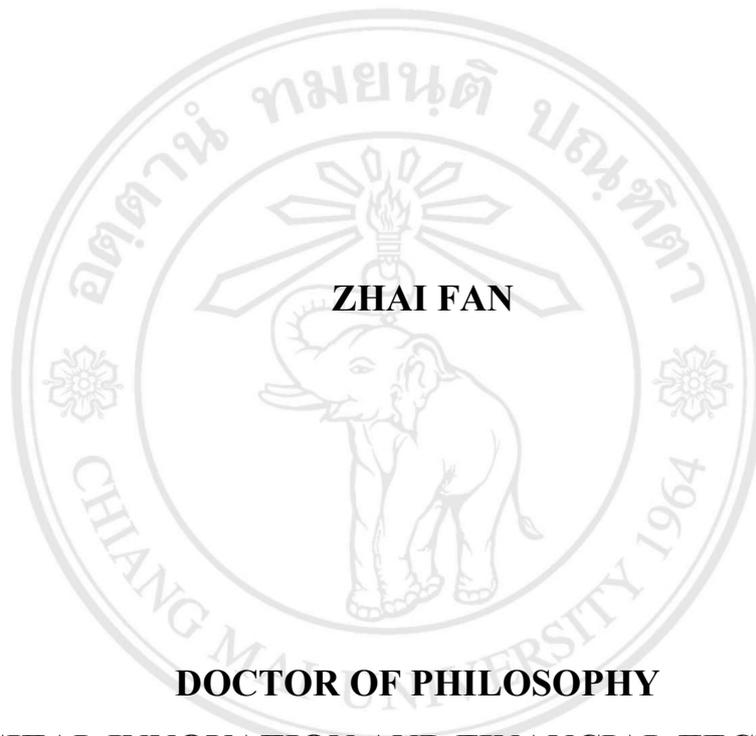


**MULTI-CRITERIA DECISION ANALYSIS ON CHINESE  
INVESTMENT IN CHIANG MAI PROPERTY MARKET  
BASED ON BELT AND ROAD INITIATIVE**



**DOCTOR OF PHILOSOPHY  
IN DIGITAL INNOVATION AND FINANCIAL TECHNOLOGY**

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**CHIANG MAI UNIVERSITY**

**MAY 2024**

**MULTI-CRITERIA DECISION ANALYSIS ON CHINESE  
INVESTMENT IN CHIANG MAI PROPERTY MARKET  
BASED ON BELT AND ROAD INITIATIVE**



**ZHAI FAN**

**A THESIS SUBMITTED TO CHIANG MAI UNIVERSITY IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY  
IN DIGITAL INNOVATION AND FINANCIAL TECHNOLOGY**

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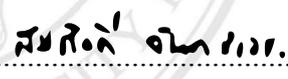
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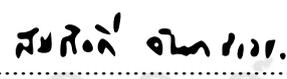
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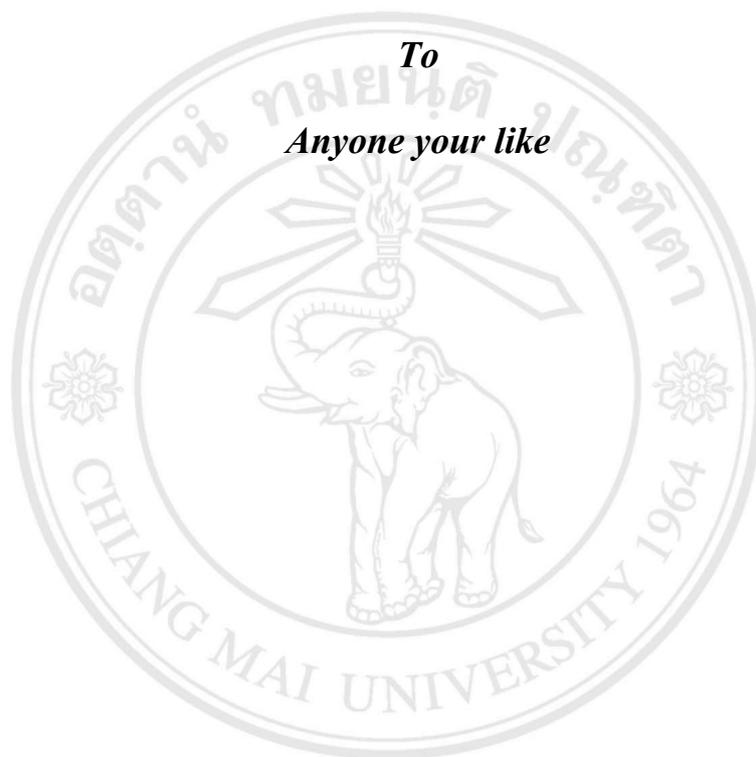
  
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Zhai Fan

<b>หัวข้อคุณสมบัติ</b>	การวิเคราะห์การลงทุนของจีนในตลาดอสังหาริมทรัพย์เชียงใหม่ ด้วยวิธีการตัดสินใจแบบใช้เงื่อนไขหลายเกณฑ์ บนเส้นทางริเริ่มหนึ่งแถบ หนึ่งเส้นทางเป็นฐาน	
<b>ผู้เขียน</b>	นางสาว ใจฟาน	
<b>ปริญญา</b>	ปรัชญาดุษฎีบัณฑิต (นวัตกรรมดิจิทัลและเทคโนโลยีการเงิน)	
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### บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์เพื่อประเมินความเป็นไปได้และผลกระทบที่อาจเกิดขึ้นจากการลงทุนของจีนในตลาดอสังหาริมทรัพย์เชียงใหม่ภายใต้กรอบความริเริ่มหนึ่งโครงการสายแถบและเส้นทาง (Belt and Road Initiative: BRI) โดยใช้วิธีการกระบวนการตัดสินใจแบบหลายเกณฑ์ (Multi-Criteria Decision Analysis: MCDA) งานวิจัยนี้มุ่งที่จะให้การประเมินที่ครอบคลุมโอกาสในการลงทุน โดยพิจารณาปัจจัยทางด้านเศรษฐกิจ การเมือง สังคม สิ่งแวดล้อม และกฎหมายที่หลากหลาย งานวิจัยนี้ใช้ระเบียบวิธีการวิเคราะห์ MCDA อย่างเป็นระบบเพื่อวิเคราะห์การลงทุนของจีนในตลาดอสังหาริมทรัพย์เชียงใหม่ เกณฑ์สำคัญถูกระบุผ่านการทบทวนวรรณกรรมและการปรึกษาผู้เชี่ยวชาญ ซึ่งครอบคลุมศักยภาพการเติบโตทางเศรษฐกิจ เสถียรภาพทางการเมือง การยอมรับทางสังคม ความยั่งยืนด้านสิ่งแวดล้อม การพัฒนาโครงสร้างพื้นฐาน และสภาพแวดล้อมทางกฎหมายและกฎระเบียบ ข้อมูลสำหรับแต่ละเกณฑ์ถูกรวบรวมจากแหล่งข้อมูลทุติยภูมิ รวมถึงรายงานทางเศรษฐกิจ สิ่งพิมพ์ของรัฐบาล และการศึกษาทางวิชาการ เกณฑ์ต่างๆ ถูกถ่วงน้ำหนักโดยใช้กระบวนการลำดับชั้นเชิงวิเคราะห์ (Analytical Hierarchy Process: AHP) ตามความเห็นของผู้เชี่ยวชาญ แต่ละทางเลือกการลงทุนถูกประเมินตามเกณฑ์ และคะแนนถูกคำนวณเพื่อกำหนดความน่าสนใจโดยรวมของโอกาสในการลงทุน การวิเคราะห์ความอ่อนไหวถูกดำเนินการเพื่อทดสอบความถูกต้องของผลลัพธ์ การวิเคราะห์เผยให้เห็นว่าตลาดอสังหาริมทรัพย์ของเชียงใหม่มีโอกาสที่สำคัญสำหรับนักลงทุนจีนภายใต้ BRI โดยเฉพาะในแง่ของศักยภาพการเติบโตทางเศรษฐกิจและการพัฒนาโครงสร้างพื้นฐาน อย่างไรก็ตาม ความท้าทายที่เกี่ยวข้องกับความซับซ้อนทางกฎหมายและกฎระเบียบ ความยั่งยืนด้านสิ่งแวดล้อม และการยอมรับทางสังคม ถูกระบุว่าเป็นปัจจัยสำคัญที่อาจส่งผลกระทบต่อตัดสินใจลงทุน คะแนนรวม

บ่งชี้ว่าในขณะที่เกณฑ์ทางเศรษฐกิจและโครงสร้างพื้นฐานมีความเอื้ออำนวยอย่างมาก แต่ต้องให้ความสนใจกับการบรรเทาความเสี่ยงทางกฎหมายและสิ่งแวดล้อม การวิเคราะห์ความอ่อนไหวยืนยันความถูกต้องของผลลัพธ์ ซึ่งแสดงให้เห็นว่าปัจจัยทางเศรษฐกิจและโครงสร้างพื้นฐานยังคงเป็นปัจจัยสำคัญแม้ในสถานะที่แตกต่างกัน งานวิจัยสรุปว่าการลงทุนเชิงกลยุทธ์ในตลาดอสังหาริมทรัพย์ของเชียงใหม่อาจให้ผลประโยชน์อย่างมากสำหรับนักลงทุนจีน หากพวกเขาจัดการกับความท้าทายที่ระบุไว้ผ่านกลยุทธ์การจัดการความเสี่ยงและการมีส่วนร่วมของผู้มีส่วนได้ส่วนเสียอย่างครอบคลุม



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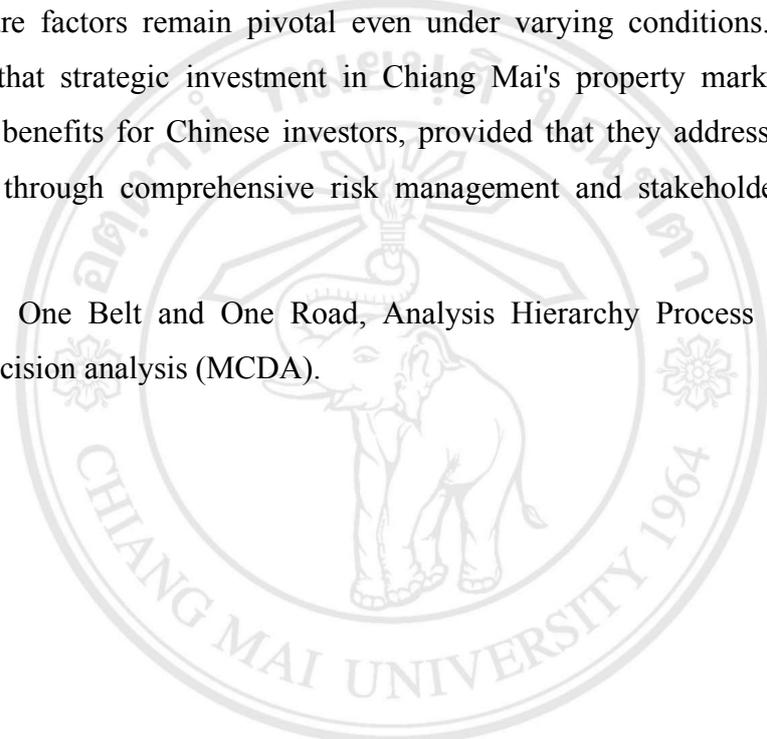
<b>Dissertation Title</b>	Multi-Criteria Decision Analysis on Chinese Investment in Chiang Mai Property Market based on Belt and Road Initiative	
<b>Author</b>	Ms. Zhai Fan	
<b>Degree</b>	Doctor of Philosophy (Digital Innovation and Financial Technology)	
<b>Advisory Committee</b>	Asst.Prof.Dr.Ahmad Yahya Dawod	Advisor
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	Lect. Dr. Naret Suyaroj	Co-advisor

## **ABSTRACT**

This research aims to evaluate the feasibility and potential impacts of Chinese investment in the Chiang Mai property market under the Belt and Road Initiative (BRI) framework. By employing a Multi-Criteria Decision Analysis (MCDA) approach, the research seeks to provide a comprehensive assessment of the investment opportunities, considering various economic, political, social, environmental, and legal factors. The research employs a systematic MCDA methodology to analyze Chinese investment in Chiang Mai's property market. Key criteria were identified through an extensive literature review and expert consultations, covering economic growth potential, political stability, social acceptance, environmental sustainability, infrastructure development, and the legal-regulatory environment. Data for each criterion were collected from secondary sources, including economic reports, government publications, and academic studies. Criteria were weighted using the Analytical Hierarchy Process (AHP) based on expert opinions. Each investment option was evaluated against the criteria, and scores were aggregated to determine the overall attractiveness of the investment opportunities. Sensitivity analysis was conducted to test the robustness of the results.

The analysis reveals that the Chiang Mai property market offers significant opportunities for Chinese investors under the BRI, particularly in terms of economic growth potential and infrastructure development. However, legal and regulatory complexities, environmental sustainability, and social acceptance challenges were identified as critical factors that could influence investment decisions. The aggregated scores indicate that while the economic and infrastructural criteria are highly favorable, attention must be paid to mitigating legal and environmental risks. The sensitivity analysis confirms the robustness of the results, suggesting that economic and infrastructure factors remain pivotal even under varying conditions. The research concludes that strategic investment in Chiang Mai's property market could yield substantial benefits for Chinese investors, provided that they address the identified challenges through comprehensive risk management and stakeholder engagement strategies.

