using Cronbach's Alpha and EFA. After PC5 was removed, 34

indicators across eight constructs were retained; the KMO value was 0.690, Bartlett's test had $p < 0.001$, total variance explained was 64.336%, and factor loadings ranged from 0.658 to 0.871.

3.3.2. Main quantitative study

Following the preliminary study, the main questionnaire contained 34 observed variables. Based on a ratio of 10 observations per measurement item, the minimum sample size was 340. The study distributed 442 questionnaires and received 418 responses. After checking compliance with sample criteria, missing data, response consistency, and indications of inattentive responding, 18 responses were excluded, leaving 400 valid observations for analysis.

Convenience sampling combined with purposive sampling was used. The screening questions required respondents to be at least 25 years old; have a monthly household income of at least VND 20 million; have purchased or signed a contract to purchase housing in Ho Chi Minh City; have purchased within a project certified or officially declared to meet green housing criteria; and be the sole or joint decision-maker in the selection and purchase process.

3.4. Data analysis methods

Data were analyzed using SmartPLS 4. The reflective measurement model was assessed through outer loadings, Cronbach's Alpha, composite reliability, average variance extracted (AVE), and the heterotrait–monotrait ratio (HTMT); the Fornell–Larcker criterion was used as supplementary evidence of discriminant validity. Common method bias was assessed using full collinearity VIF, with no value exceeding the threshold of 3.3.

The structural model was assessed using inner VIF, R^2 , f^2 , and bootstrapping. Indirect effects and the two serial mediation chains were tested using bootstrap procedures. The moderating role of price consciousness was assessed through the $PC \times AT$ interaction term and a simple slope plot. Out-of-sample predictive performance was evaluated using PLSpredict. Before multi-group analysis, MICOM was conducted to assess measurement invariance; after invariance was established, permutation-based MGA with 5,000 permutations was used to compare the male and female groups.

4. RESEARCH RESULTS

4.1. Sample characteristics

The final sample comprised 400 respondents, including 195 men (48.8%) and 205 women (51.2%). The 35–44 age group accounted for the largest share (35.3%), followed by the 25–34 age group (30.2%). Most respondents had a monthly household income from VND 40 million to under VND 100 million; 64.0% held a university degree and 28.2% held a postgraduate degree. The sample composition reflects individuals likely to participate directly in green apartment purchase decisions; however, because non-probability sampling was used, the findings are not statistically representative of all green housing buyers in Ho Chi Minh City.

4.2. Measurement model assessment results

The results show that the measurement scales meet the requirements for reliability, convergent validity, and discriminant validity. Outer loadings, Cronbach's Alpha, composite reliability, and AVE met the acceptable thresholds; HTMT and the Fornell–Larcker criterion indicated adequate discriminant validity among the constructs. Full collinearity VIF values ranged from 1.087 to 3.010, all below 3.3, indicating that common method bias was not a serious concern.

4.3. Structural model assessment results

4.3.1. Coefficients of determination and predictive performance

Endogenous Variable	R ²	Adjusted R ²
AT	0.367	0.363
GPI	0.705	0.700
GPB	0.331	0.330

The model explains 36.7% of the variance in attitude, 70.5% of the variance in intention, and 33.1% of the variance in behavior. PLSpredict results show that Q²predict for all three endogenous variables is greater than zero (AT = 0.354; GPI = 0.615; GPB = 0.276), indicating out-of-sample predictive relevance. Predictive performance is strongest for intention; behavior is more difficult to predict, consistent with the fact that transactions also depend on resource and market conditions outside the model.

4.3.2. Direct relationship testing results

Hypothesis	Relationship	β	P-value	Conclusion
H1	PBC $\rightarrow$ GPI	0.255	< 0.001	Supported
H2	SN $\rightarrow$ GPI	0.248	< 0.001	Supported
H3	EC $\rightarrow$ AT	0.457	< 0.001	Supported
H4	ESI $\rightarrow$ AT	0.355	< 0.001	Supported
H5	EC $\rightarrow$ GPI	0.344	< 0.001	Supported
H6	ESI $\rightarrow$ GPI	0.248	< 0.001	Supported
H7	AT $\rightarrow$ GPI	0.247	< 0.001	Supported
H8	GPI $\rightarrow$ GPB	0.576	< 0.001	Supported

All eight direct relationships have positive coefficients and are statistically significant. Environmental concern has the largest coefficient for attitude ($\beta = 0.457$) and a substantial direct relationship with intention ($\beta = 0.344$). Intention has the largest coefficient in relation to behavior ($\beta = 0.576$).

