GREEN HOUSING PURCHASING: A CASE OF CONSUMERS IN KUNMING, THE PEOPLE'S REPUBLIC OF CHINA

By

Mrs. Yanping YANG

A Thesis Submitted in Partial Fulfillment of the Requirements

for Master of Engineering ENGINEERING MANAGEMENT

Department of INDUSTRIAL ENGINEERING AND MANAGEMENT

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This study aims to investigate customers' green housing purchasing behavior in Kunming, China. The questionnaire was carefully designed by reviewing the literature and then categorizing the statements into five groups: environmental knowledge of customers, attitude to green purchasing, green purchase intention, green purchase behavior, and financial thinking of customers. Using Cron Cronbach's coefficient, the questionnaire tested the item's objective congruent index's consistency and reliability. There were twenty-two statements; two hundred questionnaires were distributed using purposive sampling. The return questionnaires were 179 out of 200, which is more than the maximum number of required data, 110. Then, the analysis of the average index and relative importance index were applied. It was found that the first rank of factors was 'financial thinking of customers' with a relatively importance index (*RII*) of 0.76, and the second was 'environmental knowledge of customers' with a relatively importance index (*RII*) of 0.68. This result suggested that for promoting customers' green housing purchasing. The price of green building is significant. Furthermore, developers must educate customers about the green buildings which the customers are going to buy.

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CHAPTER 1
INTRODUCTION

1.1 Motivation

The People's Republic of China is one of the largest countries. Its urbanization and industrialization have proliferated in the past decades. As a result, China has become a massive energy consumer and CO_2 emitter worldwide (Zhang et al., 2018). China's carbon emissions reached 9.1 giga tons in 2017, accounting for 28% of global emissions (Zhu et al., 2021). Inevitably, China has become the largest carbon-emissions country in the world since 2011. To cope with such a problem, China has pursued a new campaign for carbon emissions at the 75th UN General Assembly—to accomplish a carbon peak in 2030 and carbon neutrality by 2060 (Ren & Wang, 2023).

The construction industry is an economic engine that develops society and economy in China; however, it is also the primary industry that consumes energy and emits carbon gases. Li et al. (2014) reported that 60% of city carbon emissions come from China's building function maintenance. In 2019, the total energy consumption of the construction process was 2.233 billion tons, accounting for 45.9% of the national energy consumption. In the same year, China's construction industry released about 2.77 billion tons of greenhouse gas, accounting for 50.6% of the total greenhouse gas emissions nationwide (Ren & Wang, 2023). China builds about 1.6 to 2.0 billion square meters yearly, accounting for almost 40% of worldwide's new buildings (Zhang et al., 2017). Thus, if China wants to achieve the carbon peak and neutrality goals, it must revolutionize the construction industry's construction processes, business strategies, and energy consumption (Tang et al., 2020).

Accordingly, green housing is one of these primary measures that governments worldwide adopt to cope with carbon emissions. Green housing (or green building) aims to reduce and eliminate negative impacts on the environment by reducing unsustainable construction quality in terms of planning and implementing the design, construction, operation, maintain; which arises in eco-friendly housing of homes, apartments, condominiums, and other residential properties (Wijayaningtyas et al., 2019). However, with competitive economic growth, businesses devote their resources

to satisfying the end customers. Thus, green consumers or purchasers must not be noticed.

Rosner et al. (2022) reported that it had not become a standard even though constructions are being developed. Many buildings still comply with traditional building methods. The primary reason is the unwillingness of buyers to prefer green buildings over traditional buildings. Unarguably, if house buyers preferred to buy green condominiums, developers, contractors, and suppliers would have to embrace customer needs and take in the green building standards of their work.

This study focuses on investigates the factors influencing Kunming's home buyers on green building purchasing. The factors will be ranked by using the relative importance index. Furthermore, socio-demograhic variables will be investigated using descriptive and inferential statistics.

1.2 Research Objectives

1. To identify green purchasing intention of consumers in Kunming toward green housing.

2. To determine and rank the factors influencing purchase decisions of green housing of consumers in Kunming.

1.3 Research Contributions

1. The findings of this study would help developers understand the behavior and needs of green housing purchasers in Kunming.

2. The output of this study can be used to promote the development of green housing market in Kunming.

3. Finally, it can support China's environmental protection policy.

1.4 Scopes and Limitations

1. The area of study is Kunming, a capital city of Yunnan province, the People's Republic of China.

2. The duration of data collecting is between the first week of October 2023 and the last week of December 2023.

3. This is the survey research and using statistical tools for data analysis. There is no guarantee for other study areas.

4. This study focuses on residential properties such as, homes, bungalows, duplex, terraced houses, flats, condominiums, and apartments.

1.5 Abbreviation

EC	Environmental Concern
GAPI	Green Apartment Purchasing Intention
GB	Green Building
GBI	Green Building Index
GH	Green Housing
GPA	Green House Product Attributes
PA	Purchsing Attitude
PBC	Perceptual Behavior Control
PI	Purchase Intention
RII	Relative Importance Index
SN	Subjective Norm

1.6 Glossary

Residential property refers to all land and structures intended for private dwelling purposes, whether on permanent or a temporary basis.

CHAPTER 2
LITERATURE REVIEW

Green housing has proliferated for decades. However, it has various meanings and limitations in diverse geography. In this study, green housing in literature is reviewed. The meaning, scope, and limitations are described in Western and Eastern countries. However, green housing purchasing is also our intention. The theory of green purchasing behavior is reviewed. Green building purchasing is examined. The analysis tool is also explained. The related studies are also critiqued.

2.1 Green Housing

Green housing (GH) is displinces of creating and using resource-effcient methods of construction, renovation, operation, maintenance, and demolition (Zuo & Zhao, 2014). It is interchangeable with green building, sustainable housing, and sutainable building. The implementation of green housing concept was taken into national debates (Ghodrati et al., 2012). There is a gap between developed and developing coutries. It resulted in different degrees of applying green housing. In this section, we will discuss the meanings of green housing in literature, the situation of global green housing, and China's green housing.

2.1.1 Green housing definitions

Green housing is a type of housing designed for environmentally friendly and sustainable. It focuses on efficient consume of energy, water, land, and building materials (Roberts, 2009; HND, 2023). Basically, a green housing is any plan, project, or technique that might lessen or completely eliminate worse impacts to environment and climate.

Wells & Vermeer (2020) stated that green housing is the process of designing and supporting infrastructure that decreases resource use, makes friendly-environments for people's living, and reduces negative impacts on local, regional, and worldwide ecosystems. Green housing has five pillars:

1) Smart land use
2) Water efficiency and management
3) Energy efficiency

4) Resource-efficient materials

5) Healthy indoor environmental quality

Green housing focuses on improving the efficiency of resources use, such as the use of energy, water, and various types of building materials, and also reducing the environmental impairments caused by buildings during the building's life cycle (Ko et al., 2013; Juan et al., 2017).

In conclusion, green housing is a type of residence designed to use resources such as land, energy, water, and building materials efficiently and reduce environmental impacts through its life cycle.

2.1.2 Green housing worldwide

Anderson & Shiers (2009) reported the environmental impact of housing in UK, yearly energy used for building operation accounted for 30% of national energy consumption, and the building materials used for construction accounted for 10% of mineral extraction and 1% of climate change, see Fig. 2.1, and Fig.2.2 shows the waste generated by housing construction, operation, and maintenance.

Bauer et al. (2009) pointed out that during the years of 1990 to 2000, there was the rising number of environmental catastrophes for 40%. Stroms and flooding were the most disasters worldwide. It is ieviable, the climate chage is the consequence of carbon emission and natural resource used.