**Keywords:** One Belt and One Road, Analysis Hierarchy Process (AHP), multi-standard decision analysis (MCDA).



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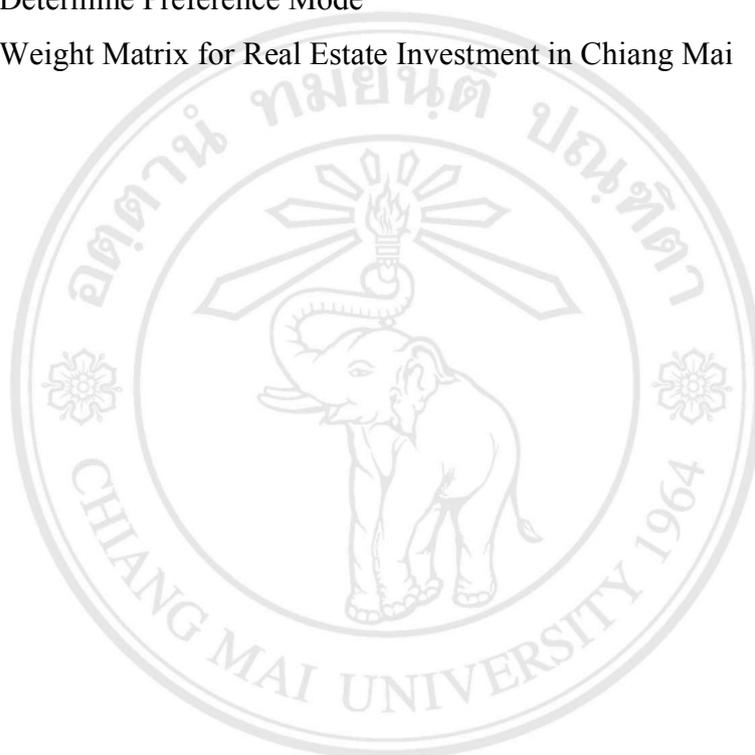
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## LIST OF ABBREVIATION

MCDA	Multi-Criteria- Decision Analysis
CI	Chinese Investment
CMPM	Chiang Mai Property Market
BRI	Belt and Road Initiative
GDP	Gross Domestic Product
FDI	Foreign Direct Investment
RE	Real Estate
ROI	Return on Investment
NPV	Net Present Value
IRR	Internal Rate of Return
NPV	Net Present Value
SWOT	Strengths, Weaknesses, Opportunities, Threats
AHP	Analytic Hierarchy Process
TOPSIS	Technique for Order Preference by Similarity to Ideal Solution
DEA	Data Envelopment Analysis
FCE	Fuzzy Comprehensive Evaluation
GIS	Geographic Information System
PPP	Public Private Partnership
MCDM	Multi-Criteria Decision Making
SDG	Sustainable Development Goals
PCA	Principal Component Analysis
PAM	Policy Analysis Matrix
WACC	Weighted Average Cost of Capital
LOP	Level of Protection
ANP	Analytic Network Process
FAHP	Fuzzy Analytic Hierarchy Process
SPSS	Statistical Package for the Social Sciences
MATLAB	Matrix Laboratory

R&D	Research and Development
WTO	World Trade Organization
ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
BRICS	Brazil, Russia, India, China, South Africa
EU	European Union
IMF	International Monetary Fund
UN	United Nations
NDRC	National Development and Reform Commission (China)
MOFCOM	Ministry of Commerce (China)
AIIB	Asian Infrastructure Investment Bank
KPI	Key Performance Indicator
CAGR	Compound Annual Growth Rate
PESTEL	Political, Economic, Social, Technological, Environmental, Legal
SWOT	Strengths, Weaknesses, Opportunities, Threats
IPR	Intellectual Property Rights
LLC	Limited Liability Company
HQ	Headquarters
SMEs	Small and Medium-sized Enterprises
RMB	Renminbi (Chinese currency)

## ข้อความความแห่งการริเริ่ม

ผู้วิจัยขอรับรองว่าด้วยความรู้และความเชื่อที่ดีที่สุด วิทยานิพนธ์ของผู้วิจัยเป็นผลงานต้นฉบับที่ไม่ละเมิดลิขสิทธิ์ของผู้ใดหรือละเมิดกรรมสิทธิ์ใด ๆ ความคิด เทคนิค คำพูด หรือเนื้อหาอื่นใดจากผลงานของผู้อื่น ไม่ว่าจะตีพิมพ์หรือไม่ได้เผยแพร่ ได้รับการยอมรับอย่างเต็มที่ตามแนวทางปฏิบัติในการอ้างอิงมาตรฐาน ซึ่งรวมถึงการอ้างอิงและการอ้างอิงที่เหมาะสมสำหรับแหล่งข้อมูลทั้งหมดที่ใช้ เพื่อให้มั่นใจว่าผลงานทั้งหมดของผู้เขียนคนอื่น ๆ ได้รับเครดิตอย่างถูกต้อง

นอกจากนี้ ผู้วิจัยขอรับรองว่าเป็นสำเนาถูกต้องของวิทยานิพนธ์ของผู้วิจัย รวมถึงการแก้ไขขั้นสุดท้ายตามที่ได้รับอนุมัติจากคณะกรรมการวิทยานิพนธ์ของผู้วิจัยและบัณฑิตวิทยาลัย ผู้วิจัยขอยืนยันว่าไม่ได้ส่งวิทยานิพนธ์นี้ทั้งหมดหรือบางส่วน สำหรับปริญญาหรืออนุปริญญาใดๆ ในมหาวิทยาลัยหรือสถาบันอื่นใด การวิจัย ข้อค้นพบ และข้อสรุปทั้งหมดที่มีอยู่ในที่นี่เป็นผลจากงานของผู้วิจัยเอง เว้นแต่จะระบุไว้เป็นอย่างอื่นอย่างชัดเจน

ฉันเข้าใจว่าการบิดเบือนความจริงหรือการไม่ปฏิบัติตามมาตรฐานเหล่านี้อาจส่งผลให้เกิดผลทางวิชาการ รวมถึงความเป็นไปได้ที่จะถูกเพิกถอนปริญญา โดยการลงนามในแถลงการณ์นี้ ฉันยืนยันความมุ่งมั่นของฉันที่จะรักษามาตรฐานสูงสุดของความซื่อสัตย์และความคิดริเริ่มในงานวิชาการของฉัน

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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# CHAPTER 1

## INTRODUCTION

### 1.1 Background

China and Thailand and global economic trends have accelerated the pace of Chinese investment in Thailand. The 19th National Congress and Xi Jinping's New Year's speech show that China will continue contributing to world peace and development by actively promoting the Belt and Road Initiative. After the adjustment in 2017, China's foreign investment will gradually become normal. The pace of business development will be appropriately accelerated. Thailand's Industry 4.0 development strategy and the opening of the Eastern Economic Corridor and the China-Thailand high-speed railway have opened up many investment opportunities. Chinese enterprises are becoming increasingly international, and the diversification of commodity origin is also more urgent. All these will promote the development of trade and investment between China and Thailand.

The Belt and Road Initiative (BRI), launched by the Chinese government in 2013, represents one of modern history's most ambitious infrastructure and economic development programs. Envisioned as a modern-day Silk Road, the BRI seeks to enhance connectivity and economic cooperation across Asia, Europe, and Africa. With over 60 participating countries, the BRI aims to foster economic growth through large-scale investments in transportation, energy, and telecommunications infrastructure. The initiative is designed to improve trade routes, reduce logistical costs, and stimulate economic development in participating regions. The strategic importance of the BRI extends beyond economics, as it also aims to enhance diplomatic ties and geopolitical influence. In Southeast Asia, Thailand has emerged as a crucial partner in the BRI due to its strategic location and economic potential. As a key transit country, Thailand plays a vital role in connecting China with other Southeast Asian nations. Within Thailand, Chiang Mai, the largest city in the northern region, presents a unique case for investment under the BRI. Known for its rich cultural heritage and status as a major tourist destination, Chiang Mai has been experiencing rapid urbanization and economic growth. The city's

property market has seen robust development, characterized by increasing demand for residential and commercial properties. This growth is further supported by the Thai government's initiatives to improve infrastructure and attract foreign investment.

The motivation behind this research is rooted in the strategic significance of the BRI and the growing interest of Chinese investors in the Southeast Asian property market, particularly in Chiang Mai. As China continues to expand its economic footprint globally, understanding the factors that influence investment decisions in target markets becomes increasingly important. This study aims to provide a comprehensive evaluation of these factors, thereby aiding Chinese investors in making informed decisions that align with both their strategic goals and the local context. The Chiang Mai property market offers significant opportunities for Chinese investors. The city's economic growth, favorable demographic trends, and expanding infrastructure make it an attractive destination for investment. However, investing in foreign property markets entails navigating a complex array of factors, including legal and regulatory frameworks, environmental sustainability concerns, and socio-cultural dynamics. These challenges necessitate a systematic approach to decision-making, which this study aims to provide through the application of Multi-Criteria Decision Analysis (MCDA).

Despite the apparent opportunities, several challenges complicate Chinese investments in Chiang Mai. Key issues include navigating Thailand's legal and regulatory environment, addressing environmental sustainability concerns, and ensuring social acceptance by local communities. The interplay of these factors necessitates a structured approach to decision-making. This research seeks to address the following problems:

1. Identification of Key Factors: What are the key factors influencing Chinese investment in the Chiang Mai property market?
2. Systematic Evaluation: How can these factors be systematically evaluated to make informed investment decisions?
3. Risk and Benefit Assessment: What are the potential risks and benefits associated with such investments under the BRI framework?

Chiang Mai's property market has seen significant interest from foreign investors, driven by its economic potential and strategic location. The city's GDP growth, which has consistently outpaced the national average, is bolstered by a thriving tourism industry and

substantial real estate development. Recent infrastructure projects, such as the expansion of the international airport and improvements in road connectivity, align well with the objectives of the BRI.

Supporting the potential for Chinese investment includes:

1. **Economic Indicators:** Chiang Mai's GDP growth has been robust, supported by strong performance in the tourism and real estate sectors. The city's economic prospects are further enhanced by government policies aimed at stimulating investment and development.

2. **Infrastructure Projects:** Ongoing and planned infrastructure projects, such as the expansion of the international airport and the development of new transportation links, enhance Chiang Mai's connectivity and accessibility. These projects align with the BRI's goals of improving trade routes and reducing logistical costs.

3. **Government Support:** The Thai government has implemented policies to facilitate foreign investment, including incentives and streamlined regulatory processes. These measures make it easier for Chinese investors to enter and operate in the Chiang Mai property market.

4. **Cultural Synergy:** The presence of a large Chinese community in Chiang Mai and cultural ties between China and Thailand can ease the integration and acceptance of Chinese investments. Cultural affinity can also facilitate business operations and interactions with local stakeholders.

However, the legal restrictions on foreign property ownership, environmental sustainability issues, and potential socio-cultural impacts present significant challenges. Addressing these issues requires a balanced and informed approach, which this study aims to provide through the application of MCDA.

MCDA is a decision-making framework that allows for the systematic evaluation of multiple criteria. It is particularly useful in situations where decisions involve complex trade-offs between conflicting objectives. In the context of Chinese investment in the Chiang Mai property market, MCDA provides a structured approach to assess various factors influencing investment decisions.

The MCDA process involves several key steps:

1. **Criteria Identification:** Identify the key criteria that influence investment decisions. These criteria can be categorized into economic, political, social, environmental, legal, and infrastructural factors.

2. **Criteria Weighting:** Assign weights to each criterion based on their relative importance. This step can be performed using methods such as the Analytical Hierarchy Process (AHP), which involves pairwise comparisons of criteria.

3. **Performance Evaluation:** Evaluate potential investment options against each criterion. This step involves collecting data on each criterion and assessing the performance of each investment option.

4. **Aggregation:** Aggregate the performance scores of each option across all criteria to obtain an overall score. This step involves combining the weighted scores to rank the investment options.

5. **Sensitivity Analysis:** Test the robustness of the results by varying the weights assigned to different criteria. This step helps to identify the most critical factors and assess the stability of the decision.

By systematically evaluating the multi-faceted aspects of Chinese investment in Chiang Mai's property market, this research intends to offer strategic insights and practical recommendations that align with both the goals of Chinese investors and the sustainable development of the local market under the BRI framework.

**Table 1.1** Sample Chart: Chinese Investment in Southeast Asian Real Estate (2010-2023)

<b>Year</b>	<b>Total Investment (USD Billion)</b>	<b>Top Investment Destinations</b>	<b>Major Sectors</b>
2010	5.2	Singapore, Malaysia	Residential, Commercial
2011	6.8	Thailand, Indonesia	Commercial, Industrial
2012	8.5	Malaysia, Vietnam	Residential, Mixed-use
2013	9.3	Singapore, Philippines	Commercial, Hospitality

**Table 1.1** Sample Chart: Chinese Investment in Southeast Asian Real Estate  
(2010-2023) (Cont.)

<b>Year</b>	<b>Total Investment (USD Billion)</b>	<b>Top Investment Destinations</b>	<b>Major Sectors</b>
2014	11.2	Indonesia, Thailand	Residential, Commercial
2015	13.6	Vietnam, Malaysia	Residential, Industrial
2016	15.8	Singapore, Philippines	Commercial, Mixed-use
2017	17.5	Malaysia, Indonesia	Residential, Commercial
2018	19.2	Thailand, Vietnam	Commercial, Hospitality
2019	21.4	Singapore, Philippines	Residential, Commercial
2020	18.9	Indonesia, Malaysia	Commercial, Mixed-use
2021	20.1	Vietnam, Thailand	Residential, Industrial
2022	22.6	Singapore, Philippines	Commercial, Hospitality
2023	24.3	Malaysia, Indonesia	Residential, Commercial

This chart provides a snapshot of Chinese investment trends in Southeast Asian real estate over the past decade, highlighting the growth in investment volume and the distribution across different countries and sectors.

