Khwopa Journal
ISSN: 2392-4845
Vol. 7 Issue 2, 2025 (Dec.)
DOI: https://doi.org/10.3126/kjour.v7i2.88265

Research Article
Received Date: May 22, 2025
Revised Date: Nov. 18, 2025
Accepted Date: Dec. 15, 2025

# Potential Clients' Purchase Intention of Green Building in Kathmandu Valley

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**Abstract**: *Green building practices have gained global attraction, with developed countries and emerging economies adopting eco-conscious construction. However, Nepal faces challenges in its building sector, lacking a mandatory energy-efficient rating system. This, this study aims to investigate the potential clients purchase intension of green building in Kathmandu Valley. Explanatory research design was used to explore the cause-and-effect relationship among factors influencing Potential Clients' Adoption Preference of Green Buildings in the Kathmandu Valley. Data is collected from 404 potential clients through purposive sampling and structured questionnaires. The Kobo Toolbox administers the data, which is then analyzed using partial least squares structural equation modeling (PLS-SEM) version 4.0 software. Research findings indicated significant relationship of relative advantage and compatibility show significant relationships with green building adoption, while environmental opinion leadership, innovativeness, simplicity, and trialability does not demonstrate significant relationship. The study highlights that respondents were highly aware about the green building. Similarly, respondents had heard about the green building practices through social media platforms, newspapers, publications and article, word of mouth, and radios etc. Furthermore, delving into additional factors such as individual risk preferences and socio-economic influences will provide a more comprehensive understanding of green building adoption.*

**Keywords:** Green building practices, Sustainable development, Kathmandu valley, Potential buyers, Diffusion of innovations theory, Environmental opinion leadership.

## 1. Introduction

In recent times, traditional construction practices have garnered increasing attention for their detrimental effects on the environment and ecosystems. In response to these concerns, there has been a global shift towards embracing green building as a proactive strategy to mitigate the adverse environmental impacts associated with construction activities (Gou & Xie, 2017). Green buildings, in comparison to their conventional counterparts, offer a multitude of advantages, not only in regard to environmental sustainability but also with regard to public well-being (Bungau et al., 2022). Furthermore, resource concerns, particularly related to energy, gained prominence in the 1970s due to geopolitical conflicts (Vakulchuk et al., 2020). This period highlighted the importance of preserving limited, non-renewable natural resources (Aysan et al., 2023). In this period there was a surge in interest in energy-efficient technologies, insulation improvements, and sustainable building practices. This emergence and growing popularity of the concept of green building signify a pivotal shift in the environmental friendly construction approaches. we approach construction. The resurgence of interest in sustainability has marked a significant turning point, igniting the commitment to environmentally responsible construction practices (Bhattarai & Singh Bhattarai, 2023).

Green building, goes beyond eco-friendliness; it encompasses design, construction, and operation strategies that not only mitigate adverse effects but also contribute positively to the environment and climate (Liu et al., 2022). This approach extends to areas such as energy efficiency, land utilization, indoor air quality, and responsible waste management during construction and demolition (Amaral et al., 2020). Sustainable construction, often synonymous with green building, seeks to reduce environmental footprints by applying tailored knowledge and technology, aligning with user needs, environmental conditions, and efficient resource utilization principles. Green building's core focus on conserving resources like energy, water, land, and materials, while simultaneously safeguarding the environment, makes it a potent strategy for mitigating carbon emissions, promoting sustainable development, and improving overall quality of life (Bungau et al., 2022). Thus, the concept of green building is not only a reflection of eco-consciousness but also a manifestation of personal preferences shaped by cultural, emotional, practical, and individual factors.

Green building practices have gained global prominence, particularly in developed countries where comprehensive legal frameworks and codes have been established to promote eco-conscious construction. These countries have witnessed significant phases of the green building movement, responding to heightened environmental awareness and advocacy (Cao et al., 2022). Similarly, emerging economies like India, China, and Brazil have also made substantial strides in adopting green building principles, driven by government initiatives, environmental concerns, and energy efficiency goals (Miranda et al., 2021). Furthermore, Least Developed Countries (LDCs) are encouraged to embrace Green Building Principles (GBPs) to address climate change vulnerabilities. While their adoption of GBPs has been slow, LDCs contribute significantly less to global greenhouse gas emissions than developed countries, primarily due to limited access to electricity, offering them an opportunity to reduce their environmental footprint through sustainable building practices (Kalua et al., 2014).

Nepal's building sector, like many developing nations, faces challenges due to unplanned construction and escalating energy consumption, leading to energy depletion and climate change risks. Residential buildings, major energy consumers, lack energy-saving measures with limited green certification adoption (Shrestha, 2016). Unlike developed countries, Nepal lacks a mandatory energy-efficient building rating system, primarily due to limited awareness, education gaps, and technological challenges (Sharma et al., 2023). Efforts like the Green Home Project have been made, but substantial changes in building practices are yet to be seen. To address these challenges and promote sustainability, Nepal needs to implement a robust Green Building Rating System, raise awareness and look into some traditional buildings such as Newari houses which offer a historical example of effective green building (Koirala, 2020).

Global green building practices, especially regarding the alignment of legislative demands with the actual methods used by construction firms. Several factors attributed, such as the indecision or lack of awareness among stakeholders in construction companies about green building laws, a selective approach to applying legislative requirements that mainly targets health and safety or economic factors, and varying perspectives between management and site workers (Windapo & Goulding, 2015). The gap between perception and execution has serious consequences for the effectiveness of ecological sustainability and green building efforts, particularly concerning enforcement and incentives. To mitigate this gap, it is important to encourage a shift in culture and attitudes among all stakeholders, embedding the essential principles of green building.

This study is divided in five sections. First started through the introduction of the study to literature review from historical perspective and different country wise. Third section presents the methodology of the study where conceptual framework, variables used in the study, hypothesis, sample size determination, and approaches of data analysis was presented. In Fourth part result and discussion of this research is discussed. At last the conclusion of the study is demonstrated.

## 2. Literature Review

Since the start of the 1900s, five important approaches Such as bioclimatic, environmental, energy conscious, sustainable, green approaches of sustainability in architecture and building constructions have evolved. During this period, discussions about building and architecture have been impacted by economic and environmental considerations (Attia, 2018).