4.3.3. Indirect effect and serial mediation testing results

Bootstrap results show that attitude serves as a complementary mediator in the relationships from environmental concern and environmental self-identity to intention. At the same time, intention serves as the central mediator between the antecedents and behavior. Both serial mediation chains, H9 and H10, are statistically significant.

Hypothesis	Serial Path	β	P-value	Conclusion
H9	EC $\rightarrow$ AT $\rightarrow$ GPI $\rightarrow$ GPB	0.065	< 0.001	Supported
H10	ESI $\rightarrow$ AT $\rightarrow$ GPI $\rightarrow$ GPB	0.050	< 0.001	Supported

The results indicate that environmental orientations are not automatically translated into behavior. They need to be expressed as favorable attitudes, then as intention, and finally as purchase behavior. This clarifies the multi-layered mechanism of the integrated TPB–VAB model.

4.3.4. Moderating role of price consciousness

The direct path from price consciousness to intention is not statistically significant and makes virtually no unique contribution to explaining intention ($f^2 = 0.001$). In contrast, the $PC \times AT$ interaction term has $\beta = -0.259$, $p < 0.001$, and $f^2 = 0.219$. H11 is supported: price consciousness weakens the positive relationship between attitude and intention. The more strongly buyers focus on obtaining a low price, the less likely a favorable attitude toward green housing is to translate into strong purchase intention.

The indirect effect of the interaction term on behavior through intention is also negative and statistically significant ($\beta = -0.149$; $p < 0.001$), indicating that the weakening of the attitude–intention relationship can be transmitted downstream to behavior through the central role of intention. However, this is an indirect consequence of the moderation mechanism, not evidence that price consciousness directly reduces behavior.

4.3.5. f^2 effect sizes

Relationship	f^2	Magnitude
AT $\rightarrow$ GPI	0.128	Small
EC $\rightarrow$ AT	0.327	Medium
EC $\rightarrow$ GPI	0.297	Medium
ESI $\rightarrow$ AT	0.197	Medium
ESI $\rightarrow$ GPI	0.172	Medium
GPI $\rightarrow$ GPB	0.496	Large
PBC $\rightarrow$ GPI	0.211	Medium
PC $\rightarrow$ GPI	0.001	Negligible
SN $\rightarrow$ GPI	0.205	Medium
$PC \times AT \rightarrow GPI$	0.219	Medium

The f^2 results show that intention plays the most prominent role in explaining behavior. Environmental concern, perceived behavioral control, subjective norm, and environmental self-identity make meaningful contributions to the formation of attitude and intention. Attitude is statistically significant, but its unique contribution to intention is small. Price consciousness operates primarily through the moderation mechanism rather than through a direct relationship.

4.3.6. Gender-based multi-group analysis

The MICOM procedure shows that the model achieves full measurement invariance between the male and female groups. Permutation-based MGA with 5,000 permutations reveals no statistically significant difference in any path coefficient. The $PC \times AT \rightarrow GPI$ interaction coefficients are negative and very similar for men (-0.262) and women (-0.255), and the difference is not significant. Therefore, within the study sample, there is insufficient evidence to develop differentiated approaches based solely on gender; this finding does not imply that men and women are identical in all aspects of perception or behavior.

5. DISCUSSION OF RESEARCH FINDINGS AND IMPLICATIONS

5.1. Summary of the main findings

Overall, the findings support the integrated TPB–VAB model. Environmental concern and environmental self-identity contribute to the formation of attitude and intention; attitude, subjective norm, and perceived behavioral control are in turn positively related to intention; and intention plays a central role and is strongly related to purchase behavior. Attitude and intention form serial mediation chains, while price consciousness weakens the attitude–intention relationship.

5.2. Discussion of the research findings

5.2.1. Applicability of TPB to green housing purchase decisions

All three core TPB constructs are positively related to intention, while intention has a large coefficient and effect size in relation to behavior. The findings reinforce the applicability of TPB in the context of a high-value decision subject to multiple constraints. However, the unique effect size of attitude on intention is smaller than those of other factors, indicating that a favorable attitude needs to be accompanied by the ability to act and social influence in order to form sufficiently strong intention.

5.2.2. Value of integrating TPB and VAB

Environmental concern and environmental self-identity are related to intention both directly and indirectly through attitude. This finding shows that the environmental-orientation layer retains a distinct association in addition to the pathway through attitude. The two EC/ESI → AT → GPI → GPB chains clarify the process through which generalized psychological orientations are translated into purchase behavior, thereby extending the model beyond an approach focused solely on explaining intention.