*Economic factors* play a crucial role in influencing investment decisions. The potential return on investment, market stability, and growth prospects are key considerations for investors. In the context of Chiang Mai, several economic factors make the property market attractive to Chinese investors:

1. **Growth Potential:** Chiang Mai's economy has been growing steadily, with significant contributions from the tourism and real estate sectors. The city's GDP growth rate has consistently outpaced the national average, indicating a strong economic outlook.

2. **Market Stability:** The Chiang Mai property market has shown resilience and stability, with increasing demand for both residential and commercial properties. The market's stability is further supported by the Thai government's policies aimed at stimulating investment and development.

3. Investment Returns: The property market in Chiang Mai offers attractive returns on investment, driven by rising property values and rental yields. The growing demand for properties, coupled with limited supply, creates favorable conditions for investors.

**Political factors** including government policies, diplomatic relations, and political stability, also influence investment decisions. In the case of Chinese investment in Chiang Mai, several political factors are relevant:

1. Government Policies: The Thai government has implemented policies to attract foreign investment, including incentives and streamlined regulatory processes. These policies make it easier for Chinese investors to enter and operate in the Chiang Mai property market.

2. Diplomatic Relations: The relationship between China and Thailand has been characterized by strong economic and diplomatic ties. The two countries have engaged in numerous bilateral agreements and initiatives aimed at enhancing economic cooperation and investment.

3. Political Stability: Thailand has experienced periods of political instability in the past, which can pose risks to foreign investors. However, the government has made efforts to maintain stability and create a favorable investment climate.

**Social factors** including cultural compatibility, local community acceptance, and demographic trends, are important considerations for foreign investors. In the context of Chinese investment in Chiang Mai, several social factors are relevant:

1. Cultural Compatibility: The presence of a large Chinese community in Chiang Mai and cultural ties between China and Thailand can ease the integration and acceptance of Chinese investments. Cultural affinity can also facilitate business operations and interactions with local stakeholders.

2. Community Acceptance: Ensuring social acceptance is crucial for the success of foreign investments. Large-scale investments can sometimes lead to socio-cultural disruptions, making it important for investors to engage with local communities and address their concerns.

3. Demographic Trends: Chiang Mai's population growth and urbanization trends create opportunities for investment in residential and commercial properties. The city's attractiveness to expatriates, retirees, and tourists further drives demand for properties.

**Environmental sustainability** is a critical consideration for modern investments. Ensuring that developments are environmentally sustainable is important for long-term success and compliance with regulatory requirements. In the context of Chinese investment in Chiang Mai, several environmental factors are relevant:

1. Sustainable Development: Investors need to ensure that their projects adhere to sustainable development principles. This includes minimizing environmental impact, promoting energy efficiency, and ensuring the sustainable use of resources.

2. Regulatory Compliance: Compliance with environmental regulations is crucial for the success of investment projects. Investors need to be aware of and adhere to local environmental laws and regulations.

3. Community Impact: Environmental sustainability also involves addressing the potential impacts of developments on local communities. This includes considering factors such as pollution, resource depletion, and ecological disruption.

**The legal and regulatory environment** is a critical challenge for foreign investors. The legal framework governing property ownership, investment regulations, and compliance requirements can significantly influence investment decisions. In the context of Chinese investment in Chiang Mai, several legal and regulatory factors are relevant:

1. Property Ownership Laws: Thailand has specific laws governing foreign property ownership. These laws can be complex and may impose restrictions on foreign investors, making it important for investors to understand and navigate these regulations.

2. Investment Regulations: The Thai government has implemented regulations to facilitate foreign investment, including incentives and streamlined processes. However, investors need to be aware of and comply with these regulations to ensure the success of their projects.

3. Compliance Requirements: Compliance with local laws and regulations is crucial for the success of investment projects. This includes adhering to property laws, investment regulations, and environmental requirements.

**Infrastructure** development plays a key role in enhancing the attractiveness of investment destinations. Improved infrastructure can reduce logistical costs, enhance connectivity, and support economic growth. In the context of Chinese investment in Chiang Mai, several infrastructure factors are relevant:

1. **Transportation Networks:** Ongoing and planned infrastructure projects, such as the expansion of the international airport and improvements in road connectivity, enhance Chiang Mai's accessibility and attractiveness to investors.

2. **Utilities and Services:** The availability and quality of utilities and services, such as electricity, water, and telecommunications, are important considerations for investors. Ensuring reliable and efficient infrastructure is crucial for the success of investment projects.

3. **Urban Development:** The Thai government's initiatives to improve urban infrastructure and promote sustainable development create favorable conditions for investment in the property market. These initiatives align with the goals of the BRI and enhance the attractiveness of Chiang Mai as an investment destination.

**The MCDA framework** provides a systematic approach to evaluate the various factors influencing investment decisions. By considering multiple criteria and their relative importance, MCDA allows for a comprehensive assessment of investment opportunities. The key steps in the MCDA process include criteria identification, criteria weighting, performance evaluation, aggregation, and sensitivity analysis.

1. **Criteria Identification:** Identify the key criteria that influence investment decisions. These criteria can be categorized into economic, political, social, environmental, legal, and infrastructural factors.

2. **Criteria Weighting:** Assign weights to each criterion based on their relative importance. This step can be performed using methods such as the Analytical Hierarchy Process (AHP), which involves pairwise comparisons of criteria.

3. **Performance Evaluation:** Evaluate potential investment options against each criterion. This step involves collecting data on each criterion and assessing the performance of each investment option.

4. Aggregation: Aggregate the performance scores of each option across all criteria to obtain an overall score. This step involves combining the weighted scores to rank the investment options.

5. Sensitivity Analysis: Test the robustness of the results by varying the weights assigned to different criteria. This step helps to identify the most critical factors and assess the stability of the decision.

By systematically evaluating the multi-faceted aspects of Chinese investment in Chiang Mai's property market, this research aims to provide strategic insights and practical recommendations. These insights will align with both the goals of Chinese investors and the sustainable development of the local market under the BRI framework. The findings of this study will contribute to a deeper understanding of the factors influencing investment decisions and provide a valuable resource for investors, policymakers, and stakeholders involved in the BRI and the Chiang Mai property market.

In recent years, the Chinese people in Chiang Mai have grown rapidly. Thailand became the fourth most popular real estate investment market for Chinese buyers, ranking sixth two years ago. This paper will further discuss the real estate investment management. The multi-property value theory is applied to the decision process of real estate investment.

In the field of global real estate investment, this study critically explores the types of real estate in Chiang Mai, Thailand, focusing on informing China's investment decisions. Due to its unique quality of life, rich cultural heritage, and strategic advantages, Chiang Mai has recently become a tourist destination for Chinese real estate investors. However, managing the complex real estate investment environment in this context is a huge challenge for Chinese investors and requires a subtle decision-making approach.

This paper addresses this challenge by applying the analysis hierarchy process (AHP) to evaluate and rank the various attribute types of Chiang Mai. We can provide a comprehensive evaluation framework for Chinese investors, which is a very suitable method for handling decision scenarios with ambiguous and uncertain features. The framework considers key criteria, including but not limited to investment potential, rental income, capital appreciation, geographic location, and accessibility. By combining intuitive fuzzy sets, the AHP model helps to reduce the inherent complexity associated with real estate investment decisions.

Moreover, my research is set in the broader context of the Belt and Road Initiative (BRI), a far-sighted project led by the People's Republic of China. If BRI is achieved, the participating countries will eventually cover more than 4.4 billion people and contribute more than \$21 billion to global GDP (Meltzer, 2017). Bri's influential infrastructure development and regional connectivity efforts redefine global investment dynamics. As a crossroads of this initiative, Southeast Asia has become a link of economic opportunities, and Chiang Mai has become a major place for real estate investment. The Belt and Road initiative to promote economic integration in the Asia-Pacific region makes Chiang Mai particularly attractive to Chinese investors. However, in this context, complex property selection requires a complex decision framework. Therefore, this thesis discusses the evolution of Chinese investment in the Chiang Mai real estate market and tries to develop a multi-standard decision analysis (MCDA) framework. MCDA is a fundamental approach to real estate investment that allows for a comprehensive evaluation of investment alternatives. However, recognizing the inherent uncertainty and imprecision associated with real estate investment, we extended our investigation by incorporating ambiguous concepts in the MCDA framework. The fuzzy set theory is known for its ability to handle fuzzy and fuzzy decision scenarios and is crucial in solving the multifaceted nature of real estate investment decisions.

In conclusion, this dissertation provides a comprehensive understanding of China's investment in the Chiang Mai real estate market within the Belt and Road Initiative. By clarifying the complex interplay between criteria for managing investment decisions, this study aims to inform Chinese investors. Ultimately, the goal is to contribute a resilient framework to reduce risk and optimize Chiang Mai's investment returns. The following sections cover MCDA, IAHP, Fuzzy Set Theory, the real estate landscape of Chiang Mai, and the transformative corridor of the Belt and Road Initiative, which together illustrate the path to dynamic and informed investment strategies in a world of unprecedented connectivity and opportunities.

## **1.2 Objectives**

The research objectives are to systematically identify and evaluate the critical criteria influencing Chinese investment decisions in the Chiang Mai property market. This involves analyzing a range of factors including economic growth potential, political stability, social acceptance, environmental sustainability, legal-regulatory environment, and infrastructural development. Understanding these factors is essential for assessing the overall attractiveness and feasibility of investment opportunities. The specific objectives are as follows:

To evaluate the Impact of the Belt and Road Initiative (BRI) on Chinese Investment Patterns in the Chiang Mai property market.

To conduct a Multi-Criteria Decision Analysis (MCDA) to Assess Investment Opportunities and Risks for Chinese Investors in Chiang Mai.

To determine the factors of MCDA in the real estate investment environment involves identifying and assessing the key criteria and considerations that influence investment decisions.

By achieving these objectives, the research seeks to provide a comprehensive and actionable framework for Chinese investors, enhancing their ability to make informed and strategic investment decisions in the Chiang Mai property market.

## **1.3 Advantage of the research**

The research offers a multitude of advantages for stakeholders, particularly for Chinese investors, policymakers, and the academic community. These advantages stem from the systematic and comprehensive approach taken to evaluate the investment potential of Chiang Mai's property market within the context of the Belt and Road Initiative (BRI). The following sections elaborate on these key advantages:

### **1.3.1 Comprehensive Evaluation of Investment Criteria?**

One of the primary advantages of this research paper is its thorough identification and evaluation of the critical criteria influencing investment decisions. By examining a wide range of factors—economic, political, social, environmental, legal, and

infrastructural—the research provides a holistic view of the investment landscape in Chiang Mai. This comprehensive evaluation enables investors to understand the multifaceted nature of the market, ensuring that all relevant aspects are considered before making investment decisions.

**Economic Analysis:** The research delves into the economic growth potential, market stability, and return on investment prospects of the Chiang Mai property market. This provides investors with crucial insights into the financial viability of their investments.

**Political and Regulatory Insights:** By analyzing the political stability and regulatory environment, the paper helps investors navigate the complexities of foreign property ownership and compliance with local laws, thereby reducing legal and bureaucratic risks.

**Social and Cultural Assessment:** Understanding social acceptance and cultural compatibility is essential for the success of foreign investments. This research highlights these aspects, ensuring that investors can anticipate and manage community relations effectively. **Environmental Considerations:** The emphasis on environmental sustainability aligns with global investment trends, where eco-friendly practices are increasingly prioritized. This ensures that investments are not only profitable but also sustainable and responsible.

### **1.3.2 Robust Decision-Making Framework**

The development and application of a Multi-Criteria Decision Analysis (MCDA) framework is another significant advantage of this research. MCDA provides a structured and quantitative approach to decision-making, which is particularly valuable in complex investment environments. The framework integrates various criteria, allowing investors to:

**Systematically Compare Investment Options:** The MCDA framework enables the comparison of different investment opportunities based on a consistent set of criteria. This ensures that decisions are made based on comprehensive and comparable data.

**Prioritize Investments:** By assigning weights to different criteria according to their relative importance, investors can prioritize investment opportunities that align with their strategic objectives and risk appetite.

**Enhance Decision Transparency and Justification:** The structured nature of MCDA ensures that investment decisions are transparent and can be justified based on quantifiable data. This is particularly useful for stakeholders who need to present their decisions to boards, partners, or regulatory bodies.

### **1.3.3 Strategic Recommendations and Risk Mitigation**

Providing strategic recommendations is a key advantage of the research. These recommendations are based on the MCDA results, ensuring they are grounded in a thorough and systematic analysis. The strategic insights offered by the research include:

**Optimal Investment Strategies:** The research highlights the most attractive investment opportunities, allowing investors to focus their resources on areas with the highest potential returns.

**Risk Management:** By identifying and evaluating potential risks associated with different investment options, the research helps investors mitigate these risks. This proactive approach to risk management can enhance investment stability and success.