Furthermore, the origins of green building can also be linked to the energy crisis of the 1960s, which acted as a catalyst for significant research aimed at enhancing energy efficiency and reducing environmental pollution (Zhang et al., 2019). Moreover, the oil crises that occurred in the initial years of the 1970s, stemming from conflicts in the Arab-Israeli region during that period, signified the initial significant concern regarding resources (Kibert, 2017) and highlighted the matters surrounding the preservation of the limited, non-renewable natural resources (Erten et al., 2009). Consequently, there was a surge in enthusiasm for enhancing energy efficiency, adopting solar technologies, upgrading residences and business structures with insulation, and implementing energy recovery systems (Kibert, 2017). By the late 1970s, many of these endeavors became customary procedures and were integrated into energy regulations sanctioned by individual states in U.S. The intense enthusiasm for energy conservation increased, largely due to a decline in relative energy costs. In 1990, the first green building rating system, known as the Building Research Establishment Environmental Assessment Method (BREEAM), was introduced by the UK's Building Research Establishment (BRE), providing a structured approach for assessing the execution and effectiveness of green buildings (Zhang et al., 2019). The 1992 Earth Summit, alternatively referred to as the United Nations Conference on Environment and Development (UNCED), introduced the Rio Declaration on Environment and Development and the Agenda, which sparked a surge in the movement for enhancing environmental conservation in the realm of construction (Kibert, 2017).

Table 1

*Different Building Approaches During 20th and 21st Century*

| Approach | Years | Focus and Themes |
|---|---|---|
| Bioclimatic Architecture (Krezlik, 2021) | 1908-1968 | • Emphasis on design harmonizing with climate<br>• Integration of nature's principles, sun shading techniques, and health considerations |
| Environmental Approach (Chatira & Chen, 2015) | 1969-1972 | • Incorporating ecological principles into design<br>• Integration of natural systems, sustainable materials, and inclusive environment for occupants |
| Energy Conscious Approach (Prof et al., 2022) | 1973-1983 | • Integrating energy efficiency principles<br>• Passive and active solar strategies, designing for reduced energy consumption, and architectural responses to energy crises |
| Sustainable Approach (Chatira & Chen, 2015) | 1984-1993 | • Holistic sustainability approach<br>• Marrying aesthetic, human comfort, and environmental performance<br>• Designing for the long-term well-being of people and the planet |
| Green Approach (Attia, 2016) | 1993-2006 | • Focusing on green and smart design<br>• Promoting ecological community planning, ener-gy-efficient technologies, and environmentally conscious urban design |
| Carbon Neutral Approach (Davies & Daniel, 2019) | 2006-2015 | • Striving for carbon neutrality<br>• Designing buildings with minimal net carbon emissions<br>• Resilience against climate change impacts and dynamic energy strategies |
| Regenerative Approach (Nowakowska & Grodzicka-Kowalczyk, | 2016-Future | • Pioneering a shift towards positive impact<br>• Designing to restore and regenerate eco-systems<br>• Embracing cradle-to-cradle principles and learning from |

| | |
|---|---|
| 2019) | nature's wisdom |

Humans were beginning to grapple with significant global environmental issues, including ozone depletion, global climate change, and the destruction of major fisheries, among others, for the first time (Kibert, 2017). In order to address sustainability, the U.S. government opted to target the construction sector due to its substantial energy resource consumption, contribution to greenhouse gas emissions, and direct public interaction. The formation of the U.S. Green Building Council (USGBC) marked a significant event in 1993 (Erten et al., 2009). Consequently, in 1998, it introduced LEED (Leadership in Energy and Environmental Design), a green building rating and certification system (Bondareva, 2005). Around the same timeframe, endeavors in other nations were arising and engaging with American initiatives (Kibert, 2017), which are listed on Table 2.

There are different scenario regarding the green building practices of different countries, UK mandates all new residential homes to align with green building by 2016, extending this requirement to all new buildings by 2019 (Wang et al., 2014). In 2004, the Canadian Green Building Council (CaGBC) adopted LEED with slight modifications, resulting in LEED Canada-NC Version 1.0. Subsequently, LEED-Canada CI was introduced in 2005 (Okanagan, 2010). Similarly, in China, Housing and Urban-Rural Development (MOHURD) released "Energy-Saving Design Standards for Civil Buildings", marking the introduction of energy conservation in China's architecture, engineering, and construction sector. Indian green building movement is primarily linked to government initiatives aimed at promoting sustainability within society and the adoption of green building guidelines by the corporate sector (Darko et al., 2017). In the USA, government policies were driven by public pressure from environmental movements. Green Building Practices in Nepalese Context

In the current context, buildings are cropping up without proper planning in Nepal (Thapa Magar et al., 2021). With energy consumption growing around 10% annually and total energy use by 2.4% per year, Nepal faces energy depletion and climate change risks, necessitating a shift toward renewable energies and energy efficiency (Sharma et al., 2023). Moreover, residential buildings are major energy consumers and need to adopt energy-saving measures (Vaidya et al., 2022). Although some architects follow LEED criteria, certification is lacking (Adhikari & Bajrachrya, 2022).

Unlike some countries where mandatory building ratings focus on energy efficiency, Nepal lacks such a system, despite having a Building Code for Safety (Shakya & Bajracharya, 2015). Due to limited awareness, both socially and culturally; and challenges, education gaps, lack of guidelines, skilled workforce, and technology, the adoption of a Green Building Rating System has been slow in Nepal. In Nepal's building industry, various efforts, including Architect Bibhuti Man Singh and Architect Sushil Bajracharya's Green Home Project, have aimed at green development. However, substantial changes in building practices have yet to be seen

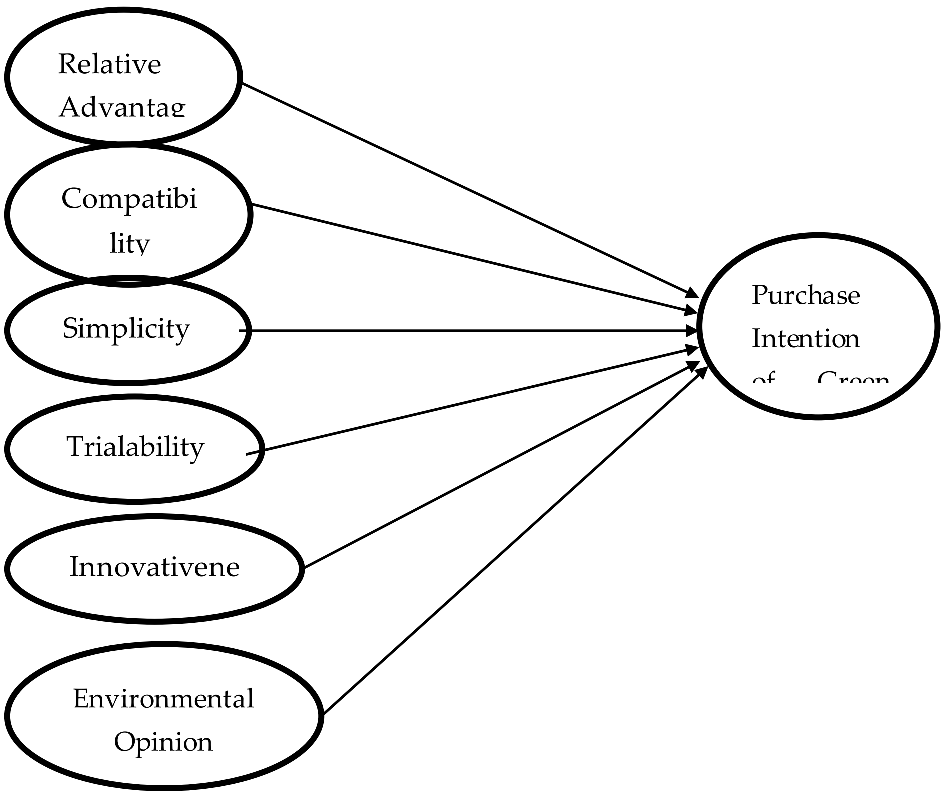
(Sharma et al., 2023). On the other side, traditional Newari houses, made from local materials, provide a historic example of green buildings in Nepal that maintained indoor temperatures effectively (Shakya & Bajracharya, 2015). To reiterate, Nepal faces pressing challenges in its building sector, including energy depletion and climate change risks (Shakya & Bajracharya, 2015). Despite efforts like the Green Home Project, the adoption of green building practices has been slow due to limited awareness, education gaps, and technological challenges. While traditional Newari houses offer a historic example of green building (Suwal, 2014), Nepal needs to implement a robust Green Building Rating System and raise awareness to meet its growing energy efficiency and sustainability needs.