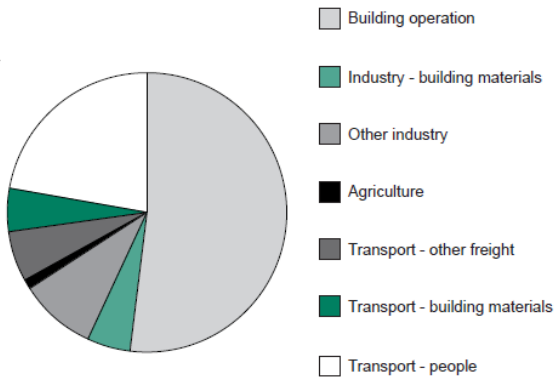

Figure 2.1 UK energy consumption

Source: Anderson & Shiers (2009)

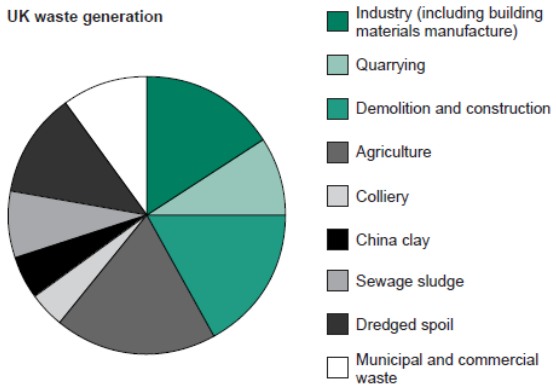

Figure 2.2 UK waste generation

Source: Anderson & Shiers (2009)

Companies in a variety of industries have since realized that long-term success depends on the prudent management of resources. When compared to solutions that are purely economically motivated, sustainable structures that are both resource- and environment-friendly have an increasingly higher status.

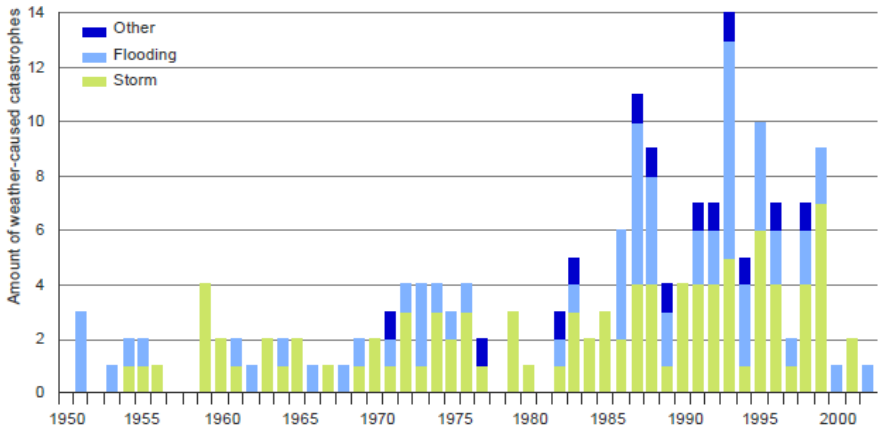

Figure 2.3 Major weather-caused catastrophoes

Source: Bauer et al. (2009)

Green housing always prioritizes regenerating energies and resources to reduce energy and operating expenses as low as possible while yet providing a high level of comfort and a healthy indoor environment. The complete building life cycle—from concept to planning stage, from construction to operation, and finally back to

renaturation—is taken into account when they are constructed in accordance with economically viable principles. Therefore, green housing are based on an integrated and future-oriented approach.

Since 2000, green housing and sustainable design have been vital worldwide activities in the design, development, and construction industry (Yudelson, 2009). Furthermore, it has accelerated interest since 2005, as shown in Fig. 2.4. Green Building Council's Leadership in Energy and Environmental Design (LEED) is a rating system for green buildings. It is not rate only the houses but also the construction sites that are restorative in process and outcome.

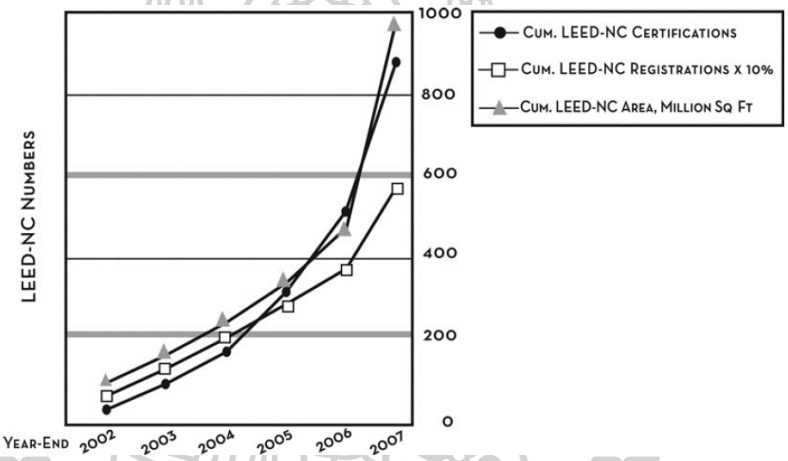

Figure 2.4 LEED-new construction projects during 2002-2007
Source: Yudeson (2009)

Figure 2.4 shows the growth of green housing in terms of cumulative LEED-new construction project registrations and certifications, increasing 75% in 2007 alone and 65% and 77%, respectively, in 2006 versus the prior year. It compromises that green housing design's acceptance and practice began accelerating from 2006 to 2007.

Hagbert et al. (2013) disclosed paradoxes and possibilities for a green housing sector in Sweden. The authors accepted that the construction sector is a significant contributor to the development and economy of the nation. However, it is a cause of resource depletion and environmental impacts. Green housing's situation in Sweden is the connection between society and the environment but on an imprecise scale. The

developers in Sweden are still questioning how sustainable development within the housing section is concretized. One of the developers' issues is the customer needs. Customers are perceived as becoming more demanding could be seen as a possibly for further challenging and developing the housing offered. Nevertheless, housing for customers' demands is not sustainable per se.

2.1.3 Green housing in China

Zhang et al. (2017) reported that green housing in China was started in 1986 with energy-saving buildings. China's green housing has been revised since then periodically. The government created a strategy for long- and medium-term development initiatives integrating green housing in May 2006. Green housing was proposed in the outline of China's Eleventh Five-Year Plan, released in October. Aiming to raise the grade of green housing for 20% of new construction, China's National Development and Reform Commission (NDRC) and Ministry of Housing and Urban-Rural Development (MOHURD) created the Action Plan on Green Housings in 2013. Green housing has become a significant trend in China's future housing.

The State Council of China's Agenda 21, which addresses sustainability challenges in urban and rural areas, is where green housing in China first emerged. Since then, the Chinese government has implemented regulations and guidelines for the construction sector to meet to protect the environment, including internal pollution management and high-quality building materials (Shi et al., 2013).

Following the 2004 Olympic Games in Beijing, the government has pushed green building techniques even more. The Beijing Olympics Organizing Commission introduced a set of Guidelines for implementing the Green Olympics 2003, which led to establishing of the Assessment System for Green Building in the Beijing Olympics (GBCAS). The GBCAS covers the technical criteria and several evaluation systems. For its pavilion developments, the 2010 Shanghai World Expo has taken inspiration from the Beijing Olympics Games' expertise with green building within a multi-project (program) setting.

The Beijing National Stadidum or the Beijing Olympic Park (Bird's nest stadium) is one of the buildings for Beijing Olympic 2008, also called Olympic Green. It is a spacious park containing ten Olympic venues, seven non-competitive venues,

and a forest park. The stadium has become a landmark of Beijing and representative works in architectural history.

The stadium, with its ostensibly dematerialized leitmotif, attracted attention not only for its perplexing architecture but also for its environmentally friendly design, which included, among other things, the use of solar photovoltaic power generation, rainwater harvesting techniques, natural ventilation, and daylighting to the greatest extent possible (Nair, n.d.).

Figure 2.5 Beijing Olympic park
Source: China discovery (n.d.)

In conclusion, China has a strong strategy and policy to promote green housing. The Ministry of Housing and Urban-Rural Development (MOHURD) is responsible for launching action plans, legislation, and benefits for stakeholders in the construction industry to participate in green housing. For example, MOHURD initiated building energy-saving and green housing development planning in the 13th five-year (2016-2020), named ‘redoubling amount of green housings’ (Zhang et al., 2017). It attempts to achieve the goal of over 2 billion m2 of new green housing, and over 50% of new ones are awarded green building certification during the 13th Five-year plan. It is an intense action on green housing worldwide.

2.2 Green Building Standards

This section presents the green building standards that apply around the world. By the way, all standards may not be reviewed in this report. However, some significant standards are briefly examined.