**Alignment with BRI Goals:** The recommendations are framed within the context of the Belt and Road Initiative, ensuring that investments contribute to the broader objectives of the BRI. This alignment can facilitate support from the Chinese and Thai governments and other stakeholders involved in the BRI.

### **1.3.4 Policy and Academic Contributions**

Beyond practical investment insights, the research paper contributes to the broader academic and policy discourse. The detailed analysis and methodological approach provide valuable contributions in several ways:

**Policy Guidance:** Policymakers can use the research findings to create an enabling environment for foreign investments. The insights into economic, social, and regulatory factors can inform the development of policies that attract and facilitate sustainable investment.

**Academic Advancement:** The methodological rigor of the research, particularly the application of MCDA in the context of international real estate investment, adds to the academic literature. It provides a case study that can be referenced and built upon in future research.

Framework for Further Studies: The research sets a precedent for future studies to adopt similar frameworks to evaluate investment opportunities in other regions or sectors. This can lead to a broader application of MCDA in international investment analysis.

In conclusion, the research offers significant advantages by providing a comprehensive evaluation of investment criteria, developing a robust decision-making framework, offering strategic recommendations, contributing to policy and academic discourse, and facilitating informed decision-making. These advantages make the research an invaluable resource for Chinese investors looking to capitalize on opportunities in the Chiang Mai property market, while also ensuring that their investments are sustainable, responsible, and aligned with the broader goals of the Belt and Road Initiative.

#### **1.4 Scope of the Research**

The scope of the research encompasses a comprehensive analysis of Chinese investment in the Chiang Mai property market based on the Belt and Road Initiative, employing MCDA techniques to support informed decision-making and promote sustainable investment practices aligned with the goals of the BRI. The overall scope of this research includes a comprehensive investigation of Chinese investors in the real estate market. Specifically, the study focused on multi-standard decision analysis (MCDA), intuitive analysis hierarchical process (AHP), and the application of fuzzy concepts in the Belt and Road Initiative (BRI). This study spans a multifaceted range of Chiang Mai real estate investments while considering the broader implications of BRI.

Time range: The time dimension of this study extends from the beginning of the Belt and Road Initiative (BRI) to the present day. This strategic breadth aims to capture the evolution of Chinese investment in the Chiang Mai property market. By examining the entire time frame, the study well tracks the development, patterns, and transitions that occur in the presence of Bri. Furthermore, this study extends its analysis to the future with a prospective perspective, aiming to predict the potential trends, changes, and dynamics of the Chiang Mai real estate market. This prospective gaze enables research to provide valuable insights and strategic advice to meet potential future needs and challenges.

Geographical scope: Geographically, this study is particularly centered on Chiang Mai, which is highly important in the overall narrative of the Belt and Road Initiative. Chiang Mai has become the focus of Chinese investors seeking diversification in real estate, closely aligned with the core objectives of the study. This geographic focus allows for an intensive and detailed study of the complex interactions between Chinese investors and the Chiang Mai property market. By focusing on this area, the study can delve into local dynamics, cultural nuances, regulatory framework, and market complexity, which together shape Chiang Mai's investment landscape.

- As part of the Belt and Road Initiative (BRI), what are the key factors and criteria influencing Chinese investors' decision to invest in the Chiang Mai real estate market?
- What are the main challenges and opportunities for Chinese investors when considering Chiang Mai real estate investment under the background of listing?
- How do the intuitive level analysis process (IAHP), multi-standard decision analysis (MCDA), and fuzzy framework affect the decision-making process of Chinese investors choosing real estate as their investment strategy?
- What is the potential economic, social, and cultural impact of China's increased investment in Chiang Mai's real estate market? How do these effects align with the goals of BRICS?

## 1.5 Concept Framework

The conceptual framework outlines the primary concepts, variables, and their relationships, providing a structured approach to analyze the Chinese investment in the Chiang Mai property market within the Belt and Road Initiative (BRI) context using Multi-Criteria Decision Analysis (MCDA). To examine and evaluate Chinese investments in the Chiang Mai property market considering the influence of the BRI, using MCDA techniques to identify optimal investment opportunities and their impacts.

### 1. Key Concepts and Variables

#### 1.1 Chinese Investment (CI)

- FDI Inflows: The amount of foreign direct investment from China into Chiang Mai.
- Investment Types: Categories of investment including residential, commercial, and industrial properties.
- Investment Motivation: Factors driving the investments, such as economic benefits, strategic positioning, and cultural connections.

1.2 Chiang Mai Property Market (CMPM):- Market Dynamics: Analysis of demand and supply, property prices, and growth trends in the market. Regulatory Environment: Understanding local laws, foreign ownership regulations, and tax policies. Infrastructure Development: Assessment of transportation, utilities, and public services supporting the property market.

2. Belt and Road Initiative (BRI): Strategic Objectives: Goals of enhancing trade routes and economic integration between China and Thailand. Projects in Thailand: Specific infrastructure projects and economic zones linked to the BRI. Policy Support: Agreements and partnerships fostering investment, including government incentives and support.

3. Multi-Criteria Decision Analysis (MCDA): Decision Criteria: Factors like economic return, risk assessment, socio-economic impact, and environmental sustainability used to evaluate investment opportunities. Analytical Methods: Techniques such as Analytic Hierarchy Process (AHP), Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), and VIKOR used for decision-making. Stakeholders: Identifying the key players, including investors, policymakers, the local community, and real estate developers.

3.1 Relationships and Interactions: Impact of BRI on Chinese Investment in CMPM. Policy Influence: How BRI-related policies either facilitate or hinder Chinese investments. Economic Incentives: Benefits like financial incentives, reduced trade barriers, and tax advantages provided under BRI. Evaluation of Investment Opportunities using MCDA. Criteria Selection: Identifying critical factors that influence investment decisions. Ranking and Scoring: Applying MCDA techniques to rank and score different investment opportunities. Risk and Return Analysis: Weighing potential benefits against associated risks to identify optimal investment choices. Effects on Local Market and

Economy. Property Market Changes: Observing changes such as price fluctuations and construction booms due to increased investment. Economic Growth: Assessing contributions to job creation, GDP growth, and overall economic development. Social and Environmental Impact: Evaluating the broader effects on community development and sustainability.

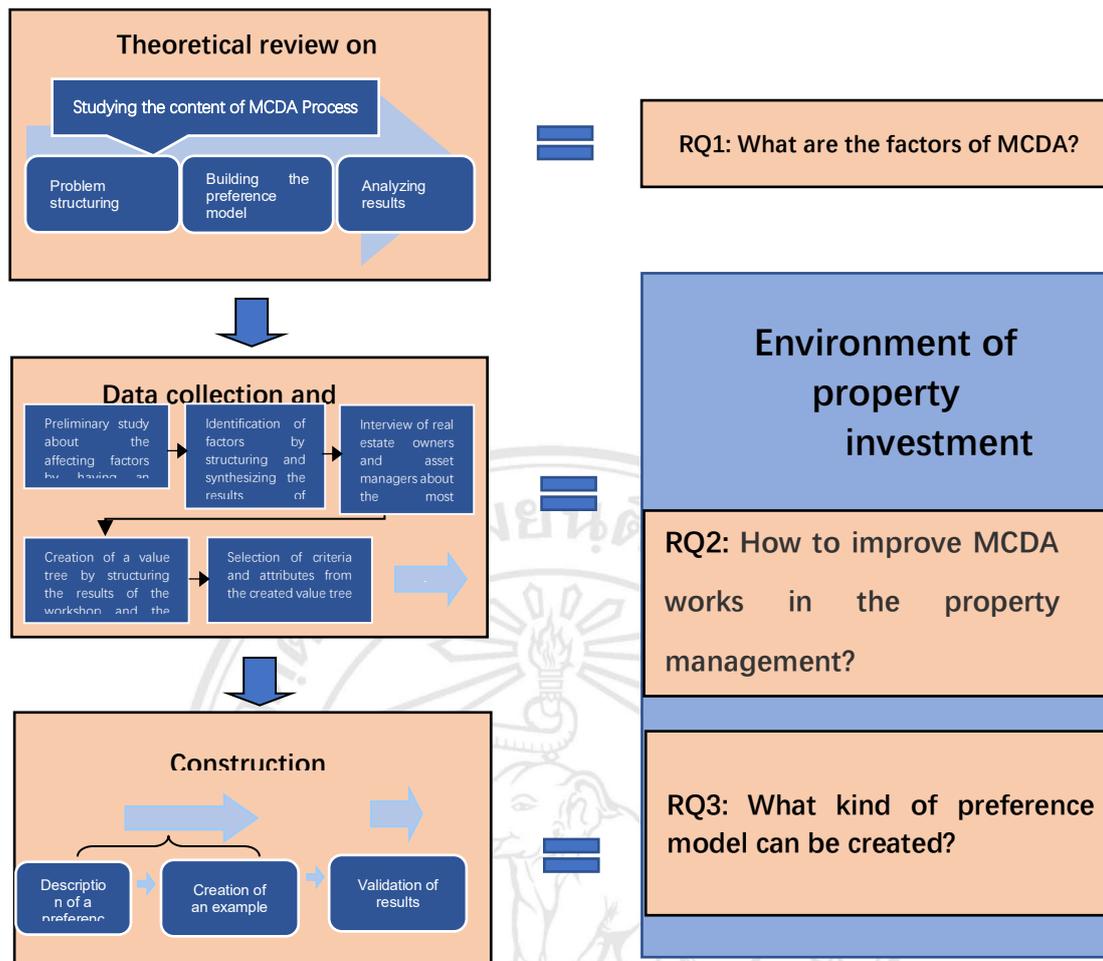
#### 4. Methodological Approach

4.1 Data Collection: Quantitative Data: Collecting numerical data like investment amounts, market statistics, and economic indicators. Qualitative Data: Gathering insights through expert interviews, policy analysis, and stakeholder surveys. MCDA Implementation

- Model Construction: Developing a decision-making model that integrates selected criteria. Data Analysis: Using MCDA methods to evaluate and rank investment options. Sensitivity Analysis: Testing the robustness of results under different scenarios.

5. Expected Outcomes: Optimal Investment Decisions: Identifying the most promising investment opportunities in the Chiang Mai property market. Policy Recommendations: Suggest adjustments to policies to improve the investment climate. Strategic Insights: Gaining an understanding of the broader impacts of BRI on regional development.

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**Figure 1.1** The Concept Framework

This framework encapsulates the primary elements and their interconnections, guiding the research toward a comprehensive analysis of the specified topic.

## 1.6 Thesis Outline

There is a structured outline of the five chapters of the dissertation. The first chapter starts in the introduction as below: The first chapter includes Background and Context, Introduction to the Belt and Road Initiative (BRI), an Overview of Chinese investment trends globally and specifically in Chiang Mai, Significance of the property market in Chiang Mai in the context of BRI. Problem Statement, Identification of gaps in current research on Chinese investment in Chiang Mai property market, Challenges and opportunities associated with these investments. Research Objectives, To analyze the

impact of BRI on Chinese investments in the Chiang Mai property market and to apply Multi-Criteria Decision Analysis (MCDA) for evaluating investment opportunities. Research Questions, What are the key factors influencing Chinese investment in the Chiang Mai property market?, How does the BRI affect these investments?, How can MCDA be utilized to assess and rank investment opportunities?. Scope and Limitations - Defining the boundaries of the study, Acknowledging potential limitations and biases.

Chapter 2: Literature Review, Introduction to MCDA, Overview of MCDA methodologies, Applications of MCDA in investment decision-making. Chinese Investment Patterns, Historical and current trends of Chinese investments abroad, Specific focus on property investments. The Belt and Road Initiative, Goals and strategic importance of the BRI, Impact of BRI on Southeast Asian economies, particularly Thailand. Chiang Mai Property Market, Market dynamics and growth trends, Regulatory environment and investment policies. Synthesis of Literature, Identification of gaps in existing research, Justification for the research focus.

Chapter 3: Research Methodology, Research Design, Explanation of the overall research approach, Justification for using a mixed-methods approach. Data Collection Methods, Quantitative data: Sources, collection methods, and tools used (e.g., market statistics, economic indicators), Qualitative data: Techniques such as expert interviews, policy analysis, and stakeholder surveys. Analytical Techniques, Detailed explanation of MCDA methods like AHP, and TOPSIS, Steps for implementing these techniques in the study. Validity and Reliability, Measures taken to ensure the validity and reliability of the data and analysis, Strategies for mitigating biases.

Chapter 4: Data Analysis and Findings. Descriptive Analysis, Summary of the quantitative data collected, Key statistics, and trends observed. Application of MCDA, Step-by-step application of MCDA methods to the collected data, Detailed ranking and scoring of investment opportunities. Discussion of Findings, Interpretation of the results, Comparison with existing literature, and Implications for investors and policymakers.

Chapter 5: Conclusion and Recommendations and Future Research. Summary of Key Findings. Strategic Implications. Policy Recommendations, Suggestions for policy adjustments to enhance the investment climate in Chiang Mai, and Recommendations for stakeholders to maximize benefits from Chinese investments. Future Research Directions,

Identifying areas for further study based on the findings and limitations of the current research. This structured outline provides a comprehensive guide to conducting the research methodically, ensuring each chapter builds on the previous one to deliver a thorough analysis of the topic.