## 3. Methodology

### Conceptual Framework

Various theoretical model was reviewed in the study for choosing the perfect and relevant theory to developed the conceptual framework of the study, some of the theories are such as Theory of Planned Behavior (TPB), Social Cognitive Theory (SCT), Expectancy-Value Theory (EVT), and Diffusion of Innovations Theory (DOI).

**Figure 1***Conceptual Framework*




*Source:* Modified from Chaudhary and Kumar (2021), Khan et al. (2022)

*According to* theory of planned behavior, the behavioral intentions are strong predictors of actual behavior, assuming individuals are rational decision-makers who consider the consequences of their actions (Lee et al., 2005). Similarly, Social cognitive theory provides insights into how people learn, interpret, and respond to their surroundings, making it valuable for understanding and guiding behavior change interventions in various contexts (Ng & Lucianetti, 2016). The expectancy value theory explores into two pivotal components: firstly, the extent to which someone anticipates achieving success in the endeavor, and secondly, the degree of significance they attach to the task itself (Kuhn et al., 2022). Among this theory,Diffusion theory of Innovation is used in the study because the Diffusion of Innovations Theory (DOI) offers a comprehensive understanding of how and why potential clients embrace sustainable building practices. It highlights the importance of knowledge dissemination, persuasion, and innovation characteristics in influencing clients' choices. With its applicability in consumer behavior research, Diffusion of Innovations Theory (DOI) provides practical insights into effectively promoting and marketing green construction practices within the construction industry. Therefore, Diffusion of Innovations Theory (DOI) was selected as the most suitable theoretical framework due to its holistic perspective on the adoption of green building innovations and its relevance in understanding clients' preferences.

This framework explains the primary factors that influence a purchase intension of green building are relative advantage, compatibility, simplicity, trialability, innovativeness, environmental opinion leadership.

**Hypothesis Development**

**Relative Advantage and Purchase Intention of Green Building**

Relative advantage refers to how much better an innovation is perceived to be compared to the idea it replaces (Van Slyke et al., 2008). The analysis takes into account factors related to expenses and the drive for social standing. Those who are innovators and early adopters tend to be more driven by status, whereas the late majority and laggards place less importance on it. In the context of potential client preferences towards green buildings, relative advantage would refer to the degree to which a green building is perceived as better than a conventional building in meeting the client's needs and goals (Durdyev & Tokbolat, 2022). It encompasses factors such as cost savings, energy efficiency, and environmental benefits. Clients who see green buildings as offering a relative advantage are more likely to choose them over traditional buildings.

*H1: Relative Advantage has a positive and significant relationship with Purchase Intention of Green Building (AB).*

**Compatibility and Purchase Intention of Green Building**

Compatibility measures how well an innovation aligns with existing values, past experiences, and needs of potential adopters (Kishore & McLean, 2007). Compatibility for green buildings refers to how well the concept and features of a green building align with the values and objectives of potential clients. Clients who are environmentally conscious and value sustainability will perceive green buildings as highly compatible with their needs (Bungau et al., 2022). On the other hand, clients with different priorities or a lack of interest in sustainability may find green building concepts less compatible.

*H2: Compatibility has a positive and significant relationship with Purchase Intention of Green Building (AB).*

**Simplicity and Purchase Intention of Green Building**

Simplicity refers to how easy an innovation is perceived to be in terms of understanding and usage (Lee et al., 2007). Simplicity, in the context of green buildings, relates to how uncomplicated it is for potential clients to understand and navigate the various sustainable features and technologies involved. Green buildings can involve complex systems such as renewable energy sources, water-saving technologies, and advanced insulation methods (Husainy et al., 2024). Clients who find these technologies easy to understand and use are more likely to embrace green building practices.

*H3: Simplicity has a positive and significant relationship with Purchase Intention of Green Building (AB).*

**Trialability and Purchase Intention of Green Building**

Trialability is the extent to which an innovation can be experimented with on a limited basis (Flight et al., 2011). It positively correlates with adoption rates. During trials, innovations may undergo reinvention and modification, leading to faster adoption. Vicarious trials are especially helpful for later adopters, while earlier adopters place less importance on trialability. Trialability for green buildings refers to the extent to which potential clients can experiment with green building practices on a limited basis. This might involve pilot projects or testing specific green features before committing to a full-scale green building project. Clients who have the opportunity to trial green building elements and witness their benefits firsthand may be more inclined to adopt them.

*H4: Trialability has a positive and significant relationship with Purchase Intention of Green Building (AB).*

**Innovativeness and Purchase Intention of Green Building**

Innovativeness refers to the ability and willingness of businesses and organizations to develop and implement new and creative solutions, practices, and technologies that promote sustainability and environmentally-friendly construction and design (Khandwalla, 2006). It involves a proactive approach to integrating innovative ideas and approaches into the construction and real estate industry to meet the goals of sustainability and appeal to environmentally conscious consumers. The adoption of green building by potential clients is closely tied to the degree of innovativeness embedded within sustainable construction practices and technologies. In other words, the willingness of clients to embrace green building concepts, such as environmentally-friendly materials, energy-efficient designs, and sustainable construction methods, largely depends on the innovative nature of these solutions.