5.2.3. Price consciousness as a boundary condition

The results do not support the interpretation that price-conscious consumers always have lower purchase intention. The direct PC → GPI path is not significant, whereas the PC × AT interaction is negative and has a medium effect size. Price consciousness therefore operates primarily as a boundary condition: as the emphasis placed on price increases, a favorable attitude is less readily translated into strong intention. This is an important distinction between price consciousness and affordability or willingness to pay a premium.

5.2.4. The intention–behavior gap

The model explains 70.5% of the variance in intention but 33.1% of the variance in behavior. This difference indicates that, although intention is an important antecedent, completion of a transaction may still depend on conditions outside the model, such as financial capacity, credit, legal conditions, supply, purchase timing, location, and transaction opportunities. The model therefore has stronger explanatory and predictive ability for intention than for realized behavior.

5.2.5. Stability across gender groups

No statistically significant differences between men and women were found in the model paths after measurement invariance was established. In housing purchase decisions, the high transaction value, high level of commitment, and involvement of multiple family members may reduce differences in the mechanism between the two groups. However, the results only indicate that no differences in path strength were detected; they do not imply that the two groups are identical in every respect.

5.3. Managerial implications and recommendations

5.3.1. For developers and distributors

The first priority is to facilitate the translation of intention into behavior, because $GPI \rightarrow GPB$ has $f^2 = 0.496$, the largest effect size in the model. Firms should organize the process from information search to contract signing in a clear, consistent, and accessible manner; ensure transparency regarding the product, legal status, construction progress, certification, selling price, payment methods, and transaction procedures; and provide comparison tools and documentation guidance for customers who have already formed purchase intention.

Environmental concern has a medium effect size for both attitude and intention. Communication should therefore translate green attributes into substantiated benefits, including energy and water efficiency, living-environment quality, materials, certification criteria, and operating costs. For consumers with a strong environmental self-identity, green housing may be positioned as a choice consistent with a responsible lifestyle, but such positioning must be grounded in actual attributes and verifiable evidence.

Regarding price, the findings do not support the inference that direct price reductions will automatically increase intention. Firms should ensure transparency regarding prices and costs and present the total cost of ownership and long-term benefits where appropriate data are available. This can help buyers assess the correspondence between price and value and reduce the extent to which excessive focus on low prices weakens the translation of attitude into intention.

5.3.2. For Financial Institutions

Financial institutions may cooperate with developers to develop financing solutions appropriate for projects that meet green standards, thereby helping buyers take greater control of their financial planning. However, credit, interest rates, and affordability were not directly tested as variables in the model; financial products should therefore be treated as enabling conditions and evaluated separately for effectiveness rather than inferred from the price consciousness coefficient.

5.3.3. For Government Authorities and Certification Organizations

Mechanisms for disclosing and verifying information about green projects should be improved; certification criteria, scope, and results should be presented in clear language so that buyers understand what the certification represents. Government authorities should monitor green claims in communications, encourage the disclosure of operating data where appropriate, and develop information platforms that allow cross-checking. Financial, credit, or supply-support policies should be evaluated on their own legal basis and specific impacts.

5.3.4. For Consumers

Buyers should jointly assess the selling price, total cost of ownership, long-term benefits, financial capacity, legal status, construction progress, certification, and the reliability of information about green attributes. They should proactively verify official disclosure sources, certification criteria, and verifiable data rather than relying solely on promotional messages. Because subjective norm is related to intention, discussions with family members and consultation with experts may support the decision-making process; however, the final decision should be based on the buyer's financial capacity and intended use.

5.3.5. Implications from the multi-group analysis

Because no statistically significant differences between men and women were detected, gender is not a priority criterion for differentiating market approaches within the current findings. Firms should

prioritize characteristics more directly connected with the decision process, such as environmental concern, environmental self-identity, attitude, social influence, perceived behavioral control, and the degree of price consciousness. Segmentation by income, age, ownership experience, or purchase purpose requires further empirical testing.

5.4. Limitations and future research directions

5.4.1. Research limitations

The study used convenience sampling combined with purposive sampling in Ho Chi Minh City. The sample is therefore appropriate for the research objectives but is not statistically representative of all green housing buyers and cannot be directly generalized to other localities.

The study uses a cross-sectional design, while intention is measured retrospectively with reference to the pre-transaction point. Because the same individuals were not followed directly from intention formation through completion of the transaction, recall bias cannot be entirely ruled out.