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## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

Chinese investment in global real estate markets has surged in recent years, driven by the Belt and Road Initiative (BRI), a grand strategy aimed at enhancing trade and infrastructure connectivity between Asia and the rest of the world. Chiang Mai, a major city in northern Thailand, has emerged as an attractive destination for Chinese property investors due to its strategic location, economic prospects, and cultural ties. This literature review examines existing research on Chinese outbound real estate investment, the influence of the BRI, the application of Multi-Criteria Decision Analysis (MCDA) in investment decision-making, and the specific dynamics of the Chiang Mai property market.

##### 2.1.1 Chinese Outbound Real Estate Investment

Chinese outbound real estate investment has been a subject of extensive scholarly attention, particularly in the context of its drivers, patterns, and impacts. Studies by Wu, Shen, and Zhang (2016) and Liu, Xu, and Wong (2018) highlight that Chinese investors are motivated by factors such as economic diversification, wealth preservation, and the search for higher returns. The regulatory environment in China, characterized by capital controls and domestic market saturation, further propels Chinese investors to seek opportunities abroad (Chen & Funke, 2020).

Additionally, research indicates that Chinese investors favor markets with stable political environments, robust legal frameworks, and promising economic growth prospects (Li, Wei, & Liu, 2017). The preference for real estate as an investment vehicle is attributed to its perceived stability and potential for capital appreciation. These studies collectively provide a foundational understanding of the motivations and preferences guiding Chinese investment behavior.

### **2.1.2 The Belt and Road Initiative (BRI)**

The Belt and Road Initiative, launched by China in 2013, aims to foster economic cooperation and infrastructure development across Asia, Europe, and Africa. The BRI's impact on global investment flows has been substantial, with Chinese enterprises increasingly engaging in infrastructure and real estate projects in participating countries (Wang, 2019). The initiative is designed to enhance connectivity through the construction of highways, railways, ports, and real estate developments, thereby facilitating trade and investment.

Several scholars, including He and Wilkins (2020) and Chien (2021), emphasize the BRI's role in shaping investment strategies by promoting regional economic integration and providing a strategic framework for international investments. The BRI's emphasis on infrastructure development has a direct correlation with increased real estate investments in key nodes along the route, such as Chiang Mai. These investments are seen as complementary to infrastructure projects, enhancing urban development and economic growth.

### **2.1.3 Multi-Criteria Decision Analysis (MCDA)**

Multi-Criteria Decision Analysis (MCDA) is a methodological approach used to evaluate complex decision-making scenarios involving multiple criteria. It is particularly relevant in investment decision-making, where investors must consider various factors such as financial returns, risks, regulatory environment, and market conditions (Belton & Stewart, 2002). MCDA techniques, such as the Analytic Hierarchy Process (AHP) and Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), provide structured frameworks for comparing and ranking investment alternatives based on predefined criteria (Saaty, 1980; Hwang & Yoon, 1981).

In the context of real estate investment, MCDA has been applied to assess property values, investment risks, and market potential. For instance, research by Zhang et al. (2015) demonstrates the use of AHP in evaluating the attractiveness of different real estate markets for Chinese investors. Similarly, studies by Chen and Khumpaisal (2009) illustrate the application of MCDA in assessing risk factors in international real estate investments. These studies underscore the utility of MCDA in facilitating informed investment decisions by integrating multiple evaluative dimensions.

## 2.1.4 Multi-Criteria Decision Analysis

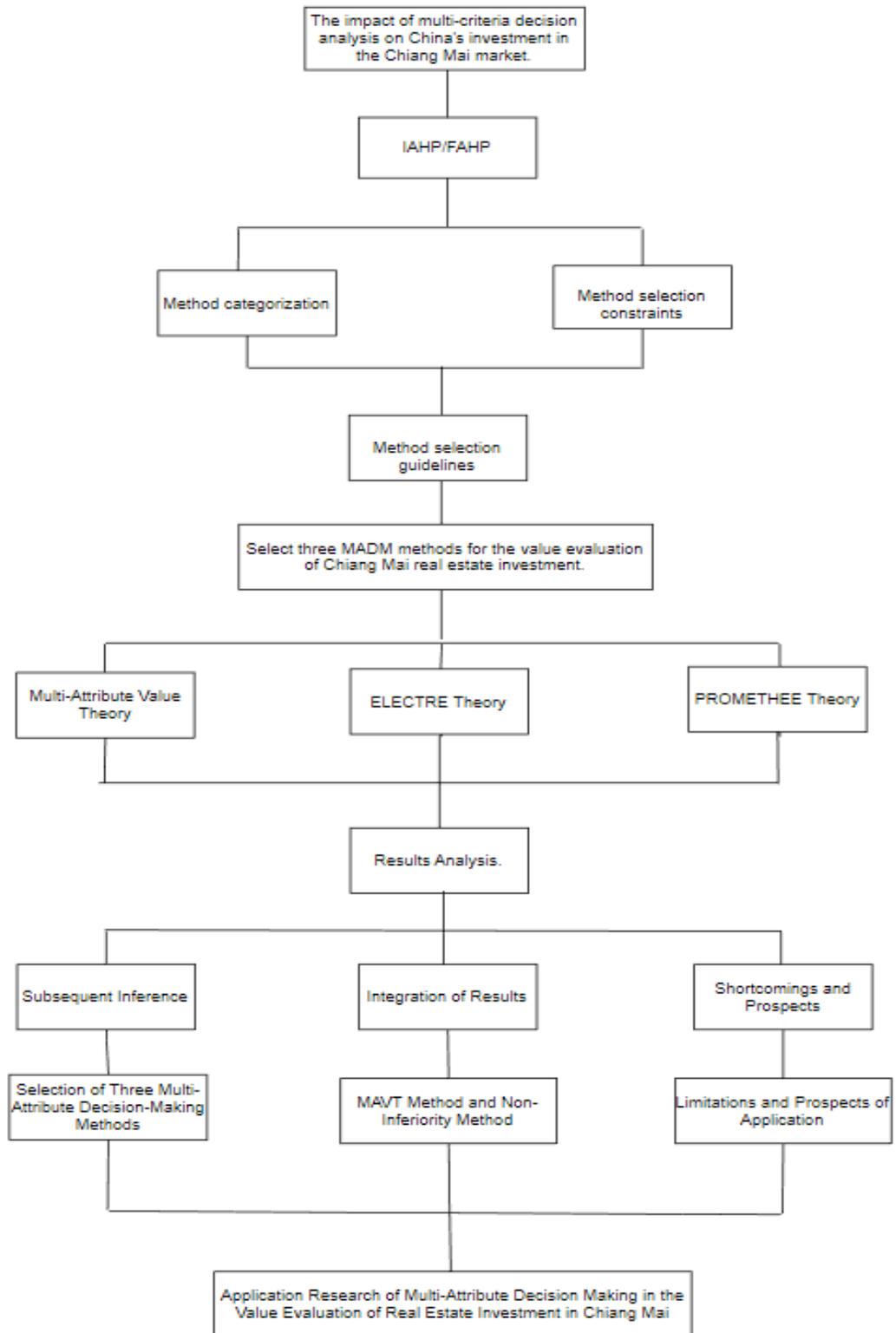


Figure 2.1 Multi-Criteria Decision Analysis

### **2.1.5 Chiang Mai Property Market**

Chiang Mai, known for its cultural heritage and burgeoning economy, has attracted significant interest from Chinese investors. The city's strategic location within the BRI framework enhances its appeal as an investment destination. Existing literature on the Chiang Mai property market highlights several factors contributing to its attractiveness, including economic growth, tourism potential, and urban development initiatives (Pholpoke, 2019; Thanaporn, 2020).

Research by JLL (2018) and Knight Frank (2020) provides detailed analyses of market trends, property values, and investment opportunities in Chiang Mai. These reports indicate a steady increase in property prices driven by demand from foreign investors, particularly from China. The influx of Chinese investment is attributed to favorable government policies, the establishment of international schools, healthcare facilities, and other amenities catering to expatriates (CBRE, 2019).

Moreover, the BRI has facilitated infrastructure improvements in Chiang Mai, such as the development of transportation networks and commercial hubs. These developments have further boosted the city's real estate market by enhancing connectivity and accessibility. Studies by Wong and Fung (2021) highlight the synergistic effects of infrastructure and real estate investments under the BRI, emphasizing the role of strategic planning and policy support in fostering sustainable urban growth.

The literature reviewed underscores the importance of considering multiple criteria in investment decisions and highlights the transformative impact of the BRI on regional property markets. Future research should continue to explore the evolving landscape of Chinese investment under the BRI, with particular attention to emerging markets and the interplay between infrastructure development and real estate dynamics.

## **2.2 The context of the research theories**

### **2.2.1 Real Estate Investment Theory:**

Theories of real estate investment, such as portfolio theory, capital asset pricing model (CAPM), or real options theory, offer insights into the dynamics of real estate markets, risk-return tradeoffs, and investment valuation techniques. These theories help

analyze how Chinese investors assess and manage risks, allocate capital, and optimize investment portfolios in the Chiang Mai property market.

### **2.2.2 Decision-Making Theory:**

Decision-making theories, such as rational choice theory, bounded rationality, or prospect theory, provide frameworks for understanding how individuals and organizations make decisions under conditions of uncertainty. These theories help analyze the cognitive processes, biases, and heuristics that influence Chinese investment decisions and the role of MCDA in supporting rational decision-making.

### **2.2.3 Policy and Regulatory Theory:**

Theories of policy analysis and regulatory frameworks help examine the impact of government policies, regulations, and incentives on Chinese investment in the Chiang Mai property market. These theories consider factors such as property rights, land use regulations, tax policies, and investment promotion measures that shape investment opportunities and risks. Belt and Road The historical context of the Initiative (BRI) is essential to understanding the transformative nature of the study. In 2013, Chinese President Xi Jinping inaugurated a ceremony, dating back to the ancient Silk Road, a network of trade routes that promotes cultural exchanges and commerce between the East and the West. This historical reference to the Silk Road highlights the initiative's desire to revive and modernize these ancient routes and reignite the spirit of cross-border cooperation and exchanges. However, it is important to recognize that BRI is not just a nostalgic historical revival, but a forward-looking and contemporary undertaking. Its primary goal is to promote economic integration and cooperation on a large scale, transcend geographical boundaries, and reshape global economic dynamics. Therefore, BRI includes a multifaceted approach, including the development of extensive transport networks, energy projects, and cross-continental trade corridors. This ambitious initiative has left an indelible mark on the world stage, redefining international relations and the global economic landscape.

Within this historical framework, BRI has gained wide attention and participation from Asia, Europe, Africa, and other countries. It represents a vision of interconnection, mutual benefit, and common prosperity. As China takes the lead in promoting economic integration in the Asia-Pacific region and establishing a global partnership, the impact of

BRICS reform is becoming increasingly evident. Bri's influential infrastructure development highlights its importance as a transformative force in international relations and investment. Understanding this historical context is critical to understanding the profound impact of this study in BRI and its impact on Chiang Mai and its impact on real estate investment.

Geographically, Chiang Mai is strategically located at the crossroads of major trade routes connecting east and west for centuries. Located in the mountains of northern Thailand, it walks along the historic Silk Road and promotes the exchange of goods, ideas, and culture. This geographical advantage has not diminished over time; instead, the Belt and Road Initiative (BRI) has revived it. However, under the attractive attraction of Chiang Mai, it is a complex and diverse real estate market that, although promising, poses complex challenges to investors. The city's real estate landscape boasts a wide variety of real estate types, ranging from apartments and condos to townhouses and detached homes. Each real estate type has its own unique opportunities and challenges, reflecting the dynamic characteristics of the Chiang Mai real estate market. One of the most important challenges for investors is the changing market landscape. Global and local property markets are affected by many factors affecting supply and demand and property value. These fluctuations may be affected by economic conditions, government policies, and even unforeseen events, adding an unpredictable factor to the investment environment.

Moreover, the real estate investment decision process is more complicated due to the criteria investors must consider. Investment potential, rental income potential, capital appreciation, geography and accessibility all play a key role in forming investment decisions. Investors must weigh these criteria against their personal preferences and priorities. Furthermore, the inherent uncertainty as an important part of real estate investment further amplified the complexity of decision-making. Market conditions can change quickly, and once stable factors may become unpredictable. These uncertainties require a structured and comprehensive approach to investment decisions that considers not only historical and geography, but also the dynamic nature of the housing market. It is in this complex tapestry that Chiang Mai's historical significance and geographical appeal converge with the complexity and uncertainty of real estate investment that our research finds its place. By introducing an intuitive analysis hierarchy analysis process (AHP), multi-standard decision analysis (MCDA), and fuzzy concept, we provide the

necessarily feasible paradigm for the solution of the real estate investment method in Chiang Mai.

### **2.2.3.1 One Belt One Road Initiative (BRI) and International Real Estate Investment**

A thorough understanding of BRI and its core objectives and its profound impact on international trade and investment patterns is essential. This large-scale development strategy aims to revitalize and modernize the historic Silk Road trade route, connecting China with Southeast Asia, Europe, and other places. The core goal of the BRI is to promote enhanced connectivity, infrastructure development, and economic cooperation among participating countries. One of the significant effects of BRI's ambitions is a dramatic surge in China's outbound property investment. The Belt and Road initiative emphasizes cross-border connectivity and "investment facilitation" and plays a key role in driving this trend. Chinese investors are increasingly looking beyond their domestic borders for profitable opportunities in foreign property markets. The trend is driven by several factors, including wanting to expand its portfolio, pursuing higher yields, and seeking strategic assets aligned with BRI's broader goals.