*H5: Innovativeness has a positive and significant relationship with Purchase Intention of Green Building (AB).*

**Environmental Opinion Leadership and Purchase Intention of Green Building**

Environmental opinion leadership encompasses individuals or entities who stand at the forefront of sustainability, driven by their innovative thinking and influential capacities (Khan et al., 2022). These leaders possess advanced insights into environmental issues, which they leverage to support organizations committed to sustainable development. They play a pivotal role in providing crucial information and guiding decision-making processes, especially in critical situations, facilitating the adoption of sustainable practices. In the context of green building, their innovative mindset aligns seamlessly with the principles of eco-friendly construction, driving the adoption of green building technologies and practices. They champion sustainability and emphasize the importance of incorporating innovative, environmentally conscious solutions, ultimately reshaping the construction industry towards a more sustainable and environmentally responsible future.

*H6: Environmental Opinion Leadership has a positive and significant relationship with Purchase Intention of Green Building (AB).*

**Variables used in the Study**

This section presents the variables used in the study. The study variables, its observed variables are listed in table 2 and this variables are taken from the review of authors papers such as Khan et al. (2022) and, Atkinson (2007), Chaudhary & Kumar (2021)**,** Imma et al. (2017), Aizstrauta et al. (2015) and, Li et al. (2021).

Table 2

*Variables and its Definitions*

| Construct | Observed Variables | Variable Notation | Description |
|---|---|---|---|
| **Relative Advantage (RA)** | Productivity | RA_1 | Efficient layout and advanced energy systems |
| Khan et al. (2022) and, | Economic Benefit | RA_2 | Results in long-term cost savings and increased property value. |
| Atkinson (2007) | Value-Adding | RA_3 | Adds significant value |
| | Comfort and Satisfaction | RA_4 | Provides ease of usage, physically and emotionally, and experiencing a sense of satisfaction or happiness |
| | Green Appeal | RA_5 | Concept of green buildings are more appealing than conventional building practices. |
| | Enhanced Experience | RA_6 | Use of green building materials and technologies would enhance overall experience in a building. |
| | Financial Appeal | RA_7 | Potential energy savings and reduced maintenance costs. |
| | Low Initial Cost | RA_8 | Low initial cost is an advantage of using this technology |
| | Immediacy of the Reward | RA_9 | The benefits of using technology are immediate |

| | | | |
|---|---|---|---|
| | Decrease in Discomfort | RA_10 | Decrease in some kind of discomfort is an advantage of using this technology |
| **Simplicity (SI)** | Ease of Installation | SI_1 | Easy to use and implement |
| Chaudhary & | Flexible | SI_2 | Can align with the needs |
| Kumar (2021), and, | Effortlessness | SI_3 | Using the technology will be free of effort |
| Khan et al. (2022) | Resource Efficiency | SI_4 | Require minimal resources |
| | Information Ease | SI_5 | Easy to access information about the benefits and features |
| | Tech Understanding | SI_6 | Simple to understand how green building technologies work |
| | Benefit Clarity | SI_7 | No difficulty finding resources that explain the advantages |
| **Compatibility** | Consistent | CM_1 | Align with personal values and beliefs |
| **(CM)** | Adaptable | CM_2 | Fits with changing building preferences |
| Chaudhary & | Sustainable | CM_3 | Suitable for long term use |
| Kumar (2021) and, | Expertise | CM_4 | Fits with construction knowledge |
| Imma et al. (2017) | Practicable | CM_5 | Fits with practice preferences |
| | Lifestyle Fit | CM_6 | In line with preferences for a sustainable lifestyle |
| | Previously introduced ideas | CM_7 | The use of technology is positioned as compatible with previously introduced ideas |
| | With client needs | CM_8 | The use of technology is positioned as compatible with client needs |
| **Trialability (TR)** | Free Trial | TR_1 | Can be tried by potential users |
| Aizstrauta et al. (2015) | Pilot Testing | TR_2 | Can be tried on a narrow scale to reduce uncertainty towards new innovations |
| and, Imma et al. (2017) | Visit Experience | TR_3 | Likely to consider a project if I had the opportunity to visit a green building and see its features firsthand |
| | Trial Importance | TR_4 | Being able to test the sustainability features of a green building before making a decision |
| | Positive Trial Impact | TR_5 | Likely to invest in a green building if I can experience its benefits through a trial |
| **Innovativeness** | Early Adopter Mentality | IN_1 | Adopt new practices and products before others |
| **(IN)** Li et al. (2021) | Open to Innovation | IN_2 | Like to embrace new ideas |
| | Consultation | IN_3 | Innovators' guide to users to help them understand how the system works and reduce uncertainties |
| | Familiarity Preference | IN_4 | Rather stick with a product usually buy than try something not |

| | | | |
|---|---|---|---|
| | | | too sure of |
| | Resistance to Change | IN_5 | Rarely switch from old simply to try something new |
| | Caution with Newness | IN_6 | Cautious to try new or different products |
| | Minimal Building Switching | IN_7 | Don't enjoy switching products frequently just for stimulation. |
| | Discomfort with Unfamiliarity | IN_8 | Uncomfortable to buy unfamiliar products just for something Different |
| | First Ownership Desire | IN_9 | Like to be among the first to embrace green building solutions |
| | Peer Leadership | IN_10 | It's important to me to be the first among my peers to adopt green building technologies. |
| **Environmental Opinion Leadership (EL)** | Role Modelling | EL_1 | Inspiration and influence on others by demonstrating environmentally friendly actions |
| Atkinson (2007)**,** Chaudhary & | Mass Appeal | EL_2 | Widespread interest and support for environmental initiatives |
| Kumar (2021), and, Khan et al. (2022) | Reliability | EL_3 | Trustworthiness and consistency of leaders' messages and actions |
| | Credibility | EL_4 | Knowledgeable, honest, and trustworthy in environmental advocacy |
| | Environmental Concern | EL_5 | Green buildings contribute positively to environmental sustainability, and this matters to me |
| | Sustainability Support | EL_6 | Belief that supporting green building initiatives is crucial for a sustainable future |
| | Reduced Footprint | EL_7 | Contribute to reducing my environmental footprint. |
| | Social prestige | EL_8 | Use of this technology advances the social prestige of the user |
| **Purchase Intention of Green** | Less Environmental Harm | AB_1 | Choose green building because they are less harmful to environment. |
| **Building (AB)** | Less Harmful to People | AB _2 | Choose green building because they are less harmful to people. |
| | Information Availability | AB _3 | Sufficient availability of resources helps to choose green building. |
| | Resale Value | AB _4 | Belief that green buildings have good resale value. |
| | Overall Cost | AB _5 | The overall costs of green buildings are |

| | |
|---|---|
| | reliable. |

## Study Area and Populations

The research is conducted in Kathmandu Valley, located in Province no. 3 of Nepal, which comprises Kathmandu, Bhaktapur, and Lalitpur districts. Geographically, the valley is situated between latitudes 27° 32' 13" to 27° 49' 10" north and longitudes 85° 11' 31" to 85° 31' 38" east, at an average altitude of about 1,300 meters (4,265 feet) above sea level. Kathmandu Valley occupies a central position within the country and is home to a population of approximately 1.5 million people.