2.2.1 Code for sustainable homes (CSH)

Code for Sustainable Homes (CSH) is a technique for grading and certifying the environmental performance of new dwellings in the UK. In order to promote ongoing advancement in environmentally friendly home construction, there is a national code for planning and building new dwellings. The World Wildlife Fund (WWF) and the Association for Environment Conscious Building (AECB) applaud CSH for adding "whole house" carbon emissions and elevating zero carbon development to the top of the industry agenda. To analyze the overall environmental impact, CSH rates new homes from Level One to Level Six based on their performance against nine sustainability criteria (as listed below). The lowest level is Level One, which is above building rules, and the highest level, Level Six, which reflects excellent advancements in terms of sustainability (Ye et al., 2015; Zhang et al., 2017).

(1) Energy and CO2 emissions - Energy used in operations and the resulting carbon dioxide emissions into the atmosphere (each level of the Code has different minimum requirements that must be satisfied).

(2) Water - Minimum criteria must be met at each level of the Code; internal and exterior water-saving methods are defined.

(3) Materials: The origin and environmental impact of the building materials used to construct the home (presence of minimal criteria).

(4) Management of surface water runoff from the development and flood risk (minimum standards in place).

(5) Construction materials are reduced, reused, and recycled (minimum standards are met), and recyclable garbage and compost are stored.

(6) Pollution: Using heating systems and insulating materials that do not contribute to global warming.

(7) Good daylight quality, sound insulation, private space, accessibility, and adaptability are provided (minimum standards are only for Code Level 6).

(8. Management) Designing for security and minimizing the effects of construction.

(9) Ecology - Effectively constructing land and preserving and enhancing the local ecology.

2.2.2 Leadership in energy and environmental design (LEED)

Since 1998, Leadership in Energy and Environmental Design (LEED) has changed to more accurately reflect and include new green building technologies. LEED New building (NC) version 1, a pilot version, was followed by LEED NC version 2, LEED NC version 2.2, LEED 2009 (formerly known as LEED version 3), and LEED version 4, a complete system of interconnected standards spanning every step of the development and building process, in 2005. The specializations offered by LEED version 4 are divided into five broad areas. Those services currently offered in that suite include green home design and construction, green neighborhood development, green building operations & maintenance, and green interior design & construction. Table 2.1 provides a detailed breakdown of the versions under the various categories. Most of the building type is new construction based on the GSM of LEED space in the USA between 2009 and 2011. Therefore, LEED for New Construction (LEED-NC) is used in this paper to make comparisons. Integrated process, location and transportation, sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, innovation, and regional priority are the seven key categories that LEED projects must score in order to achieve certification. A project receives one of four LEED rating levels, including certified, silver, gold, and platinum, depending on the number of points it receives.

2.2.3 Evaluation standard for green building (ESGB)

The Evaluation Standard for Green Building (ESGB), a national standard for China, was adopted in 2006. China's green building evaluation standard has undergone several developments, whether created from scratch, acquired, or refined via learning (Geng et al., 2012). A new version of the evaluation standard for green buildings in China was released in 2014. This version used LEED as a reference and included seven indicators: quality of the indoor environment, operation management, and construction management, as well as conservation of land and outdoor environment, energy conservation and utilization, water conservation, and resource utilization, and material

conservation and resource utilization. Table 2.2 displays the variations between ESGB 2006 and ESGB 2014. Control items and scoring items are included for each sort of indication. The sum of all the indicators' scores is 100. The evaluation indicator method also uniformly assigns innovative items to promote technical advancement and improvements in green buildings. The assessment result of the control item must be met before the score item and innovation item are reviewed. The overall points, weighted scores of the score items, and inventive things make up the rating. Based on their performance against seven criteria, they are rated between one and three stars.

Table 2.1 LEED's versions

Categories	Versions
Green Building Design and Construction	• LEED for New Construction • LEED for Core and Shell • LEED for Schools • LEED for Retail: New Construction and Major Renovations • LEED for Healthcare
Green Interior Design and Construction	• LEED for Commercial Interiors • LEED for Retail: Commercial Interiors
Green Building Operations & Maintenance	• LEED for Existing Buildings: Operations and Maintenance
Green Neighborhood Development	• LEED for Existing Buildings: Operations and Maintenance
Green Home Design and Construction	• LEED for Existing Buildings: Operations and Maintenance

Source: Zhang et al. (2017)

Table 2.2 ESGB 2006 and 2014 versions comparison

	ESGB vesion 2006	ESGB version 2014
Evaluation phase	Operation phase	Design phase Operation phase
Evaluation objects	Residential buildings and public buildings	Civil buildings
Index categories	1. Energy, resources, environment load, indoor environment quality 2. Operation management	1. Energy, resources, environment load, and indoor environment quality 2. Construction management
Structural system	Control items general and preference items	Control and score items
Evaluation methods	Counting the number of provisions	Total score rate

Source: Zhang et al. (2017)

2.2.4 British building research establishment environment assessment method (BREEAM)

The British Building Research Establishment Environmental Assessment Method (BREEAM), developed and run by the BRE for new public buildings, became the world's first comprehensive green building evaluation system in 1990 (Cui et al., 2012). Additionally, the more recent versions of BREEAM include "BREEAM 2/91 for new supermarkets," "BREEAM 3/91 for new homes," "BREEAM 4/93 for vacating public buildings," and "BREEAM 5/93 for new industrial buildings. The weighting systems were not included in any of the earlier versions. The weighing system was added to BREEAM 98, and management, health and wellbeing, energy, transport, water, material, land use & ecology, and pollution were adjusted to be the evaluation indicators. The current edition, BREEAM International for New Construction 2016, has also been made available for certifying projects globally. Planning professionals, local governments, developers, and investors can utilize the New Construction, In-use, Refurbishment, and Fit-Out, Communities, and Infrastructure manuals from BRE to

evaluate a building's lifecycle with an eye toward design, construction, operation, and refurbishment.

2.2.5 Comprehensive assessment system for builf environment efficiency (CASBEE)

Japan's Comprehensive Assessment System for Built Environment Efficiency (CASBEE) was created in 2001 through a partnership between local governments, businesses, and academic institutions (Ye et al., 2015). CASBEE has steadily evolved into a multi-level system that covers the entire life cycle. The evaluation system comprised brand-new buildings, old structures, renovated buildings, and neighborhood construction from 2002 to 2007 and from CASBEE-Public buildings through CASBEE-Residential buildings. JSBC has consistently enhanced the CASBEE system's design as it is being developed. The Building Sustainable Environmental Performance Evaluation System for Buildings also replaced the Comprehensive Environmental Performance Evaluation System for Buildings in 2009. JSBC released CASBEE for cities in 2010. With the system's ongoing development, CASBEE has become a comprehensive system that can meet the evaluation needs and adapt to various stages, scales, applications, and regional buildings. The most recent version, created in 2014, can be used during the building's development, renovation, and use phases. With criteria from the CASBEE structures, CASBEE for Commercial Interiors, and CASBEE for Temporary Construction manuals, CASBEE may evaluate the structures from the design to the renovation.

2.2.6 Green building standards comparison

Figure 2.6 illustrates the comparision among green building standard worldwide. However, some of standard may not explained in this report. A curious reader can find other standards' details in Bauer et al. (2009).