In the background of global real estate development trends, the surge of China's foreign real estate investment has profound significance. It not only reshaped the dynamics of the international property market, but also stimulated competition among global cities to attract Chinese capital. The influx of Chinese investment has led to soaring house prices in some markets, prompting discussion about its impact on local affordability and housing availability. Chiang Mai's real estate market within the BRI framework is particularly noteworthy for several reasons. Chiang Mai has become an attractive tourist destination for Chinese real estate investors. Its proximity to China, combined with its rich cultural heritage and natural beauty, has attracted the attention of Chinese investors looking for diversification and growth opportunities. Moreover, Chiang Mai's real estate market reflects the broader trends and challenges associated with China's outbound investment, making it a more instructive case study. As we explore this area of connectivity and investment, we will travel through the historical evolution of BRI, dissect its global impact, and further study the motivation for Chinese investors to explore overseas real estate opportunities.

In addition, we will carefully study the key role of real estate in BRI, studying how it expands economic cooperation and international business cooperation. In the integration of these forces in Chiang Mai becomes a microcosm, we can interpret the broader trends and changes in the international real estate market. In conclusion, this section paves the way for a comprehensive understanding of the context of our research. It lays the foundation for the real estate market, its appeal to Chinese investors, and factors influencing its investment decisions. Through this exploration, we will not only strive to contribute to the discourse on Chinese investment within the BRI framework, but also contribute to the broader narrative of global real estate trends in an era defined by connectivity and cross-border cooperation.

### **2.2.3.2 Historical evolution**

Belt and Road The historical evolution of the initiative significantly shapes the development of international trade, investment, and infrastructure in the 21st century. Understanding Bri's profound impact on global affairs requires beginning a chronological journey that tracks the history of the initiative, illustrates key milestones, and analyzes the underlying motivation for starting it up. Since its official announcement in 2013, this background exploration has provided important insights into Bri's progress, expansion, and development goals. The origin of the BRIC dates to September 2013, when Chinese President Xi Jinping unveiled the concept during his visit to Kazakhstan and Indonesia. Originally known as "Belt and Road" (OBOR), the Belt was illustrated as a grand vision to reignite the ancient Silk Road trade routes that once promoted economic and cultural exchanges between East and West. At its core, it tries to reignite China's historical role as a global business and interconnection hub. In its early stages, it consisted of two main parts: the Silk Road Economic Belt and the 21st Century Maritime Silk Road. The former envisions a land trade corridor connecting China and Europe through Central Asia and the Middle East.

The latter also focuses on connecting China to Southeast Asia, South Asia, Africa, and Europe through port networks and maritime infrastructure. These basic concepts underpin BRI's initial goals, emphasizing infrastructure development, economic cooperation, and cultural exchanges among participating countries. With the development of BRI has evolved from a concept to a comprehensive strategy for international

participation and development. The milestone interrupted the transition. It is worth noting that in 2015, China established the Asian Infrastructure Investment Bank (AIIB), a multilateral financial institution designed to fund infrastructure projects in Brazil's participating countries. The move marks China's commitment to fund the initiative's massive infrastructure needs. The BRI has gradually expanded its geographical range to include more and more countries in Asia, Europe, Africa, and even parts of Latin America. By the mid-2010s, BRI had expanded its reach to include more than 140 countries, demonstrating the initiative's global ambitions.

This expansion was accompanied by the evolution of the Bri objectives, including broader sectors beyond the infrastructure, such as trade facilitation, policy coordination, financial integration, and person-to-person communication. The motives behind Bri are many. One major driver is China's desire to find new channels for its excess capacity to boost economic growth while easing domestic overcapacity. In addition, BRI aims to enhance China's geopolitical influence and soft power by positioning itself as a leader in global development and cooperation.

In addition to its historical evolution, we must also follow the Belt and Road Initiative and the trajectory of Chinese investment on the global stage. BRI has crossed significant milestones and expanded its reach and is now preparing to continue to shape the dynamics of the international trade, investment, and real estate markets. Understanding its prospects and potential impact on Chiang Mai will be crucial. A key aspect of Bri's future is its adaptability and response to changing global dynamics. As the world experiences major changes, including emerging challenges in economic power, changing trade patterns, and climate change, Britain is likely to adapt and develop accordingly. The initiative may diversify its focus, including green and sustainable infrastructure projects, consistent with global sustainability goals and reflecting a growing emphasis on environmental responsibility. Furthermore, BRICS is expected to continue to promote economic cooperation and connectivity among participating countries.

China's commitment to strengthening trade relations and infrastructure development suggests that the initiative will remain a cornerstone of its foreign policy. This continued commitment could lead to the development of new economic corridors,

expansion of existing ones, and greater emphasis on digital connectivity and technology-driven projects. In China's foreign real estate investment, the future is full of prospects and challenges. Chinese investors are likely to continue seeking investment opportunities in foreign property markets. However, they may adopt more subtle strategies based on lessons learned from past investments. Factors such as risk mitigation, compliance, and alignment with SDG are expected to be highlighted in investment decisions. For regions like Chiang Mai, which has long embraced Chinese real estate investment, the future provides opportunities for sustainable urban development, job creation, and economic growth. However, local authorities and stakeholders will need to carefully manage the impact of such investments to ensure equitable interests in communities, avoid potential challenges associated with gentrification, and promote responsible real estate development. In addition, Bri's future could increase cooperation between China and other global powers and regional organizations. Cooperation projects and partnerships could create a new era of international cooperation and promote a more interconnected and prosperous world.

**Belt and Road** The historical evolution of the Belt and Road Initiative (BRI) represents a fascinating narrative, highlighting its importance in contemporary international relations. By tracing its journey from conceptualization to expansion and its evolving goals, one can understand the multifaceted aspects of this transformative initiative. Understanding the historical context of BRI is crucial to understanding its impact on international trade, investment, and real estate markets, providing the context for the subsequent meaningful analysis of China's outbound real estate investment in Chiang Mai and other regions. At the same time, examining the future of BRICS and Chinese investment gives us a glimpse into the future of global affairs. As the initiative continues, its adaptability, sustainability, and collaboration will be critical to shaping its impact on the international property market. Looking ahead, stakeholders in regions such as Chiang Mai should be vigilant, adaptable, and proactive to address the challenges of this dynamic global phenomenon. The historical context provides a foundation for understanding the potential direction and outcome of Bri's ongoing journey. With future development, its historical lessons will be valuable guides to the future.

### 2.2.3.3 Global Impact

The research contributes to understanding the global implications of the Belt and Road Initiative by examining how Chinese investment patterns and strategies in Chiang Mai reflect broader BRI objectives. Insights from the research can inform policymakers, investors, and stakeholders worldwide about the opportunities and challenges associated with BRI-related investments in emerging markets.

Belt and Road Initiative (BRI) has a profound global impact, reaching beyond national borders and continents. It has not only reshaped international trade patterns but also triggered major developments in infrastructure and promoted economic cooperation among the participating countries. It led to the transformation of international trade routes and strengthened the connection between China and many parts of the world. Overland and sea routes open new trade routes, reducing transportation time and costs. These changes contributed to a shift in global trade patterns, with the BRICIC countries experiencing increased trade flows and economic integration. The initiative also promotes trade diversification by promoting economic links between previously less-linked regions.

In recent years, China's overseas real estate investment has experienced significant growth, reshaping the global property market. To understand this, the key trends and drivers behind the surge in investment activity. One of the main drivers of China's outbound property investment is its own domestic market conditions. Soaring house prices in major Chinese cities, fears of a property bubble, and strict government measures to curb speculative purchases have prompted investors to seek opportunities overseas. Many Chinese investors believe the overseas property market offers better value and more stable returns than the overheated domestic market.

Government policy and regulatory reforms play a key role in shaping China's outbound property investment. While Beijing sometimes restricts capital outflows, it also encourages overseas investment to diversify risks and stabilize the domestic property market. The Qualified Domestic Institutional Investor (QDII) and Qualified Domestic Individual Investor (QDII2) programs provide legal channels for Chinese investors to invest in foreign real estate. To diversify risk and increase the resilience of their portfolio, many Chinese individual and institutional investors are encouraged to allocate some of their wealth to international real estate assets. These investments can hedge against

domestic market volatility and currency depreciation. The factors in the foreign property market also attracted Chinese investors.

These include higher rental yields, lower property taxes, more affordable entry prices in some areas, and the potential for capital appreciation. In addition, in countries with a perfect real estate market, a stable legal system and investor protection also enhance investor confidence. Education and immigration are important drivers for some investors, especially those who seek educational opportunities for their children or consider future immigration. Investing in foreign real estate promotes access to high-quality education and becomes a stepping stone to acquiring residence or citizenship in the host country. China's outbound real estate investment is influenced by various factors. Understanding these trends and drivers is crucial to attracting Chinese investors and Chinese investors seeking overseas opportunities.

#### **2.2.3.4 Real estate investment**

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#### **2.2.3.5 Global Real Estate Market Dynamics**

One significant trend in the global housing market is the fluctuations in property prices. These prices are influenced by a variety of factors, including economic status, demographic change, and investment sentiment. For example, housing prices in major urban areas often soar by increasing urbanization and the attractiveness of urban life. On the other hand, secondary urban and rural areas may offer more affordable property options. The dynamic trend of real estate prices will significantly affect the attractiveness of real estate investment and affect the preference of Chinese investors. Market saturation is another problem in the global housing sector.

In some areas, the market has been flooded with domestic and foreign players competing for real estate assets. This saturation could lead to increased competition, potentially driving up property prices and reducing investment opportunities. Market saturation, as well as regulatory changes and economic changes, could influence Chinese investors' investment strategies, prompting them to explore new markets and asset classes. The surge in Chinese outbound investment has left a clear mark on the global property market. Supported by a strong domestic economy and a growing middle class, Chinese investors have been seeking foreign property diversification and higher yields. Their large capital inflows affect property prices, market dynamics and investment patterns in many countries.

### **2.2.3.6 Chiang Mai Case Study**

Chiang Mai's affordability and cost of living are the key to attracting Chinese investors. Compared with big Chinese cities such as Beijing, Shanghai, or Shenzhen, Chiang Mai offers much lower costs of living, including the choice of affordable housing. This affordability factor has particularly attracted Chinese investors seeking diversification and returns beyond domestic property. Chiang Mai's property market provides an attractive gateway to the international housing arena without the high financial barriers encountered in other cities around the world. In addition, the city's peaceful atmosphere and rich cultural heritage have also attracted Chinese investors.

Chiang Mai's reputation as a cultural and historical treasure resonates with Chinese tourists and investors. Its quiet temples, picturesque landscapes, and slow lifestyle welcome contrast to the hustle and bustle of China's urban center. Chinese investors often see Chiang Mai not only as an investment opportunity, but also as a potential place for leisure and retirement, reflecting the multifaceted motives that support China's outbound real estate investment. Chiang Mai's strategic position within the BRI framework also enhances its appeal. The city is an important link between China and the rest of Southeast Asia, boosting its potential as a trade and investment hub. The development of infrastructure projects such as the Thailand-China high-speed railway that links Kunming and Bangkok has further strengthened Chiang Mai's connectivity, making it a more attractive destination for real estate investment.

Taking Chiang Mai as a case study further explores how Bri's broader goals intersect with the local dynamics. It provides insight into how Chinese investors navigate the unique cultural differences, regulatory environment, and housing market conditions in the region. Moreover, Chiang Mai's experience can reveal the challenges and opportunities emerging when foreign property investment merges with BRI's goals.

### **2.2.3.7 Challenges and Opportunities**

Analyzing the inherent complexity of Chinese real estate investment in Chiang Mai and other BRS is crucial to a comprehensive understanding of market dynamics. Cultural differences bring both challenges and opportunities to Chinese real estate investors. While differences in language, business practices, and social norms may initially present barriers, they also open perspectives for cross-cultural collaboration and learning.

For example, Chinese investors who strive to understand and respect Chiang Mai culture can build stronger relationships with local stakeholders and navigate the market more effectively. In addition, cultural exchanges can lead to the integration of unique design elements and amenities in real estate projects to cater to the preferences of residents. The regulatory framework for foreign property markets, including Chiang Mai, can be very complex and may change. These regulations may affect the acquisition, ownership, and development of real estate.

Understanding and complying with local laws and regulations is essential for Chinese investors to avoid legal challenges. Regulatory complexity can be seen as a challenge, but it also creates opportunities to work with local legal experts and regulatory authorities. By fostering good relationships and following the rules, Chinese investors can keep their investments safe and contribute to the stability of the local property market.

China's real estate investment can also stimulate economic growth and development. Investment in infrastructure such as residential and commercial property can lead to creating jobs, increasing economic activity, and improving the living standards of local populations. These investments may also attract more foreign investment and promote a virtuous cycle of economic development. However, managing the speed and scale of the investment to prevent issues such as gentrification and housing bubbles is essential to ensuring long-term sustainability and equitable development. Building positive relationships with local stakeholders, including governments, communities, and businesses, is an opportunity for Chinese investors to gain project support and effectively respond to challenges.

Working with local authorities could also lead to easier regulatory procedures and encouraging investment. Contact with local communities can increase social acceptance and may reduce potential resistance to large-scale property development. Understanding the risks associated with foreign real estate investments, such as currency fluctuations, economic recession, or political instability, is crucial. Chinese investors can seize opportunities by implementing effective risk mitigation strategies, including diversifying their portfolios, conducting comprehensive due diligence, and understanding global economic trends.