The research primarily targets potential clients in the Kathmandu Valley who are planning to build a house, have applied for a home loan, are designing a house, or can afford to purchase one. The study also targets construction consultancy clients interested in green building, high-income individuals, and managerial professionals who are potential real estate investors. The above mentioned people are the potential client for the study and before conducted the study, researcher has ensured that they has planned to build house, applied for home loan, high income individuals.

The choice of Kathmandu Valley as the study area is driven by several factors that make it an ideal location for investigating purchase intentions related to green buildings among these target groups. The number of households in Kathmandu increases by 7,500 every year, as reported by the Informal Sector Research and Study Centre Shrestha (2010). Furthermore, Shrestha et al. (2022) in 2017 reveals that the urban area of Kathmandu Valley has expanded by a staggering 412% over the last three decades, which shows the increase in the demand of housing in this area. Moreover, Kathmandu Valley boasts a diverse population, representing various demographics and backgrounds, including those who aspire to own a green home, providing a rich and comprehensive dataset for analyzing potential clients' purchase intentions of green buildings. Additionally, the region exhibits a high level of environmental awareness among its residents, which is particularly relevant for those planning for house design with sustainability in mind, as it makes it conducive for studying the factors influencing green building preferences. Furthermore, the presence of numerous financial institutions, real estate developments, and environmental initiatives within the valley (Timsina, 2020) is of interest to those who have applied for home loans or are looking to invest, providing an intricate ecosystem for exploring the dynamics of green building purchase intentions. Lastly, the Kathmandu Valley's economic environment, market potential, and cultural dynamics create a unique backdrop for researching the factors that drive individuals, especially those in the high economic earning group and managerial level, to make informed decisions to invest in green buildings.

## Sampling Technique and Sample Size Determination

The study uses non-probability sampling due to the unavailability of the actual number of possible clients who are intented to purchase green building in Kathmandu Valley.

Non-probability sampling helps researchers to collect data from the respondents without exact number of population list and allows to collect based on the respondents ready to participant in the survey.To calculate the sample size for this study, the study used the following formula: $n0 = \frac{z^2pq}{e^2}$ (Singh & Masuka, 2014). Here, n0 is the sample size for the study, the standard tabulated value for 5% level of significance (z) is 1.96, p is the Prevalence or proportion of an event 50% , and the allowable error to be tolerated (e) is 5%. Therefore, the final sample size for this study was 403. However, the data was collected from 404 respondents.

**Research Instrument, Data Collection Procedure and Data Analysis Techniques**

The research instrument of the study is structural questionnaire and the same question in the same language is used in the study in order to maintain the consistency and uniformity of the data. Closed ended questions has asked in the survey to get the same pattern answer. To ensure the data collected is valid, data was checked does the respondent has answer all the questions.. The pilot testing was done through 15 respondents. The actual data was collected from October to December 2023. The data was analyzed from Kobo Toolbox, Excel, and Smart PLS was used.

## 4. Results and Discussion

### Sociodemographic Analysis

The descriptive section provides a detailed breakdown of the data, incorporating tables, charts, and figures to offer a comprehensive overview of the surveyed population. Total 404 respondents with 63.37% males and 36.63% females were involved in the study. The distribution of the age category shows that majority (73.27%) of the respondents who are involved in the survey are the 30-64 age category. The marital status of the respondents shows that 28.22% are unmarried, while the majority, accounting for 71.78%, are married. The family type is predominantly nuclear (73.76%), followed by joint (25.99%), and others. In the education background majority of the respondents are bachelors degree (36.88%) 36.14% having master degree and rest have other degree.Similarly, the higher level of respondents are from healthcare, educator, engineers, bankers and business owners and they represent the top to middle level manager position. Majority of the respondents have 1- 5 years (28.96%) and 6-10 years (36.39%) experiences. Moreover, the highest portion of the participants have 50,000-1,00,000 (37.87%) and 1,00,000-2,00,000 (24.26%) income in monthly basis.

### Awareness on "Green Building" among Potential Clients

The respondents generally feel knowledgeable about the benefits of green building (62.62%) and are aware of specific green building features or certifications (38.86%). The overwhelming majority believes that green buildings can address environmental issues, such as air pollution and climate change (95.05%). Additionally, a high percentage of respondents agree that green building contributes to a more sustainable future for urban areas like Kathmandu Valley (93.81%) and has a positive impact on the overall aesthetics and appeal of a neighborhood or community (94.06%). Most respondents are willing to recommend green buildings to friends or family (93.81%) and express a likelihood of considering purchasing or renting a green building for their future residence or business (97.03%). Moreover, a significant majority (98.27%) would be more inclined to invest in green building if financial incentives were offered by the government.

The customer knowledge related to green building was measured through the awareness index. 12 questionnaires with yes and No questions were asked to measure the awareness. If the respondents answer 9 or more questions yes out of 12, the respondents were highly aware (Y=2). If those who answered less than 6 answer with Yes answer, they are categorized as low aware (Y=0) and respondent with 6 to 9 answer correct they are moderately aware (Y=1). Thus, the equation of awareness level is 75% (Highly aware), with 50% to 75% (moderately aware) and less than 50% (less aware) (Devkota & Phuyal, 2018).

The awareness scale for above survey findings, indicates that a significant proportion of the respondents fall into the "High Aware" category, with 246 individuals (approximately 61%) demonstrating a robust understanding of green building concepts. A considerable number, 150 respondents (around 37%), are classified as "Moderate Aware," indicating a moderate level of awareness. A relatively small portion, 8 individuals (approximately 2%), falls into the "Less Aware" category, suggesting a lower level of familiarity with green building practices. These findings underscore a noteworthy level of awareness among the surveyed population, with the majority exhibiting either moderate or high levels of awareness regarding environmentally friendly building concept depicted in bar chart below:

Table 3

*Awareness Level*

| S.N. | Questions | Yes | | No | |
|---|---|---|---|---|---|
| | | Number | % | Number | % |
| 1. | Have you ever been involved in any environmental issue-related training, workshops, or programs? | 168 | 41.58 | 236 | 58.42 |
| 2. | Are you associated with any social organization? | 57 | 14.11 | 347 | 85.89 |
| 3. | Have you heard the term "green building" or "environmentally friendly building", before taking this survey? | 286 | 70.79 | 118 | 29.21 |
| 4. | Would you like to see more information and education campaigns about green building in | 382 | 97.03 | 12 | 2.97 |

| | | | | | |
|---|---|---|---|---|---|
| | Kathmandu Valley? | | | | |
| 5. | Do you feel that you are knowledgeable about the benefits of "green building"? | 253 | 62.62 | 151 | 37.38 |
| 6. | Are you aware of specific green building features or certifications, such as LEED (Leadership in Energy and Environmental Design) or GRIHA (Green Rating for Integrated Habitat Assessment)? | 157 | 38.86 | 247 | 61.14 |
| 7. | Do you believe that green buildings can help address environmental issues, such as air pollution and climate change? | 384 | 95.05 | 20 | 4.95 |
| 8. | Do you believe that green building contributes to a more sustainable future for urban areas like Kathmandu Valley? | 379 | 93.81 | 23 | 5.69 |
| 9. | Do you think that green buildings have a positive impact on the overall aesthetics and appeal of a neighborhood or community? | 380 | 94.06 | 24 | 5.94 |
| 10. | Are you willing to recommend green buildings to friends or families based on your understanding of their benefits? | 379 | 93.81 | 25 | 6.19 |
| 11. | Are you likely to consider purchasing or renting a green building for your future residence or business? | 392 | 97.03 | 12 | 2.97 |
| 12. | Would you be more inclined to invest in green building if there were financial incentives offered by government? | 397 | 98.27 | 5 | 1.24 |