System (Country of origin)	DGNB (Germany)	BREEAM (Great Britain)	LEED (USA)	Green Star (Australia)	CASBEE (Japan)	Minergie (Switzerland)
Initiation	2007	1990	1998	2003	2001	1998
Key Aspects of Assessment & Versions	- Ecological Quality - Economical Quality - Social Quality - Technical Quality - Process Quality - Site Quality Purpose of the DGNB Certificate: Application for buildings of any kind (Office high-rises, detached residential homes, infrastructure buildings etc.) DGNB for: - Offices - Existing Buildings - Retail - Industrial - Portfolios - Schools	- Management - Health & Well-being - Energy - Water - Material - Site Ecology - Pollution - Transport - Land consumption BREEAM for: Courts, EcoHomes, Education, Industrial, Healthcare, Multi-Residential, Offices, Prisons, Retail	- Sustainable Sites - Water Efficiency - Energy & Atmosphere - Material & Resources - Indoor Air Quality - Innovation & Design LEED for: New Construction, Existing Buildings, Commercial Interiors, Core and Shell, Homes, Neighborhood Development, School, Retail	- Management - Indoor Comfort - Energy - Transport - Water - Material - Land Consumption & Ecology - Emissions - Innovations Green Star for: - Office – Existing Buildings - Office – Interior Design - Office – Design	Certification on the basis of "building-environment efficiency factor" BEE=Q/L Q ... Quality (Ecological Quality of buildings) Q1 - Interior space Q2 - Operation Q3 - Environment L ... Loadings (Ecological effects on buildings) L1 - Energy L2 - Resources L3 - Material Main Criteria: (1) Energy Efficiency (2) Resource Consumption Efficiency (3) Building Environment (4) Building Interior	4 Building standards are available: (1) Minergie - Dense building envelope - Efficient heating system - Comfort ventilation (2) Minergie-P additional criteria to (1): - Airtightness of building envelope - Efficiency of household applicances (3) Minergie-Eco additional criteria to (1): - Healthy ecological manner of construction (optimized daylight conditions, low emissions of noise and pollutants) (4) Minergie-P-Eco Adherence to criteria of Minergie-P and Minergie-Eco
Level of Certification	Bronze Silver Gold	Pass Good Very good Excellent Outstanding	LEED Certified LEED Silver LEED Gold LEED Platinum	4 Stars: ‚Best Practice' 5 Stars: ‚Australien Excellence' 6 Stars: ‚World Leadership'	C (poor) B B+ A S (excellent)	Minergie Minergie-P Minergie-Eco Minergie-P-Eco

Figure 2.6 Sustainable building rating system comparison

Source: Bauer et al. (2009)

Table 2.3 shows the criteria comparison among green building standards. However, Green Mark and G-SEED 2013-2 are not explained in this study.

Table 2.3 Evaluation criteria of green building standards

Evaluation criteria	LEED	ESGB	BREEAM	CASBEE	Green Mark	G-SEED 2013-2	Total
Water	✓	✓	✓	✓	✓	✓	6
Energy	✓	✓	✓	✓	✓	✓	6
Material	✓	✓	✓	✓	✓	✓	6
Indoor environment	✓	✓		✓		✓	4

Table 2.3 (continued)

Evaluation criteria	LEED	ESGB	BREEAM	CASBEE	Green Mark	G-SEED 2013-2	Total
Land and outdoor environment		✓	✓	✓			3
Transport	✓		✓			✓	3
Waste			✓		✓		2
Pollution			✓			✓	2
Health and wellbeing			✓		✓		2
Innovation	✓		✓				2
Construction project management		✓	✓				2
Operation management		✓				✓	2
Site	✓					✓	2
Quality of service				✓			1
Off-site environment				✓			1
Maintenange management						✓	1
Regional priority	✓						1
Integrative process	✓						1
Ecological environment						✓	1
Total	9	7	10	7	5	10	

Source: Cui et al. (2021)

2.3 Green Purchasing

A purchase decision is how individuals, groups, or organizations choose, buy, rent, use, and utilize goods, services, ideas, and experiences to satisfy the needs of desire (Kottler & Keller, 2009). Rachmawati et al. (2019) stated that the decision before purchasing includes three stages; problem recognition, seeking information, and evaluation for the final decision.

This section introduces green purchasing behavior before green building purchasing. These two sub-sections lead to the factors that influence consumers to select green housing.

2.3.1 Green purchasing behavior

Different market sectors have varying levels of demand for green products. Firms must identify green customer segments to market green products or communicate environmental activities to people likely to be concerned about environmental issues. There have been few attempts in the past 20 years to categorize consumers strictly based on their levels of green shopping behavior. However, a ton of research has been done in an effort huge profile the population's overall environmentalists using a range of segmentation factors. Socio-demographic factors, including sex, age, education, social class, and psychological factors like locus of control, alienation, conservatism, and dogmatism, make up most of the measurements (Schlegelmilch et al., 1996).

Personality traits have slightly stronger correlations with people's environmental consciousness. While this is true for overall environmental indicators, specific pro-environmental actions, such as green purchase decisions, show mixed results. Additionally, it has been demonstrated that personality traits explain only a small portion of the variability of the behavioral measures used. Using personality traits to segment the market based on behavioral criteria should be done cautiously, as stated in the following quote: Personality measures are most likely effective for characterizing segments once they have been defined on some other basis. Within segments isolated based only on personality traits, conduct and the motivations behind it would likely vary. Moreover, because of the fundamentally complicated procedures involved in their measurement and interpretation, personality factors do not easily lead to a segmentation approach.

The European Commission (EC) reported (Eurobarometer, 2013) details the purchasing habits of green products across the EU and notes that Austria is the only member state where the majority of people (48%) frequently purchase green goods. Only 15% of respondents in Lithuania said they frequently purchase these things. It is still unclear why these two nations have such a disparity. Additionally, while studying the factors that influence people to behave in an environmentally friendly way, authors in the literature list buying green products as one of the scale items. The population's positive environmental behavior can be seen from one angle, where the green purchasing and environmentally friendly conduct constructions are similar.

On the other hand, these behavioral categories might be unique because not all consumers who purchase environmentally friendly goods do so for environmental reasons and some people who have a propensity to behave more sustainably cannot afford to do so. Therefore, the first part of this article examined the connections between green purchasing behavior and consumer behavior in Austria and Lithuania. Additionally, it was examined whether making a green purchase and engaging in environmentally friendly behavior are related to the same external variables, such as the significance of product price, environmentally conscious social norms, and gender, taking into account the goal-framing theory, which holds that different goals influence a separate item of environmentally friendly behavior. The differences in green purchase behavior and its determinants between these countries were also analyzed, along with recommendations for Lithuania, in order to reveal what Lithuania can learn from Austria in terms of the promotion of green purchases and environmentally friendly behavior (Liobikiene et al., 2017).

2.3.2 Green housing purchasing

With increasing environmental awareness, the market value of green products has grown substantially. GBI-Research (2010) reported that the estimated value of the global green building market was US$195 billion in 2010 and was estimated to reach US$600 billion by 2015.

Juan et al. (2017) investigated customer behavior factors in green building purchasing. The researchers deployed the theory of consumer behavior named the Howard-Sheth model. The model consists of input, exogenous, and hypothetical constructs, as shown in Fig. 2.7.

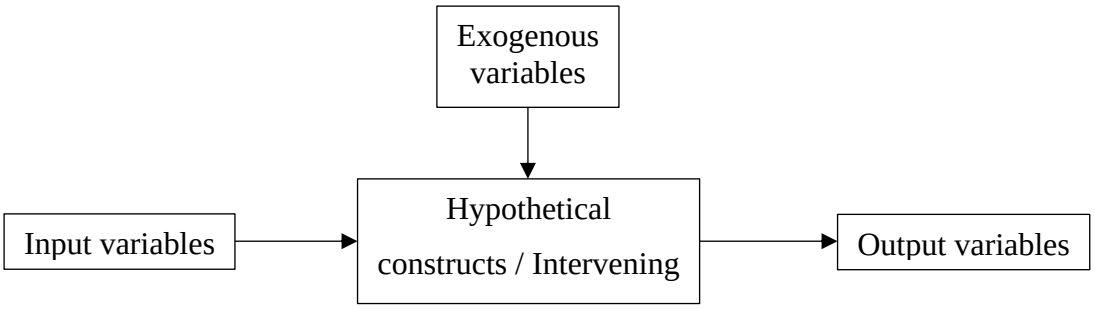

Figure 2.7 Howard-Sheth model
Source: Juan et al. (2017)

The study used an artificial neural network (ANN) to develop a pricing model to predict the price premiums of green buildings. The proposed tool shows the ability of robustness by 94% overall prediction capability.

In Bangladesh, green housing is an emerging concept of environmental sustainability. Zahan et al. (2020) examined green purchase behavior towards green housing of Bangladeshi consumers. They used an extended theory of planned behavior (TPB) and structural equation modeling (SEM). It was found that environmental concern and environmental knowledge showed an insignificant influence on subjective norm and green purchase intention. Like how attitudes and perceived behavioral control significantly and positively influence green purchasing intention, subjective norms revealed a negligible association with this intention. Consequently, to educate Bangladeshi consumers about green homes, marketers should strongly emphasize the effects of environmental damage.