Purchase behavior was recorded through self-report and was not verified against contracts, transaction records, or objective project data.

The model focuses on TPB–VAB constructs and price consciousness and does not include several housing-market-specific factors such as trust in certification, developer reputation, risk, access to credit, legal conditions, location, supply, and perceived value.

The environmental self-identity scale still contains reverse-worded indicators. Although they were correctly coded and met the measurement criteria in this sample, future studies could compare the scale with an entirely positively worded version to assess stability.

The multi-group analysis was conducted only by gender; heterogeneity by income, age, ownership experience, purchase purpose, awareness of green certification, or housing type was not tested.

5.4.2. Future research directions

Future research should expand surveys to other localities and market segments in Vietnam and, where feasible, use probability or stratified sampling to improve representativeness.

Longitudinal designs should be prioritized by measuring attitude, intention, and antecedents before the transaction and then tracking purchase behavior at a later point in order to examine the intention–behavior process more rigorously.

Self-reported data should be combined with objective sources such as contracts, transaction records, certification databases, and operating data; in-depth interviews or case studies may also be incorporated to clarify motivations and barriers.

Future research should extend the sample to individuals newly exposed to information, those considering a purchase, those who have signed a contract but have not yet taken possession, and current residents in order to compare stages of the purchase process.

Additional variables should include trust in certification, developer reputation, risk, perceived value, perceived price fairness, access to credit, and project characteristics; the PBC → behavior path and additional mediating and moderating mechanisms should also be examined.

Heterogeneity should be tested by income, age, ownership experience, purchase purpose, awareness of green certification, and housing type, while clearly distinguishing price consciousness from affordability, total cost of ownership, perceived value, and willingness to pay a premium.

CONCLUSION

The dissertation developed and tested an integrated TPB–VAB model to clarify the mechanism underlying green housing purchase intention and behavior in Ho Chi Minh City. The findings reveal a multi-layered process: environmental concern and environmental self-identity are related to attitude and intention; attitude, subjective norm, and perceived behavioral control are related to intention; and intention is in turn strongly related to purchase behavior. The two serial mediation chains from EC and ESI through attitude and intention to behavior are statistically significant.

Price consciousness has no statistically significant direct relationship with intention but weakens the positive relationship between attitude and intention. This finding indicates that price consciousness is more appropriately viewed as a boundary condition of the attitude–intention process than as a direct antecedent. The model explains 70.5% of the variance in intention and 33.1% of the variance in behavior, while also demonstrating out-of-sample predictive relevance for attitude, intention, and behavior. No statistically significant differences between men and women were found in the model paths.

Theoretically, the study reinforces the applicability of the TPB–VAB framework to a high-value, high-commitment consumption decision, extends the explanatory scope from intention to realized purchase behavior, and adds price consciousness as a boundary condition. Methodologically, the study organizes measurement among individuals who had completed or committed to transactions, refines the measurement scales through multiple stages, and evaluates the model through a measurement–explanation–prediction–group-comparison sequence. Practically, the findings emphasize the need for transparency in information, certification, prices, and costs; support for consumers’ ability to complete transactions; and a basis for buyers to comprehensively evaluate value, costs, and the reliability of green attributes before making a decision.

LIST OF THE AUTHOR’S RESEARCH PUBLICATIONS RELATED TO THE DISSERTATION

No.	Publication Title	Journal/Proceedings	Publication Date
1	Development Trends in Green Real Estate in Vietnam	The International Conference on the Business based on Digital Platform BDP-4	September 2024
2	A Comprehensive Policy Framework for Low-Carbon Building Development in Vietnam	Finance Journal, Issue 2, No. 853, pp. 70–74	July 2025
3	Development of Green Building Certification: Global Trends and Opportunities in Vietnam	Finance Journal, Issue 1, No. 856, pp. 123–126	September 2025
4	The Formation of Green Housing Purchase Behavior in Ho Chi Minh City: The Mediating Role of Attitude and the Moderating Role of Price Consciousness	Financial Economics, Issue 3, No. 27, pp. 424–429	June 2026
5	Consumer Behavior Toward Green Housing: A Bibliometric Review and Research Directions for Vietnam	Journal of Finance and Accounting Research, May Issue 2, No. 312, pp. 297–300	June 2026
6	Drivers of Green Housing Purchase Intention and Behaviour: A Systematic Review and Integrated Marketing Framework (2021–2025)	International Real Estate Review	Accepted for publication, 21 June 2026