*Source: Field Survey (2023)*

According to the clients they have heard about the green building from different sources such as social media (32%), magazines (17%), publication (17%), word of mouth (10%), online media (11%), real state (8%), radio (5%) which are presented in the graph below.

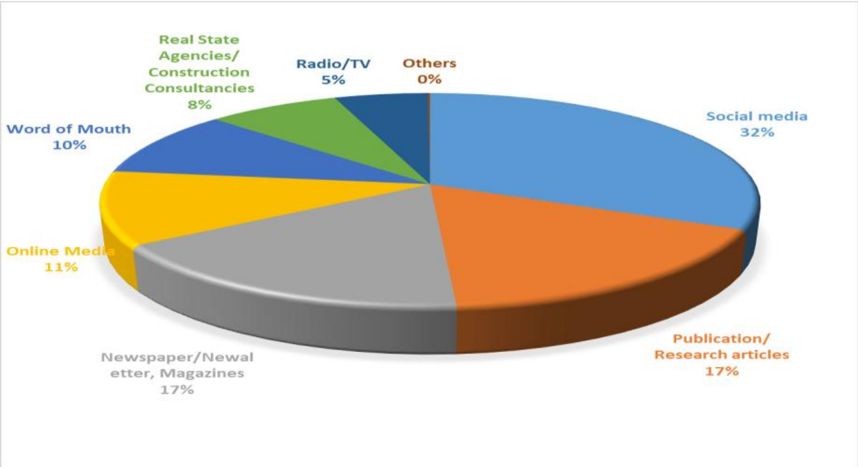


*Figure* 2: Source through which potential clients have heard about green buildings

## Inferential Analysis

### Measurement Model

The measurement model is evaluated to determine the reliability and validity of the constructs. The assessment of the outer model involved examining internal consistency via composite reliability, although the evaluation of Cronbach's alpha has become a typical procedure in research.

It typically provides conservative assessment in PLS-SEM (Tavakol & Dennick, 2011). Previous literature has suggested using "Composite Reliability" as a replacement (Bagozzi and Yi, 1988; Hair et al., 2012). Whereby considering that all values of composite reliability are>0.7, indicating a satisfactory level of internal consistency.

Table 4

*Reliability and Validity*

| Coding | Latent Variables and Items | Loadings | AVE | CR | Cronbach's Alpha |
|---|---|---|---|---|---|
| **AB** | **Purchase Intention of Green Building** | | 0.5 | 0.7 | 0.7 |
| **AB_5** | Less harm to environment | 1 | | | |
| **CM** | **Compatibility** | | 0.6 | 0.9 | 0.867 |
| **CM_2** | Adaptable | 0.745 | | | |
| **CM_3** | Sustainable | 0.775 | | | |
| **CM_4** | Expertise | 0.758 | | | |
| **CM_5** | Practicable | 0.817 | | | |
| **CM_6** | Life Style Fit | 0.788 | | | |
| **CM_7** | Previously Introduced Ideas | 0.763 | | | |
| **EL** | **Environmental Opinion Leadership** | | 0.637 | 0.898 | 0.858 |
| **EL_1** | Role Modelling | 0.793 | | | |
| **EL_2** | Mass Appeal | 0.774 | | | |
| **EL_4** | Credibility | 0.821 | | | |
| **EL_5** | Environmental Concern | 0.807 | | | |
| **EL_6** | Sustainability Support | 0.795 | | | |
| **IN** | **Innovativeness** | | 0.605 | 0.859 | 0.781 |
| **IN_1** | Early Adopter Mentality | 0.745 | | | |
| **IN_2** | Open to Innovation | 0.818 | | | |
| **IN_3** | Consultation | 0.825 | | | |
| **IN_6** | Caution with Newness | 0.718 | | | |
| **RA** | **Relative Advantage** | | 0.793 | 0.885 | 0.74 |
| **RA_5** | Green Appeal | 0.901 | | | |
| **RA_7** | Financial Appeal | 0.88 | | | |
| **SI** | **Simplicity** | | 0.641 | 0.877 | 0.815 |
| **SI_1** | Ease of Installation | 0.793 | | | |
| **SI_5** | Information Ease | 0.778 | | | |
| **SI_6** | Tech Understanding | 0.82 | | | |
| **SI_7** | Benefit Clarity | 0.811 | | | |
| **TR** | **Trialability** | | 0.683 | 0.915 | 0.883 |
| **TR_1** | Free Trial | 0.781 | | | |
| **TR_2** | Pilot Testing | 0.818 | | | |
| **TR_3** | Visit Experience | 0.86 | | | |

| | | |
|---|---|---|
| **TR_4** | Trial Importance | 0.855 |
| **TR_5** | Positive Trial Impact | 0.814 |

The study's composite reliability and average variance inflation factor exceed the threshold levels of 0.5 and 0.7, respectively, indicating that the factor loadings are deemed reliable (Ramayah et al., 2018). Additionally, the convergent validity of the model was evaluated using the average variance extracted (AVE), which reflects the strength of the relationship among the construct's items. A strong indication of convergent validity is an AVE value higher than 0.5 (Fornell & Larcker, 1981). All obtained scores were above 0.5, meeting the recommended criteria. Several items' constructs were removed, as shown in Table 6, to meet the minimum acceptable level of AVE (Hair et al., 2014)

### Discriminant Validity

The Fornell-Larcker criterion is utilized to examine discriminant validity, determining how distinct each element in the model is from the other constructs (Fornell & Larcker, 1981). The criterion proposed by Fornell and Larcker was verified and deemed satisfactory as all the square roots of the AVE were greater than the associated correlations (Hair et al., 2020). The HTMT approach relies on estimating the correlation among the constructs. Discriminant validity is confirmed based on the HTMT ratio. Kline (2023) established a threshold of 0.85 or lower, whereas Kock (2022) and Henseler et al. (2015) suggested a more lenient threshold of 0.90 or lower. All HTMT ratios fall below the threshold of 0.9, which further substantiates the discriminant validity of this research.