It is unavoidable. The cost of green buildings is higher than that of conventional buildings. This factor affects buyers' decisions. In the literature, buyers' comments on green housing purchasing were divided into comment quantity, comment quality, comment titer, and reviewer credibility. Fang et al. (2021) investigated the mediation role of psychological distance that affects homebuyer comments worldwide. The empirical survey was conducted online. There were 368 respondents; however, 266 were valid questionnaires. The descriptive analysis revealed that most respondents were aged between 19 and 20, had undergraduate education, and companies' staff.

Interestingly, most of them had the lowest income in the questionnaire. The exciting thing about this study was that the authors used psychological distance mediation variables such as time, social, and space distance to construct the influence model of homebuyer comments on green housing buying intention. Using correlation analysis, the authors pointed out that the comment quality, comment titer, and the reviewers' credit rating positively impact green housing purchasing intention. On the other hand, the comment quantity has no vital effect. The authors also construct a hoteling model based on the dependent variables to predict purchasing intention.

Chuweni et al. (2022) studied the influencing factors toward green housing buying in Malaysia. The factors were based on the study of Azis et al. (2021) which were location, financial, neighborhood, and housing attributes. Theoretically, location is the primary component for a homebuyer's decision. Strategic location researches point out that regardless of income level homebuyers still accept that the most important factors in the residential properties decision is the location. Green housing is accepted in a group of young and elder people who has the high income. Various realestage professionals also accepted that the major factor of homebuyers is the proximity to work area, shool, shopping mall, hospital, and mass transportation.

Financial factor is also in the determination of homebuyers. They consider this factor a financial risk because the home mortgage duration may reach three decades. However precisely, the financial factor can be divided into three attributes:

1) It is the house price. It is marketing perception that a green residence is higher than the conventional residence, about 30% (Elias & Lin, 2015).

2) It is the capability to secure a home mortgage. It is the consequence of the first attribute.

3) The developers' dignity.

Since green residences need advanced construction technologies, homebuyers have confidence in well-known developers; accordingly, the reputation of developers is one of the reasons to buy a green building.

Neighborhood and housing features are one of the mentioned factors. There are five attributes for this dimension. First is the home design. This attribute is crucial for providing healthy indoor and air quality. Low air quality in open-air areas and the PM2.5 problem drive people to look for healthy, high-quality indoor air. A green

building must be designed to cure this pain point. The second is the land size. Sparing areas for daily operations and maintenance is a valuable way to minimize environmental impacts. The third is privacy. The neighborhood is significant for homebuyers' decisions. Green housing developers must consider noise, traffic conditions, water quality, and air quality. The fourth is the housing oriented. It is a dynamic factor that brings a means of social engagement. The elements are not specific. It is upto the developers. For example, energy efficiency, building material management, and rainwater harvesting. The environmentally friendly green features establish a positive relationship between the home and the buyer, attracting the purchase. It was discovered that the elements induce purchasers to pay a sale price premium of between 3.4% and 6.4% (Jayantha & Man, 2013). The last attribute is the number of bedrooms. It was found by an empirical study of Bond (2015). The number of bedrooms is the third feature of green buildings in California. Homebuyers percept that the number of bedrooms relates to natural light, spaciousness, and fresh air. The low number of bedrooms could not provide these features.

In conclusion, the price of green properties is generally higher than conventional properties. Due to new technologies, modern building materials, and advanced construction techniques, green housing is more complicated and high cost. Additionally, many green property projects must be certified by an accreditation body; companies must incur this cost. The literature has investigated factors influencing homebuyers to select green buildings using many theories and academic techniques. Most of them use empirical studies and questionnaires as research tools. Marketing theory merges with the psychological subject deployed. Most studies could not claim in general; they were limited by study area. Inevitably, cultural and economic situations are also vital circumstances.

2.4 Average Index

Average Index (AI) is used to determine the influencing factors and pointing out the most vital factor in purchase intention (Alaloul et al., 2020). The following equation is used in this study.

$$AI = \frac{\sum_{i=1}^{5} w_i n_i}{N} \quad (2.1)$$

where AI is average index, w_i is the weight for i level of 5-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree), n_i is a number of respondents for i level of 5-point Liker scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree, N is the total number of respondents.

The classifications of the rating sclaes are:

1 = strongly disagree (1.0 ≤ Average Index < 1.5),

2 = disagree (1.5 ≤ Average Index < 2.5),

3 = neutral (2.5 ≤ Average Index < 3.5),

4 = agree (3.5 ≤ Average Index < 4.5),

5 = strongly agree (4.5 ≤ Average Index < 5).

2.5 Relative Importance Index

Prediction and explanation are the two discrete applications of multiple regression analysis. When multiple regression is used for strictly predictive purposes, an equation is derived from a sample to predict scores on a criterion variable based on scores on a set of predictor variables. This equation can be applied to predictor scores within a comparable sample to predict the unknown criterion scores. The elements of the equation are regression coefficients, which indicate the amount by which the criterion score is expected to increase as a result of a unit increase in a given predictor score, assuming that the other predictor scores remain unchanged. The extent to which the predictor variables can predict the criterion (indicated by R^2) is of much greater interest than the magnitude of the relative regression coefficients.

Multiple regression is also utilized for explanatory or theory-testing objectives. In this instance, we are interested in the contribution of each variable to the prediction of the criterion. For instance, a theory may imply that one variable is relatively more

significant than another. The primary concern is interpretation so that meaningful conclusions can be derived regarding one predictor concerning another. In multiple regression, this is indicated by the relative importance of predictors, even though there are numerous possible definitions of importance (Johnson & LeBreton, 2004).

Variable significance has three distinct interpretations. Change in the criterion due to a given change in the predictor variable, as measured by the regression coefficient, is referred to as theoretical importance. Level importance refers to the contribution of the predictor to the increase in the mean criterion score, which corresponds to the product of a variable's mean and its unstandardized regression coefficient. It is a standard economic measurement. Lastly, dispersion importance refers to the proportion of the criterion variance accounted for by the regression equation that can be attributed to each predictor variable. When the explanatory aspects of regression analysis are relevant, this interpretation of significance corresponds most often to measures of significance in the behavioral sciences.

In this study, the relative importance index for 5-point Likert scales variables is used as the following equations.

$$RII = \frac{\sum_{i=1}^{5} w_i n_i}{h \times N} \tag{2.2}$$

where RII is the relative importance index, n_i is a number of respondents for i level of 5-point Liker scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree), w_i is the weight for i level of 5-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree), A is the highest weight, N is the total number of respondents.

2.6 Conclusion

This chapter describes the situation of green housing attracting people, governments, and developers to explore new knowledge, new construction techniques, and new ways of people's living. Green housing's definitions are drawn. However, it is up to the countries' cultures, educations, geographics, and economics. The strong support of the Chinese government makes green housing prosperous. Many policies have been launched to attract all stakeholders in the construction industry to join sustainable living.

Some green building standards are reviewed. They are also compared. China sets ESGB to be the nation's green building standard. There needed to be more international publications in the first decade of launching. However, many international publications describe the ESGB and its application for the last ten years. The latest ESGB version covers more construction phases, all buildings related to human, and construction management.

An excellent green building is useless if homebuyers have no intention of purchasing it. This chapter reviewed the theory of green purchasing behavior. It is found that green product purchasing is different in different countries. There are common barriers and different drivers; it is a serious consideration when buying green housing. Various literature used psychological knowledge and advanced decision-making theory to understand green building purchase intention. Nevertheless, this study intends to use the average and relative importance indexes to quatify, and order factors influencing green housing.

CHAPTER 3
RESEARCH METHODOLOGY

This chapter explains the research procedure and research tools used in the study. It is a survey study and quantitative analysis.

3.1 Questionnaire Design

3.1.1 Questionnaire

A 5-point Likert scale is used to measure each influential factor. A structured questionnaire in Chinese and English will be emailed to collect data from residents of the province of Kunming. However, before the formal survey, interviews with college professors and developers' supervisors are conducted to improve the reliability and validity of the measurement scales. If necessary, the influencing factors and language are modified.