### **2.2.3.8 Policy and Regulatory Framework**

The review of China's foreign real estate investment management framework includes a comprehensive analysis of China, China, and investment countries. In China, government policies play an important role in shaping the outbound investment landscape. These policies can include limiting capital outflows, foreign exchange controls, tax incentives, and investment promotion measures.

For example, the Chinese government may limit the amount of capital it can invest overseas to manage the risk of capital flight. These restrictions may affect the scale and pace of Chinese property outbound investment. Instead, the host country has its own set of policies and regulations affecting foreign property investment. These may include provisions on property ownership, land use, zoning regulations, tax systems, and visa requirements for investors. The ease of doing business, legal protection for foreign investors, and transparency of regulatory procedures are key factors in investment decisions. Host countries may also implement policies to attract foreign investment, such as providing tax incentives, streamlining approval procedures, or granting preferential treatment to specific sectors. The interaction between China and the host country's policies is crucial. Understanding how these policies are consistent or conflict helps clarify the investment environment and the feasibility of real estate projects.

In addition, policy changes may significantly affect investment trends over time. Therefore, assessing the impact of these policies on investment decisions and results is crucial to the comprehensive assessment of foreign real estate investment in Chiang Mai and other relevant regions. It gives us a detailed look at the regulatory environment and its impact on investors, developers, and the broader housing market.

### **2.2.3.9 Impact on the Local Economy**

Assessing the economic impact of China's real estate investment in the context of the Belt and Road Initiative (BRI) is a complex effort to study the institute in all aspects of regional economic development and growth. When Chinese investors work on real estate projects, they often employ local workers for construction, maintenance, property management, and related services. The influx of investment in infrastructure and real estate development has created jobs for skilled and unskilled workers. This could lead to lower unemployment, higher income levels, and better livelihoods in local

communities. These investments not only improve the overall quality of life of residents, but also stimulate economic activity.

Improved infrastructure could attract more investment, boost trade, and reduce transport costs for businesses. This in turn can promote economic growth and competitiveness in the region. Property investment could also have a significant impact on local gross domestic product (GDP). As Chinese investors engage in property development, these contributions tend to increase, causing higher economic output. In addition, subsequent economic activities from real estate projects such as retail, hospitality, and services also contribute to the local economy. In some cases, Chinese property investment could help diversify the economy. By introducing new industries or sectors, such as tourism or science parks, these investments reduce the region's reliance on a single economic driver. Economic diversification can enhance the region's resilience to economic shocks and provide long-term stability.

#### **2.2.3.10 Future Trends**

The development trajectory of China's foreign real estate investment is closely related to China's economic situation. As China continues to grow and mature, investors seek opportunities to diversify their portfolios and invest overseas. Economic changes, such as GDP growth, inflation, and currency valuations, may affect the number and destination of Chinese property investment. Chinese government policies play a key role in shaping global real estate investment. Future policy changes such as capital controls, taxation, and regulations related to overseas investments could significantly affect capital flows into international property markets. Government support for policy and related initiatives also affects the direction and scale of investment. Geopolitical events and international relations will influence the regional appeal to Chinese property investors. Trade tensions, diplomatic relations, and global economic stability could all influence investment decisions. Growing global awareness of environmental sustainability and climate change may prompt Chinese investors to consider green and sustainable real estate projects within the BRI. As investors align with the global SDG, investments in environmental development, renewable energy infrastructure, and sustainable urban planning may become more prominent. The integration of smart cities and digital infrastructure with real estate may become a prominent trend. Chinese

investors are likely to prioritize projects with advanced technology and digitization, reflecting a broader global shift to technology-driven urban development. Diversification remains the core principle of the investment strategy. Chinese investors may continue to diversify their portfolios to mitigate the risks associated with economic volatility and market uncertainty. This may lead to investments in different types of property assets in different locations. As Chinese investors focus more on long-term sustainability and social responsibility, they may focus more on local communities. This may lead to prioritizing community development, cultural preservation, and investment in responsible real estate practices.

### **2.3 Theoretical Concepts**

In various foreign direct investment (FDI) theories, the eclectic paradigm, also known as the OLI model, is the most appropriate framework for understanding China's overseas real estate investment in the context of the Belt and Road Initiative (BRI). This OLI model, developed by John Dunning, takes into account three basic factors: ownership advantage (O), location-specific advantage (L), and internalization advantage (I). By analyzing the motives and strategies behind these investments, the model provides a valuable theoretical framework for examining the decision of Chinese investors to invest in specific international real estate markets.

**Ownership Advantage (O):** The ownership advantage in the Oli model provides a robust framework for understanding Chinese investors making deliberate choices when entering a specific international real estate market. In the context of China's overseas real estate investment in Chiang Mai, Chinese investors have many financial resources, industry expertise, and unique assets, which are different in the global real estate sector. Chinese real estate companies, especially those with a good track record, tend to have large capital reserves. This financial strength gives them a competitive advantage in exploring investment opportunities in the Chiang Mai real estate market, while investors often have rich industry knowledge and experience. Chinese real estate companies with a history of successful investment in both domestic and international markets can use their insights to effectively navigate the nuances of the Chiang Mai real estate environment. This may involve recognizing emerging property trends, understanding local regulations,

and building relationships with key stakeholders such as government authorities and local communities. Investors may also be able to gain a range of other advantages, such as advanced building capacity and innovative technologies. These assets enable them to make strategic decisions, shape the urban real-estate landscape, and contribute to the dynamic interaction of global and local forces.

Specific location advantage (left): The decision of Chinese investors to invest in real estate in Chiang Mai is profoundly influenced by the unique attributes and opportunities offered by the location. The advantages of specific locations provide a valuable framework for dissecting how these unique aspects influence the choice of Chinese investors. Several factors, including cultural familiarity, market insight, and regulatory acuity, play a key role in shaping their investment decisions. Chinese investors are often attracted to their common cultural affinity or deep understanding. In the context of Chiang Mai, investors from China may find the city's cultural richness and heritage to resonate with their preferences and interests. This familiar culture not only inspires their personal enthusiasm for the area, but also facilitates a better integration into the local property market. For example, an investor proficient in Chiang Mai's traditions and cultural nuances may be better at identifying historic properties to attract local and international buyers. Controlling the regulatory pattern is also a key aspect of international real estate investment. Chinese investors with a good understanding of Chiang Mai's real estate regulations and legal framework can make better choices. Conduct thorough due diligence to ensure compliance with local laws and regulations to reduce potential legal risk. This location-specific advantage can significantly influence investment strategies, affecting whether investors choose green space investments or seek partnerships with local companies.

Internalized Advantage (I): Internalized advantage reveals the strategies adopted by Chinese investors in international real estate investment, especially in markets like Chiang Mai. This explores whether these investors choose to handle all aspects of their investments independently or to work with local partners. Some Chinese investors may choose to internalize the business. This approach allows them to provide a higher level of control and decision-making power to maintain their vision throughout the investment process. Instead, Chinese investors may work with local partners. The decision may be facilitated by factors such as limited local market knowledge, regulatory complexity, or

a desire to leverage the expertise and established networks of local participants. This collaboration could allow them to leverage local market dynamics to effectively navigate regulatory needs and build a foothold faster.

Input-output analysis: Urban and regional economic theory provides an indispensable framework for understanding the complex dynamics between Chinese real estate investment and its affected local economies and communities. A particularly valuable theory in this regard is input-output analysis, a quantitative economic approach known for its ability to assess interdependencies between different sectors of the economy. In the context of my research, the application of input-output analysis has the potential to generate deep insights into Chinese real estate investments in specific regions, focusing on how these investments affect different industries, including construction, services, and manufacturing, and their impact on employment patterns. This analysis provides a structured and data-driven approach to assess the broader economic impact of Chinese investment in regions such as Chiang Mai. This approach is well suited to fully examine the ripple effects of real estate investment, considering both direct and indirect effects, and revealing both direct and long-term effects.

## **2.4 Literature review and Related research**

To gain a deep and deep understanding of the real estate market, it is essential to explore a range of sub-themes. Each of these sub-themes plays a unique role in providing a comprehensive and profound analysis of this dynamic market.

### **2.4.1 Market Overview**

Chiang Mai's real estate market presents a complex and multifaceted landscape characterized by various real estate types and market segments. In this market, people can identify different categories, including residential, commercial, and industrial properties, each of which, due to its unique attributes, demand drivers, and inherent challenges, collectively contribute to its performance and overall market dynamics. The exploration of these market segments is crucial to a comprehensive understanding of the real estate market. The residential property market plays a central role in the Chiang Mai real estate market. This category includes a wide range of housing options, from single-family homes and condos to apartments and gated communities. Demand for residential property

is closely linked to population growth, changing family structure, and changing lifestyle preferences. Analyzing the dynamics within this section includes assessing the interactions between local resident housing needs and external influences, such as urbanization and migration patterns. Second, Chiang Mai's commercial real estate sector caters to the city's booming commercial and retail sectors. Commercial real estate includes office space, retail outlets, and hotel facilities. The performance is related to economic conditions, local business expansion, and tourism trends. Understanding the demand drivers of commercial real estate is crucial to measuring the city's economic vitality and its attractiveness as a tourist destination for entrepreneurs and investors. The industrial property sector includes manufacturing facilities, warehouses, and logistics centers. Factors affecting demand in this area include supply chain considerations, trade activity, and industrial expansion initiatives. Analysis can reveal the role of Chiang Mai as a regional economic center and its ability to adapt to industrial growth. Besides the segmentation analysis, the historical trend of real estate prices and market performance also provide valuable insights into the evolution. Examining historical data related to property prices, rental yields, and occupancy can determine the frequency of market cycles, patterns, and external variables. This historical perspective is the cornerstone of assessing the current state of markets and making informed predictions of their future trajectory. It helps identify stable market segments, volatility areas, and factors contributing to this volatility. In addition, it is important to recognize the key roles played by stakeholders in the local real estate industry, including real estate developers and real estate agencies. These industry players have a significant impact on market dynamics, real estate valuations, and overall market sentiment. Their decisions on property development, marketing strategy, and investment planning.

The Belt and Road Initiative (BRI), launched by China in 2013, aims to enhance global trade and stimulate economic growth across Asia and beyond through infrastructural and investment projects. One of the significant areas influenced by the BRI is real estate, with Chinese investors increasingly targeting foreign property markets. This literature review examines the market dynamics of Chiang Mai's property market under the BRI's influence, highlighting the factors that attract Chinese investors, the application of Multi-Criteria Decision Analysis (MCDA) in evaluating these investments, and the broader implications for both local and international markets.

#### **2.4.2 Chinese Investment Trends in Global Real Estate**

Chinese outbound investment in global real estate has grown substantially over the past decade, driven by the need for diversification, wealth preservation, and seeking higher returns. According to studies by Li, Wei, and Liu (2017), and Chen and Funke (2020), factors such as political stability, legal security, and economic prospects are crucial in attracting Chinese investors to foreign markets. The regulatory environment in China, characterized by stringent capital controls, has also pushed investors to look abroad (Wu, Shen, & Zhang, 2016).

Research by Tseng and Kuo (2019) indicates that Chinese investors have shown a preference for markets with stable economies and strong legal frameworks. They also value the potential for property value appreciation and the ability to generate rental income. These preferences shape their investment decisions, with cities like Chiang Mai becoming increasingly attractive due to their promising economic and development outlooks.

#### **2.4.3 The Belt and Road Initiative's Impact on Real Estate Investment**

The BRI aims to foster economic cooperation and infrastructure development across participating countries, thus significantly influencing global investment patterns. Studies by He and Wilkins (2020), and Wang (2019) highlight that the BRI not only enhances trade and connectivity but also promotes real estate investments in strategic locations along the Belt and Road. The initiative's focus on infrastructure development, such as roads, ports, and railways, directly correlates with increased real estate activities in these regions.

Chiang Mai, as part of Thailand's involvement in the BRI, has seen substantial infrastructure investments, enhancing its appeal to foreign investors, particularly from China. The BRI's infrastructure projects are expected to boost local economies, thus increasing the attractiveness of the real estate market as detailed by Chien (2021).

#### **2.4.4 Market Dynamics of Chiang Mai Property Market**

Chiang Mai has emerged as a key destination for Chinese real estate investors, driven by its strategic location, cultural ties, and economic potential. According to Pholpoke (2019) and Thanaporn (2020), factors such as the city's burgeoning tourism

industry, urban development initiatives, and favorable government policies have played significant roles in this trend.

Industry reports from JLL (2018) and Knight Frank (2020) provide detailed insights into Chiang Mai's property market, indicating a steady rise in property values driven by foreign demand. These reports underscore the importance of tourism, which fuels the demand for residential and commercial properties. The influx of Chinese investment is also attributed to the establishment of international amenities such as schools, healthcare facilities, and commercial centers catering to expatriates (CBRE, 2019).

#### **2.4.5 Application of Multi-Criteria Decision Analysis (MCDA)**

MCDA offers a systematic approach to evaluating complex decision-making scenarios involving multiple criteria. It is particularly useful in real estate investment, where investors must weigh various factors such as financial returns, risks, regulatory environments, and market conditions (Belton & Stewart, 2002). Techniques like the Analytic Hierarchy Process (AHP) and Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) provide structured frameworks for comparing and ranking investment alternatives (Saaty, 1980; Hwang & Yoon, 1981).