Table 5

*Discriminant Validity- Forell and Larcker Criterion*

| | AB | CM | EL | IN | RA | SI | TR |
|---|---|---|---|---|---|---|---|
| **AB** | 1 | | | | | | |
| **CM** | 0.582 | 0.775 | | | | | |
| **EL** | 0.401 | 0.577 | 0.798 | | | | |
| **IN** | 0.47 | 0.655 | 0.639 | 0.778 | | | |
| **RA** | 0.723 | 0.572 | 0.478 | 0.508 | 0.891 | | |
| **SI** | 0.543 | 0.701 | 0.5 | 0.529 | 0.6 | 0.801 | |
| **TR** | 0.424 | 0.52 | 0.589 | 0.714 | 0.516 | 0.5 | 0.826 |

Table 6

*Heterotrait- Monotrait Ratio (HTMT)*

| | AB | CM | EL | IN | RA | SI | TR |
|---|---|---|---|---|---|---|---|
| **AB** | | | | | | | |
| **CM** | 0.622 | | | | | | |
| **EL** | 0.432 | 0.667 | | | | | |
| **IN** | 0.532 | 0.795 | 0.783 | | | | |
| **RA** | 0.839 | 0.716 | 0.604 | 0.669 | | | |
| **SI** | 0.592 | 0.83 | 0.593 | 0.656 | 0.761 | | |

| TR | 0.451 | 0.591 | 0.677 | 0.86 | 0.64 | 0.582 |
|---|---|---|---|---|---|---|

Similarly, Cross-loadings were used to further confirm discriminant validity. While testing the cross loading if All items have higher significant factor loadings on the underlying constructs to which they belong than on any other construct, as Table 7 shows (Wasko & Faraj, 2005), if the cross-loading values with other constructions are less than 0.1, there is no cross-loading issue (Hair et al., 2020).

Table 7

*Discriminant Validity –Cross Loading*

| | AB | CM | EL | IN | RA | SI | TR |
|---|---|---|---|---|---|---|---|
| **AB_5** | 1 | 0.582 | 0.401 | 0.47 | 0.723 | 0.543 | 0.424 |
| **CM_2** | 0.466 | 0.745 | 0.453 | 0.532 | 0.43 | 0.483 | 0.42 |
| **CM_3** | 0.509 | 0.775 | 0.483 | 0.529 | 0.44 | 0.534 | 0.434 |
| **CM_4** | 0.423 | 0.758 | 0.409 | 0.424 | 0.424 | 0.556 | 0.352 |
| **CM_5** | 0.425 | 0.817 | 0.421 | 0.481 | 0.457 | 0.596 | 0.321 |
| **CM_6** | 0.438 | 0.788 | 0.482 | 0.556 | 0.479 | 0.523 | 0.481 |
| **CM_7** | 0.43 | 0.763 | 0.422 | 0.511 | 0.425 | 0.57 | 0.394 |
| **EL_1** | 0.315 | 0.455 | 0.793 | 0.533 | 0.39 | 0.39 | 0.509 |
| **EL_2** | 0.304 | 0.479 | 0.774 | 0.504 | 0.381 | 0.422 | 0.417 |
| **EL_4** | 0.332 | 0.441 | 0.821 | 0.489 | 0.397 | 0.346 | 0.439 |
| **EL_5** | 0.339 | 0.449 | 0.807 | 0.474 | 0.365 | 0.431 | 0.479 |
| **EL_6** | 0.308 | 0.482 | 0.795 | 0.555 | 0.376 | 0.411 | 0.51 |
| **IN_1** | 0.331 | 0.51 | 0.456 | 0.745 | 0.335 | 0.416 | 0.572 |
| **IN_2** | 0.39 | 0.497 | 0.495 | 0.818 | 0.421 | 0.422 | 0.597 |
| **IN_3** | 0.38 | 0.545 | 0.496 | 0.825 | 0.432 | 0.404 | 0.565 |
| **IN_6** | 0.359 | 0.486 | 0.538 | 0.718 | 0.383 | 0.404 | 0.485 |
| **RA_5** | 0.671 | 0.473 | 0.373 | 0.411 | 0.901 | 0.515 | 0.428 |
| **RA_7** | 0.614 | 0.549 | 0.483 | 0.497 | 0.88 | 0.556 | 0.495 |
| **SI_1** | 0.514 | 0.604 | 0.463 | 0.494 | 0.576 | 0.793 | 0.462 |
| **SI_5** | 0.377 | 0.549 | 0.412 | 0.425 | 0.406 | 0.778 | 0.38 |
| **SI_6** | 0.404 | 0.545 | 0.347 | 0.33 | 0.429 | 0.82 | 0.318 |
| **SI_7** | 0.419 | 0.536 | 0.365 | 0.425 | 0.481 | 0.811 | 0.421 |
| **TR_1** | 0.317 | 0.448 | 0.478 | 0.585 | 0.398 | 0.41 | 0.781 |
| **TR_2** | 0.344 | 0.339 | 0.424 | 0.542 | 0.389 | 0.397 | 0.818 |
| **TR_3** | 0.353 | 0.432 | 0.544 | 0.589 | 0.42 | 0.422 | 0.86 |
| **TR_4** | 0.376 | 0.423 | 0.532 | 0.623 | 0.473 | 0.39 | 0.855 |
| **TR_5** | 0.359 | 0.505 | 0.453 | 0.608 | 0.448 | 0.447 | 0.814 |

**Path Analysis**

Partial Least Square Equation Modeling (PLSSEM) with SmartPLS 4.0 was used to test the hypotheses. In order to find the route coefficients and the corresponding t-value for direct and mediated associations in this investigation, bootstrapping was used with SmartPLS 4.0. Five latent constructs with several observed variables are shown in Figure 3. According to Henseler et al. (2015) and Hair et al. (2011), considerable, moderate, and weak predictive power are indicated by R 2 values of 0.75, 0.50, and 0.25, respectively. The model has adequate predictive potential, as evidenced by the R2 of 0.567 for purchase intention of green buildings (AB). As a result, the model adequately explained the endogenous variable's variation.