From the literature, factors are divided into five groups: environment knowledge (E), attitude toward green purchasing (A), green purchase intention (I), green purchase behavior (B), and financial thinking of customers (F). Please note that the statements were raised from the literature.

Table 3.1 Statements in the questionnaire.

No.	Statement
E1	Humanity is engaging in the extensive exploitation of the natural environment.
E2	To ensure their survival, humans must establish a state of symbiosis with the natural environment.
E3	The purchase of green housing helps our environment.
E5	I understand the positive impact and other beneficial of green housing on our environment.
E6	I can save our environment by supporting green housing.
E7	I also recommend my family and friends to purchase green housing and support them with my knowledge.
A1	I love to purchase green products, especially green housing.

Table 3.1 (continued)

No.	Statement
A2	It is a good idea to buy green housing.
A3	I have money, time, knowledge, and willingness to buy green housing.
A4	There are a lot of advantages to buying green housing over conventional housing.
I1	I want to buy green housing in the near future.
I2	I would love to live in green housing.
I3	I will recommend my friends to buy green housing.
B1	I prefer green housing because of its eco-friendly features.
B2	I have bought green housing because they are environmentally friendly.
B3	Humanity is engaging in the extensive exploitation of the natural environment.
B4	I checked the certifications of green housing and their standards before purchasing it.
F1	The most significant barrier to my green housing purchasing is the price.
F2	There are no regulations for customers. Thus, I would buy conventional housing.
F3	It is good to have an incentive for customers to buy green housing.
F4	A green loan to buy green housing is an excellent factor in choosing green housing.
F5	Even if it is green housing, other factors, such as location, number of bedrooms, transportation access, and vicinity, are still important.

The questionnaire also included the respondents' demographic information such as gender, age, education level, job position, salary, and experience, see Appendix A. We then tested the questionnaire using the Item Objective Congruence (IOC). Four experts in green building from the construction industry and college professors evaluated the statements, and IOC was calculated. It found that all statements lie between 0.63 and 1.00. Thus, the questionnaire was congruent.

3.1.2 Reliability test

Cronbach's Alpha coefficient is used to examine the consistency of the collected data, with coefficient values ranging from 0.00 to 1.00, where 1.00 indicates the highest internal consistency. If the obtained coefficient value is greater than 0.63, the

measurement method is reliable.1.3 Validity test. Eq. 3.1 is the Cronbach's Alpha Coefficient calculation.

$$\alpha = \frac{N}{N-1}\left(1 - \frac{\sum_{i=1}^{N} S_i^2}{S_j^2}\right) \quad (3.1)$$

where α is cronbach's coefficient, S_i^2 is the variance associated with each item, S_j^2 is the variance associated of the total scores.

We then used Cronbach's coefficient to assess the reliability of the questionnaire by testing 30 respondents randomly. It was found that the α = 0.84 meant it was a good, reliable questionnaire.

3.2 Sample and Data Collection

The questionnaire was sent via e-mail, and telephone calls are required in case of a delayed response. The survey was conducted from October 2023 to December 2023 using the purposive sampling technique, limited to only green building owners. The optimum sample size was calculated with the suggestion of Babin & Black (2010), with the rule of thumb 5:1 ratio, which means five responses should be obtained for each variable. In this study, we have 22 items; hence, the required sample size was to be at least 110 (22 × 5). However, we distributed the questionnaire to 200 respondents.

3.3 Data Analysis

The researchers analyzed the returning data following the research objectives in three steps. First, the demographic data was analyzed by using descriptive statistical analysis tools. Second, the average index (AI) is calculated. It determines the influencing factors and identifies the most vital factor in purchase intention (Alaloul et al., 2020). The following equation is used, and Table 2 illustrates the classifications of the average index.

$$AI = \frac{\sum_{i=1}^{5} w_i n_i}{N} \quad (3.2)$$

where AI is average index, w_i is the weight for i level of 5-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree), n_i is a number of respondents for i level of 5-point Liker scale (5 = strongly agree, 4 = agree,

3 = neutral, 2 = disagree, 1 = strongly disagree, N is the total number of respondents. Table 3.2 shows the classification of the rating scale.

Table 3.2 Classifications of AI.

AI	Class
$1.0 \leq AI < 1.5$	Strongly disagree
$1.5 \leq AI < 2.5$	Disagree
$2.5 \leq AI < 3.5$	Neutral
$3.5 < AI \leq 4.5$	Agree
$4.5 \leq AI < 5.0$	Strongly agree

Finally, we ranked the factors by using the Relative Importance Index (RII). The relative importance index for five-point Likert scale variables is used as the following equation.

$$RII = \frac{\sum_{i=1}^{5} w_i n_i}{h \times N} \tag{3.3}$$

where RII is the relative importance index, n_i is a number of respondents for i level of 5-point Liker scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree), w_i is the weight for i level of 5-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree), h is the highest weight (in this study is 5), N is the total number of respondents. Table 3.4 shows the interpretation of the relative importance index.

Table 3.3 Importance level for Relative Importance Index.

RII Values	Importance Level	
$0.8 < RII \leq 1.0$	Very significant	VS
$0.6 < RII \leq 0.8$	Significant	S
$0.4 < RII \leq 0.6$	Neutral	N
$0.2 < RII \leq 0.4$	Little significance	LS
$0.0 \leq RII \leq 0.2$	Very little significance	VLS

3.4 Research Process Flowchart

Figure 3.1 shows the steps of this research project.