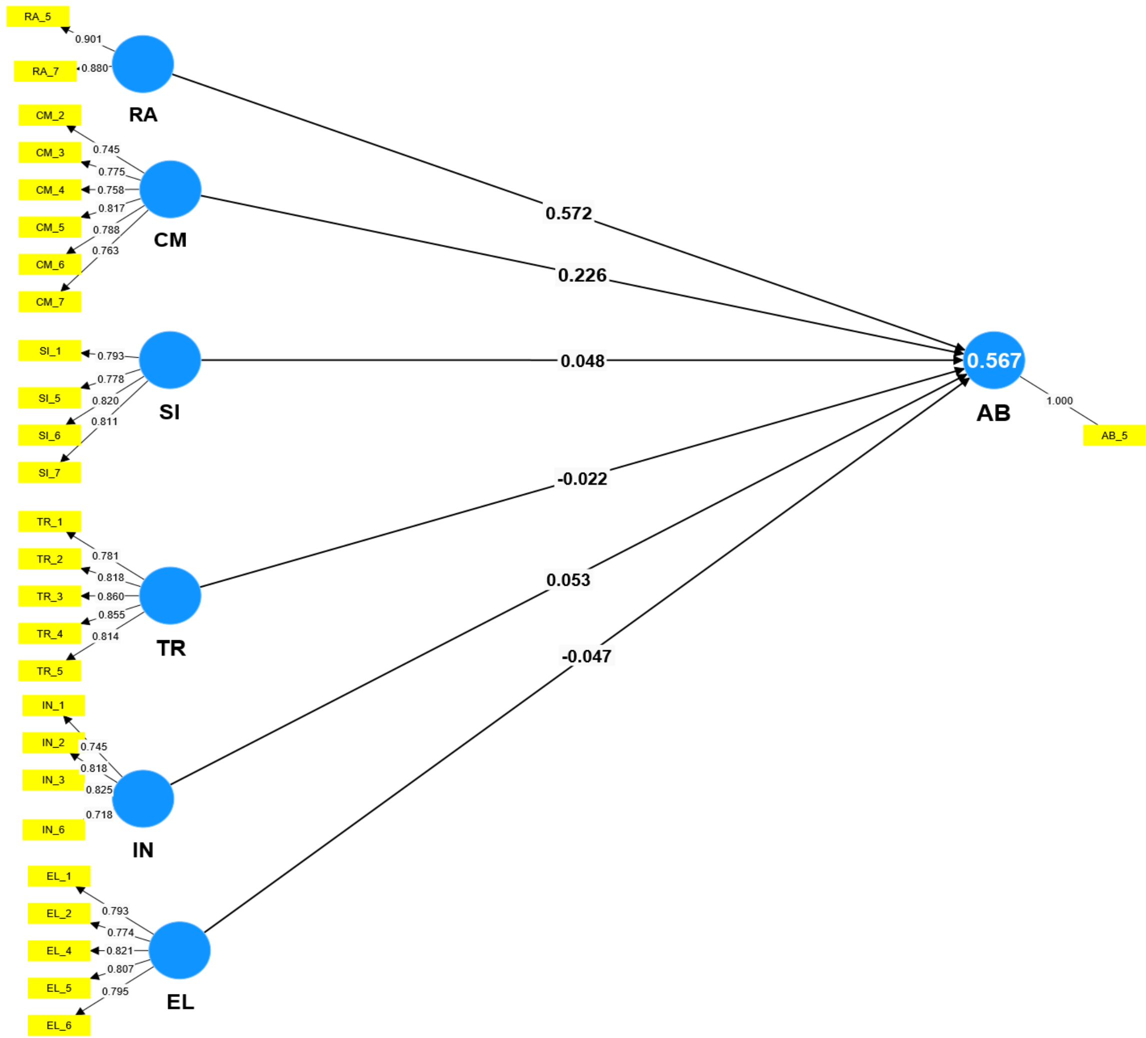



*Figure 3.* Path Analysis

To examine the significant of the variables, bootstrapping with 5000 samples is used. Among the six hypotheses, two hypothesis H1 and H2 is accepted RA-> AB (β=0.559, t value=10.056 and P<0.05) CM->AB (β= 0.232, t-value=4.074 and P<0.05). Other four hypothesis shows the insignificant relationship which is shown in table.. below.

**Table 8**

*Hypothesis Testing*

| Structural Path | Beta Coefficient (b) | SD | t-value | p-value | Confidence Interval (95%) LLCI | ULCI | Conclusion |
|---|---|---|---|---|---|---|---|
| H1: RA -> AB | 0.559 | 0.056 | 10.056 | 0 | 0.448 | 0.663 | Supported |
| H2: CM -> AB | 0.232 | 0.057 | 4.074 | 0 | 0.125 | 0.347 | Supported |
| H3: SI -> AB | 0.033 | 0.058 | 0.568 | 0.57 | -0.086 | 0.142 | Not Supported |
| H4: TR -> AB | -0.022 | 0.058 | 0.38 | 0.704 | -0.133 | 0.093 | Not Supported |
| H5: IN -> AB | 0.054 | 0.062 | 0.873 | 0.383 | -0.066 | 0.176 | Not Supported |
| H6: EL -> AB | -0.024 | 0.054 | 0.444 | 0.657 | -0.127 | 0.086 | Not Supported |

## Discussion

The study focuses on the Potential Clients Preference of Green Building in Kathmandu valley. Total of 6 hypotheses were formulated on the basis of relationship between independent variables (relative advantage, compatibility, simplicity, trialability, innovativeness, and environmental opinion leadership), dependent variable (adoption of green building). Relative Advantage (H1: RA -> AB) and Compatibility (H2: CM -> AB) were supported, with beta coefficients of 0.232 and 0.559, respectively, both exhibiting significant t-values and p-values. Similar results have been shown by studies conducted by Kaine and Wright (2022) Conversely, hypotheses involving Environmental Opinion Leadership (H6), Innovativeness (H5), Simplicity (H3), and Trialability (H4) were not supported, as their beta coefficients showed non-significant t-values and p-values. The study carried out by Khan et al. (2022) showed contrary result showing significant association of green building adoption with Environmental Opinion Leadership , Innovativeness, Simplicity, and Trialability. The limitation of the study are the study is only focused on 403 respondents which might affect the generalizability of the findings to a broader population. The study's scope may be limited to the factors considered in the framework, and other variables can influencing the adoption of green buildings. The external factor such as Macro-economic conditions, regulatory changes, or unforeseen events, which may have bearing on potential clients' decisions, were not explicitly addressed in the study.

## Conclusion

In conclusion, relative advantage, compatibility, and environmental opinion leadership positively impacted in the clients purchase intension of green building. The findings contribute valuable insights into potential clients' preferences and the factors influencing the adoption of green building practices in Kathmandu Valley. Implementing a robust Green Building Rating System, inspired by insights from the study, can become a vital policy measure. Collaborating with construction consultancies, educational institutions, and environmental organizations, policymakers can facilitate the implementation of comprehensive programs aimed at fostering a culture of sustainable construction practices in Kathmandu Valley. To overcome the limitations identified in the study on potential clients' preferences for green building, future research should consider a larger and more diverse sample to enhance the generalizability of findings. Expanding the geographical scope beyond the Kathmandu Valley is crucial to capturing regional variations in preferences and awareness. Additionally, delving into additional factors such as individual risk preferences and socio-economic influences will provide a more comprehensive understanding of green building adoption.

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