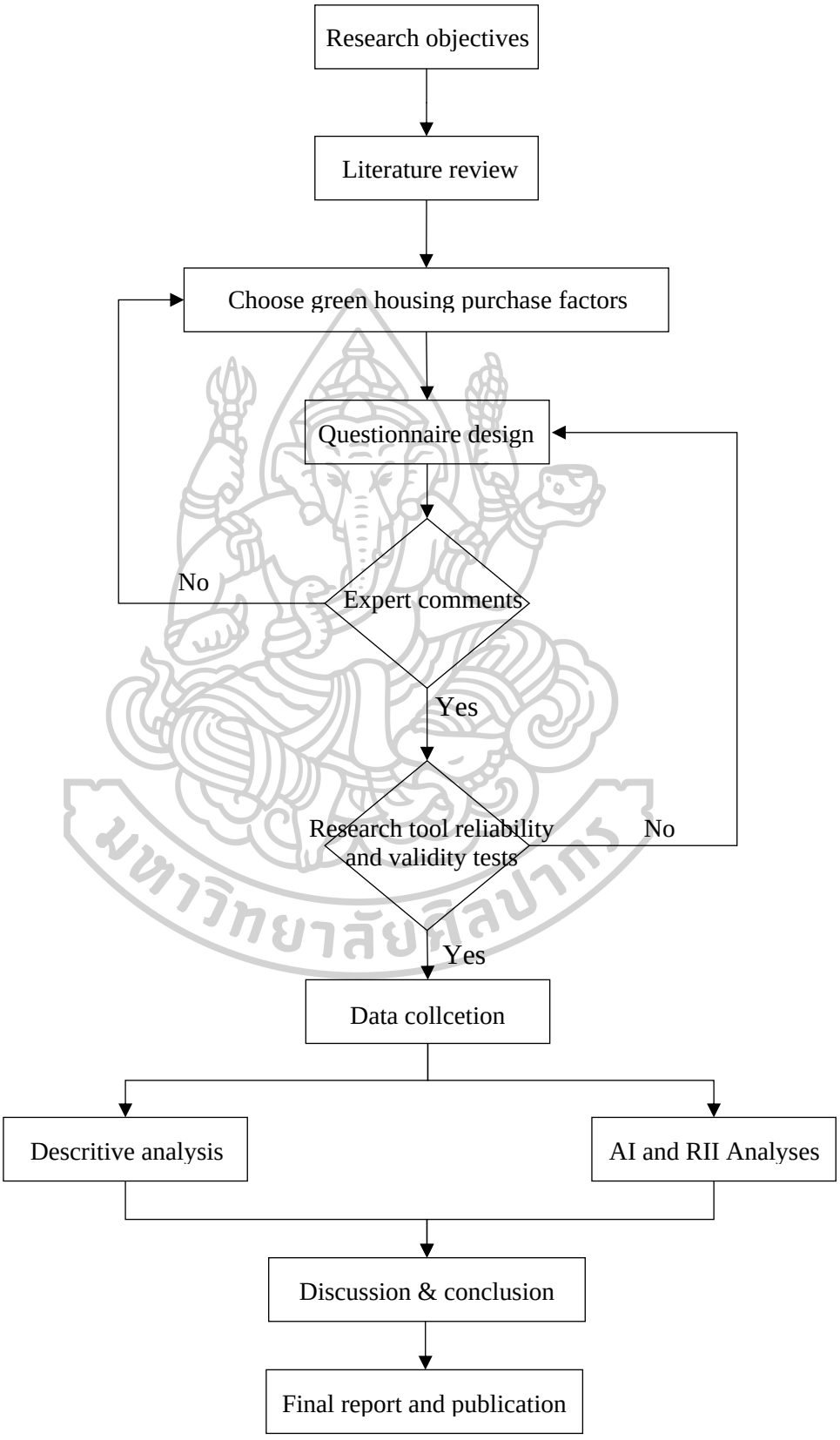

Figure 3.1 Research process flowchart

CHAPTER 4
RESULT AND ANALYSIS

The returning questionnaire were analyzed on both descriptive and inference statistical tools. There were 179 return questionnaires who are living in green buildings, which accounted for an 89.5% return rate. The sample of 179 respondents was deemed sufficient to analyze the data. The demographic data is shown in the first section.

4.1 Demographic Data

Most of the respondents were male. They were 30-40 years old. They hold bachelor's or master's degrees. Most respondents work in a company at the middle-management level. The demographic data is shown in Table 4.1.

Table 4.1 Respondents' profile.

Variable	Category	Frequency	Percentage (%)
Gender	Male	127	70.95
	Female	52	29.05
Age	20-29	42	23.46
	30-39	59	32.96
	40-49	61	34.08
	50-59	10	5.59
	>60	7	3.91
Education	High school	0	0.00
	Vocational	5	2.79
	Higher vocational	7	3.91
	Bachelor	84	46.93
	Master	72	40.22
	Doctoral	11	6.15

Table 4.1 (continued)

Variable	Category	Frequency	Percentage (%)
Job position	Business owner	23	12.85
	Operational staff	14	7.82
	Middle-management	79	44.13
	Top-management	63	35.20

Most of the respondents were male. They were 30-40 years old. They hold bachelor's or master's degrees. Most respondents work in a company at the middle-management level. Furthermore, the data are shown in Figures 4.1 to 4.5. Please note that all respondents are living in green buildings.

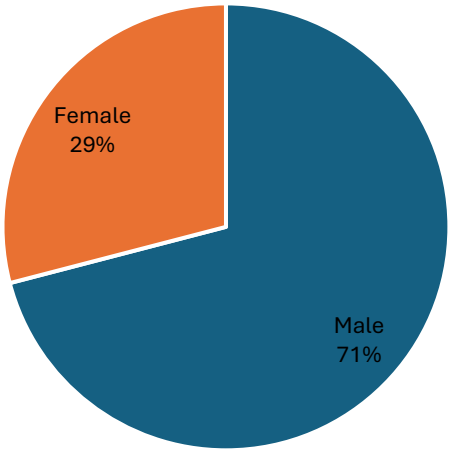

Figure 4.1 Gender of respondents.

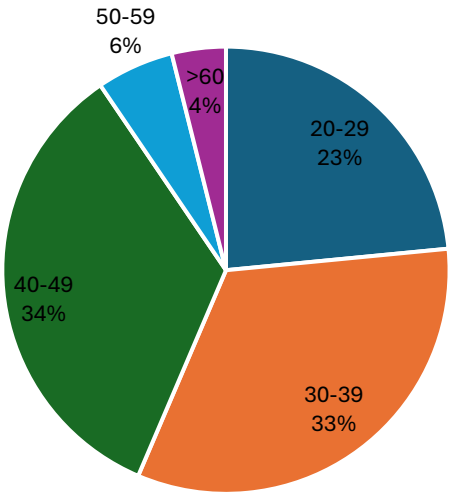

Figure 4.2 Age of respondents.

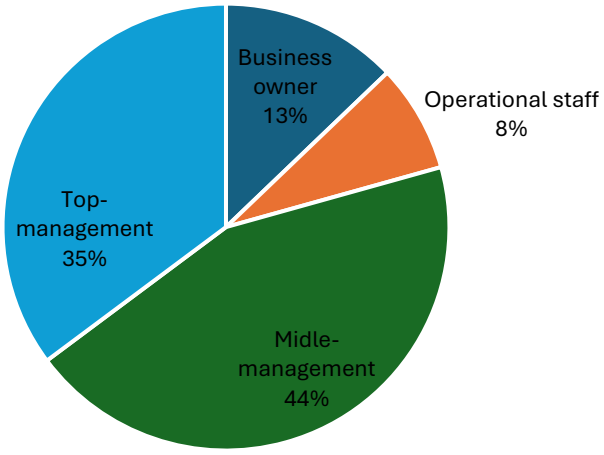

Figure 4.3 Education of respondents.

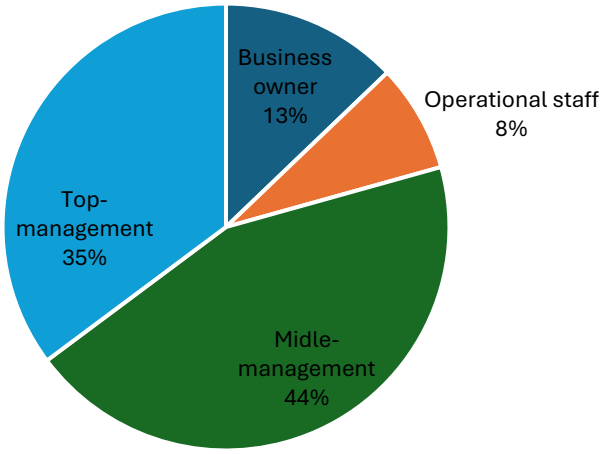

Figure 4.4 Jop position of respondents.

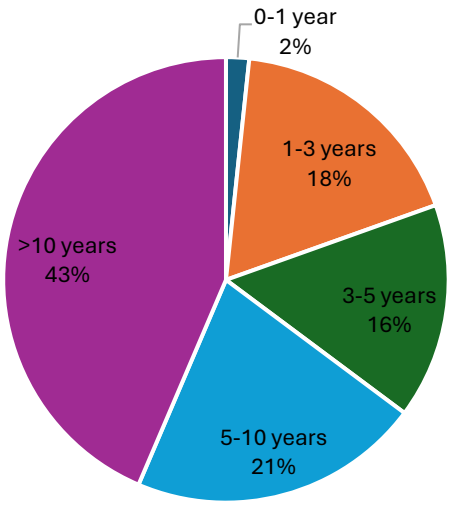

Figure 4.5 Job experience of respondents.

4.2 Respondents' Opinion

The average index and relative importance index of each item are shown in Table 4.2.

Table 4.2 Collected data and analysis.

No.	Statement	Score					Frequency	*AI*	*RII*
		1	**2**	**3**	**4**	**5**			
E1	Humanity is engaging in the extensive exploitation of the natural environment.	0	0	31	63	85	179	4.30	0.86
E2	To ensure their survival, humans must establish a state of symbiosis with the natural environment.	4	23	45	93	14	179	3.50	0.70
E3	The purchase of green housing helps our environment.	11	44	87	32	5	179	2.87	0.57
E5	I understand the positive impact and other beneficial of green housing on our environment.	2	22	42	78	35	179	3.68	0.74
E6	I can save our environment by supporting green housing.	37	19	38	62	23	179	3.08	0.62
E7	I also recommend my family and friends to purchase green housing and support them with my knowledge.	14	33	79	43	10	179	3.01	0.60

Table 4.2 (continued)

No.	Statement	Score					Frequency	*AI*	*RII*
		1	2	3	4	5			
A1	I love to purchase green products, especially green housing.	8	26	69	72	4	179	3.21	0.64
A2	It is a good idea to buy green housing.	22	48	55	49	5	179	2.82	0.56
A3	I have money, time, knowledge, and willingness to buy green housing.	6	66	76	28	3	179	2.75	0.55
A4	There are a lot of advantages to buying green housing over conventional housing.	22	43	65	44	5	179	2.82	0.56
I1	I want to buy green housing in the near future.	2	2	73	85	17	179	3.63	0.73
I2	I would love to live in green housing.	24	23	48	79	5	179	3.10	0.62
I3	I will recommend my friends to buy green housing.	8	39	89	31	12	179	3.00	0.60
B1	I prefer green housing because of its eco-friendly features.	3	29	38	77	32	179	3.59	0.72
B2	I have bought green housing because they are environmentally friendly.	5	68	91	13	2	179	2.66	0.53

Table 4.2 (continued)

No.	Statement	Score					Frequency	*AI*	*RII*
		1	2	3	4	5			
B3	Humanity is engaging in the extensive exploitation of the natural environment.	10	32	83	39	15	179	3.09	0.62
B4	I checked the certifications of green housing and their standards before purchasing it.	9	79	57	32	2	179	2.66	0.53
F1	The most significant barrier to my green housing purchasing is the price.	4	25	31	92	27	179	3.63	0.73
F2	There are no regulations for customers. Thus, I would buy conventional housing.	1	3	65	87	23	179	3.72	0.74
F3	It is good to have an incentive for customers to buy green housing.	0	4	38	102	35	179	3.94	0.79
F4	A green loan to buy green housing is an excellent factor in choosing green housing.	3	1	28	117	30	179	3.95	0.79

Table 4.2 (continued)

No.	Statement	Score					Frequency	*AI*	*RII*
		1	2	3	4	5			
F5	Even if it is green housing, other factors, such as location, number of bedrooms, transportation access, and vicinity, are still important.	2	8	23	122	21	176	3.80	0.76

Please note that the numbers in Score columns from 1 to 5 are the frequency. The average and relative importance indexes are calculated separately for each statement. The highest index is E1, with *AI* = 4.30 and *RII* =0.86. It shows that the respondents have a good understanding of the impact of their choice on the environment. The second and third ranks are F4 and F3. We can interpret that the customers also worry about finance. It is good to be offered incentives and the unique benefits of a loan to buy a greenhouse. We then analyzed the data by determining the *AI* and *RII* as groups, as shown in Table 4.3.

Table 4.3 Ranking of factors for purchase decision green housing.

Group	Factor	*AI*	*RII*	Interpretation	Rank
E	Environmental knowledge of customers	3.41	0.68	Significant	2
A	Attitude to green purchasing	2.90	0.58	Neutral	5
I	Green purchase intention	3.24	0.65	Significant	3
B	Green purchase behavior	3.00	0.60	Neutral	4
F	Financial thinking of customers	3.81	0.76	Significant	1

Table 4.3 points out that the ‘financial thinking of customers’ affects their green housing purchase. Additionally, the ‘environmental knowledge of customers’ is a driving factor that makes customers buy greenhouses. Developers must be aware of these two factors and design their market strategy rigorously. This result also communicates to a policymaker who wants to promote a sustainable construction industry. Please note that the price of construction with green materials and green construction practices is higher than traditional construction, 20% to 30%.

CHAPTER 5
CONCLUSION

Green housing includes homes, bungalows, duplexes, terraced houses, flats, condominiums, and apartments. They are built from green and high-performance materials, saving more energy than conventional materials. Furthermore, they were designed with environmentally friendly concepts. To make the construction industry sustainable, green housing/building will inevitably be applied to the industry. The study investigates customers' green purchasing housing behavior in Kunming, China. The result revealed some invaluable information for developers.

5.1 Conclusion

The most critical factor affecting the customers' behavior is 'financial thinking,' with average index 3.81 and relative importance index 0.76. Precisely, the most critical factors in financial thinking group are 'a green loan to buy green housing' and 'the incentive for customer who buy green housing.'

The second rank of important group is 'environmental knowledge' with average index 3.41 and relative importance index 0.68. Incisively, the most vital factor is 'the knowledge about how human too much exploiting of the natural environment.' It is very important to educate customers for making decision.

As a result, a developer must design a strategic plan for promoting his green building and educating customers about green housing. This result is also valuable information for a policymaker who wants to promote a sustainable construction industry.

5.2 Recommendations and Outlook

This study has a limitation on the economic situation. Its result may vary due to the uncertainty of the economy. Furthermore, the analysis did not consider the relationship between the demographic data and green housing purchasing behavior. Accordingly, we will deploy a statistical tool to determine their connection in future analysis.

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APPENDIX

The Questionnaire

Questionnaire

This form is the questionnaire for a research project of Ms. Yanping Yang, a student in the Master Degree of Engineering Program in Engineering Management at Silpakorn University. The topic is "Green Housing Purchasing: A Case of Consumers in Kunming, the People's Republic of China."

There are three parts of questions as follows:

Part 1:

The first part asks about the respondent's background in the construction industry. The second part asks the opinion about the factors that influence sustainable practice in the Kunming construction industry. It is a five-point Likert scale:

Score 1 means 'strongly disagree',

Score 2 means 'disagree',

Score 3 means 'neutral',

Score 4 means 'agree', and

A score of 5 means 'strongly agree'.

The last part is an open question and the recommendation from the respondent about sustainable construction practices in Kunming.

Thank you very much for your cooperation. The data are kept secret and unopened to a third-party organization. The purpose of this study is academic only.

Part I: Demographic Data

No.	Question	Answer
Q1	What is your gender?	□ Make □ Female
Q2	How old are you?	□ 20-29 Years Old □ 30-39 Years Old □ 40-49 Years Old □ 50-59 Years Old □ 60 and older
Q3	What is your education level?	□ High school □ Vocational □ Higher vocational □ Undergraduate □ Master degree □ Doctoral degree
Q4	What is your job position?	□ Business owner □ Operational level staff (e.g. staff, operators, practitioner) □ Middle-management level staff (e.g. supervisor, asst. manager, manager) □ Top-management level staff (e.g. director, chief officer, general manager)
Q5	How long you have been working? (include previous jobs)	□ 0-1 year □ 1-3 years □ 3-5 years □ 5-10 years □ More than 10 years
Q6	What is your education major?	…….
Q7	Do you currently live in green housing or green building?	

Part II: Please read the statement carefully and then select the score based on your opinion.

No.	Statement	Score				
		1: strongly disagree	2: disagree	3: neutral	4: agree	5: strongly agree
E1	Humanity is engaging in the extensive exploitation of the natural environment.					
E2	To ensure their survival, humans must establish a state of symbiosis with the natural environment.					
E3	The purchase of green housing helps our environment.					
E5	I understand the positive impact and other beneficial of green housing on our environment.					
E6	I can save our environment by supporting green housing.					
E7	I also recommend my family and friends to purchase green housing and support them with my knowledge.					
A1	I love to purchase green products, especially green housing.					

No.	Statement	Score				
		1: strongly disagree	2: disagree	3: neutral	4: agree	5: strongly agree
A2	It is a good idea to buy green housing.					
A3	I have money, time, knowledge, and willingness to buy green housing.					
A4	There are a lot of advantages to buying green housing over conventional housing.					
I1	I want to buy green housing in the near future.					
I2	I would love to live in green housing.					
I3	I will recommend my friends to buy green housing.					
B1	I prefer green housing because of its eco-friendly features.					
B2	I have bought green housing because they are environmentally friendly.					
B3	I have bought green housing even though they are more expensive than conventional housing.					

No.	Statement	Score				
		1: strongly disagree	2: disagree	3: neutral	4: agree	5: strongly agree
B4	I checked the certifications of green housing and their standards before purchasing it.					
F1	The most significant barrier to my green housing purchasing is the price.					
F2	There are no regulations for customers. Thus, I would buy conventional housing.					
F3	It is good to have an incentive for customers to buy green housing.					
F4	A green loan to buy green housing is an excellent factor in choosing green housing.					
F5	Even if it is green housing, other factors, such as location, number of bedrooms, transportation access, and vicinity, are still important.					

VITA

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