In real estate, MCDA has been applied to assess market attractiveness, investment risks, and property values. Zhang et al. (2015) demonstrate the use of AHP in evaluating different real estate markets' attractiveness for Chinese investors, while Chen and Khumpaisal (2009) illustrate MCDA's application in assessing international real estate investments' risk factors. These methodologies help investors make informed decisions by integrating multiple evaluative dimensions. Chiang Mai's property market has benefited significantly from the BRI's strategic framework, which has facilitated infrastructural improvements and economic integration. Wong and Fung (2021) highlight that the synergy between infrastructure development and real estate investment under the BRI enhances urban growth and market potential. The city's real estate market is characterized by its strong demand for both residential and commercial properties, driven by its growing economy and tourism sector.

Moreover, the favorable policy environment in Thailand, including investment incentives and regulatory support, further boosts Chiang Mai's attractiveness to Chinese investors. Reports from Knight Frank (2020) and CBRE (2019) emphasize that the city's

real estate market is poised for sustained growth, supported by continuous infrastructural enhancements and increasing foreign investment.

#### **2.4.6 Demand-Driven Factors**

The demand for Chiang Mai real estate is formed by many factors. Local demand drivers include residents' desire to seek suitable housing solutions, which may include various types of properties such as apartments, homes, or condominiums. Moreover, changing family structure, lifestyle preferences and desire to upgrade living space also influence local demand trends. On the international scale, the demand for Chiang Mai property has exceeded its boundaries. Foreign investors and expats often look for various real estate opportunities in Chiang Mai, including investing, retirement, or building holiday homes. These global perspectives significantly impact the housing market, creating opportunities and challenges. Population change plays a key role in influencing real estate demand trends. Analysis of zing population growth, age distribution, and migration patterns helps to understand the changing housing needs of urban residents. Chiang Mai's appeal as a tourist destination and its growing expatriate community are key drivers of real estate demand. The city's rich culture, natural beauty, and relatively low cost of living attract tourists and expatriates. Understanding these demand drivers is essential to an informed analysis and prediction of future trends and dynamics in the market.

#### **2.4.7 Supply Analysis**

The analysis of the current real estate supply landscape in Chiang Mai is an important part of understanding the complexity of the local property market. The comprehensive survey includes several key aspects, including a review of property trends, the state of construction activities, and the emergence of new projects. Moreover, it involves a thorough assessment of vacancy rates and potential problems related to excess housing if they manifest within the market. To further study the supply analysis, it is worth noting that Chiang Mai has seen a significant expansion in its residential real estate industry in recent years. This expansion is mainly in the form of apartment development, in response to local and international needs. Famous developers like Sanily and quality homes have started major condominium projects such as Nim and Astra to cater to the growing interest in urban life. These property development trends are closely related to

the ongoing construction activities, actively reshaping the city skyline. Notable projects include the OneNimman complex, which shows a mix of residential, commercial, and hotel components, illustrating how developers can use multifunctional development concepts to create vibrant, versatile urban spaces. However, this expansion of the property supply is not without potential challenges. Monitoring vacancy rates becomes vital, as rising vacancy rates may signal the problem of oversupply. In some cases, Chiang Mai has seen new condominiums due to rapid growth. For example, for example, known for its stylish atmosphere and proliferation of condominiums, has been the focus of potential oversupply. Understanding the current dynamics of the Chiang Mai real estate market helps to make informed investment decisions, develop effective market strategies, and address potential challenges associated with the oversupply problem.

#### **2.4.8 Chiang Mai Real Estate Investment Trends**

Further research of investment types adds depth to our understanding of the market. Chiang Mai real estate investment range, from rental property, and vacation home to commercial space. Each type of investment has specific considerations, risks, and potential returns. For example, rental properties provide a reliable revenue stream, but require active management and maintenance. In contrast, holiday homes may experience demand fluctuations associated with seasonal patterns. At the same time, commercial space offers substantial return potential, but is closely related to market dynamics and economic conditions. A remarkable feature of foreign investment in Chiang Mai is the remarkable presence of China. Over the past decade, Chinese investors have shown growing interest in Chiang Mai's property offering. Their investments include various real estate categories, from residential property to commercial businesses. The influence of China's outbound investment has penetrated the Chiang Mai market, affected the real estate price, guided the development trend, and formed the investment strategy. Recognizing the key role of Chinese investors in the local property sector is crucial to understanding the dynamics of the real estate market and the numerous opportunities and challenges.

#### **2.4.9 Regulatory Environment**

Understanding the regulatory environment requires examining the local and national rules that affect property transactions. These include broad legal provisions and administrative requirements, all of which help to ensure transparency, fairness, and

legitimacy of property transactions. These provisions provide for procedures for property transfer, title deeds, and title documents. By understanding these rules, investors and stakeholders can navigate the market with confidence and certainty. A key aspect of the regulatory framework concerns land-ownership restrictions, particularly those related to foreign investors. Like many other countries, Thailand has specific rules on land ownership for foreigners. These regulations define the types of property in which foreign individuals or entities can invest and the conditions. Understanding these restrictions is critical to foreign investors seeking access to the Chiang Mai property market. Tax policy is another key aspect of the regulatory environment. Taxes related to real estate transactions can significantly affect investment decisions and the overall cost structure of property ownership. This includes property purchase tax, rental income tax, and capital gains tax. By mastering this regulatory environment, investors can make informed decisions and be effectively involved in Chiang Mai's property market.

The regulatory environment plays a critical role in shaping foreign direct investment (FDI), particularly in real estate markets. For Chinese investors under the Belt and Road Initiative (BRI), understanding and navigating the regulatory landscape of host countries like Thailand is essential. This literature review examines the impact of regulatory frameworks on Chinese investment in the Chiang Mai property market, highlighting how local laws, bilateral agreements, and BRI-related policies influence investment decisions.

The regulatory environment encompasses the legal and administrative framework governing foreign investments in a country. Studies such as those by Globerman and Shapiro (2003) and Wei (2000) indicate that a stable and transparent regulatory environment attracts FDI by reducing risks and uncertainties. Key regulatory factors include property rights protection, investment incentives, tax regulations, and restrictions on foreign ownership.

According to Globerman and Shapiro (2003), robust property rights protection is crucial for attracting foreign real estate investments, as it assures investors of their ownership and control over assets. In contrast, stringent foreign ownership restrictions can deter investments, as highlighted by Wei (2000). Therefore, understanding the regulatory specifics of the Thai property market is essential for Chinese investors.

Thailand has implemented several regulatory measures to manage foreign investment in its real estate market. The country's investment policies, as outlined by the Board of Investment of Thailand (BOI), provide various incentives for foreign investors, including tax breaks and exemptions from certain import duties (BOI, 2020). However, there are restrictions on foreign ownership of land, which is limited to leasehold arrangements, typically for 30 years, with an option to renew (Tilleke & Gibbins, 2019).

Research by Tilleke & Gibbins (2019) and Baker McKenzie (2020) notes that while foreigners can own buildings and condominiums outright, land ownership is generally restricted. This regulatory nuance necessitates strategic planning and legal acumen for Chinese investors looking to enter the Chiang Mai property market.

#### **2.4.10 Legal and Policy Reforms in Chiang Mai**

Chiang Mai, as a strategic location under the BRI framework, has benefited from national and local policy reforms aimed at stimulating investment. The city's urban development plans align with the broader objectives of the BRI, focusing on improving infrastructure, enhancing tourism, and promoting sustainable growth (Chiang Mai Municipality, 2020). Studies by JLL (2018) and CBRE (2019) indicate that local government initiatives in Chiang Mai include streamlined approval processes for foreign investments, improved public services, and infrastructure upgrades. These reforms create a conducive environment for real estate investments, making Chiang Mai an attractive destination for Chinese investors.

While the regulatory environment in Thailand presents several opportunities for Chinese investors, there are also challenges to consider. Research by Baker McKenzie (2020) points out that regulatory compliance can be complex, requiring thorough due diligence and an understanding of local laws. Additionally, navigating leasehold arrangements and ensuring compliance with foreign ownership regulations necessitate careful legal and financial planning. Opportunities arise from the Thai government's proactive stance on promoting foreign investment through the BRI. The alignment of local development plans with BRI objectives enhances investment prospects, particularly in urban centers like Chiang Mai. The city's strategic location, combined with favorable regulatory adjustments, positions it as a key beneficiary of Chinese investment under the BRI.

#### **2.4.11 Infrastructure and Urban Development**

Infrastructure projects play a key role in shaping the desirability and value of properties in Chiang Mai. Development of transport networks such as highways, highways, and public transport systems can significantly improve accessibility to different areas of the city. Improvement in transportation infrastructure often leads to an increase in property value, especially in areas that benefit from enhanced connectivity. In addition, upgrades to utilities, such as water supply and electricity distribution, could further enhance the attractiveness of specific communities, pushing up housing prices in those areas. Urban development planning may have a profound impact on the real estate market in Chiang Mai. These plans outline the development and transformation of cities over time, including the allocation of land for various uses, such as residential, commercial, and industrial uses. Implementation of these programs may lead to changes in real estate demand and value. For example, if an area is designated for commercial development, it may attract businesses and cause a surge in demand for commercial property, thus affecting its prices. Sustainable development and green building initiatives have gained prominence in the global real estate industry, and Chiang Mai is no exception. With increasing environmental awareness, properties with environmental features and sustainable development practices often require higher prices and greater demand. These initiatives include energy-efficient buildings, renewable energy, waste reduction measures, and green space. From an environmental and financial perspective, properties that adhere to sustainability principles are often considered more valuable. A comprehensive understanding of all these factors enables investors, developers, and policymakers to make informed decisions that not only shape the market but also contribute to sustainable growth in Chiang Mai's real estate sector.

#### **2.4.12 Market Challenges**

The Chiang Mai real estate market, like any real estate market, is not without challenges and potential risks. Legal issues can include a range of issues, including land ownership regulations, title and zoning laws. One noteworthy consideration is restrictions on foreign land ownership, which can affect investment decisions. Understanding the legal framework for managing real estate transactions is essential for investors to effectively navigate the market and avoid complex legal issues. Economic uncertainty is

another aspect of the challenges facing the Chiang Mai property market. These uncertainties may stem from fluctuations in the national and global economies, changes in interest rates, and changes in consumer sentiment. The economic downturn could lead to lower housing demand and lower prices, affecting investors and developers. Analyzing economic trends and their potential impact on the real estate market is critical to risk mitigation. Real estate investment itself has risks, and Chiang Mai is no exception. These risks may include market volatility, changes in property values, and difficulties in property management. In addition, foreign investors may face specific risks associated with currency exchange rates and regulatory changes. Comprehensive risk assessment is essential for investors to make informed decisions and develop risk mitigation strategies for the Chiang Mai market. Environmental issues and disaster risk assessment should not be ignored. Like many areas, Chiang Mai is vulnerable to environmental challenges such as floods, wildfires, and natural disasters. Assessing the vulnerability of property to such risks and considering disaster preparedness and mitigation measures is critical to both property owners and investors.

#### **2.4.13 Cultural and Social Factors**

Protecting its rich cultural heritage plays an important role in shaping urban real estate development and investment decisions. Guided by local regulations, conservation emphasizes the importance of seamless integration of new buildings with the city's cultural and architectural heritage. This requirement forces property developers to maintain a delicate balance by incorporating traditional elements into their designs to commemorate Chiang Mai's historic heritage. Historical or cultural properties have become coveted investments, attracting buyers with deep respect for preserving Chiang Mai's rich heritage. Social and lifestyle preferences are the key determinants of property selection in Chiang Mai. The tranquil and pleasant climate of the city makes it an ideal destination for retirees seeking a peaceful and peaceful retirement. This population structure promotes the demand for residential properties in peaceful communities providing a high-quality lifestyle. Instead, urban areas with vibrant nightlife and cultural activities attract younger, more international people. Property developers must align their projects with their target market's lifestyle preferences to ensure market success. By understanding and catering to these preferences, developers can create properties that resonate with the specific needs and aspirations of potential buyers or tenants. The

awareness of community in Chiang Mai is a typical feature of the city. Residents and foreigners usually form close communities within the community, and cultivate a strong sense of belonging. These community dynamics significantly affect real estate investment decisions. Buyers often seek property in areas where they can connect with like-minded people and enjoy the benefits of close communities. Recognizing the value of this society, developers can choose to design properties with public space or amenities to promote community interaction and make their properties more attractive to potential buyers or tenants. These are important to Chinese investors; they help guide them to create properties that resonate with potential tenants or buyers.

#### **2.4.14 Future Forecast on Chinese investors in the real estate sector**

Chinese investors in Chiang Mai are watching housing price trends closely as they seek profitable investment opportunities. Historical data show that property prices continue to rise, especially in the ideal areas of the city. However, accurate predictions of future price trends remain challenging. Several factors will affect property prices, including China and Thailand, currency fluctuations, and market supply and demand. Informed forecasts from real estate experts and market analysts can guide Chinese investors to carefully calculated investment decisions that match their financial goals. The economies of China and Thailand both play a key role. A strong Chinese economy could spur foreign property investment, while a downturn could lead to more cautious practices. Chinese investors also focus on Thai government policies, especially those related to foreign property ownership and taxes. Changes in these regulations may significantly affect investment strategies. Moreover, the global sustainability trend is consistent with Chinese investors' preference for green property. Global events, such as economic crises, political instability, or public health emergencies, may have immediate and unforeseen consequences. For example, the COVID-19 pandemic has reshaped real estate demand and use patterns, prompting investors to adjust their strategies. Moreover, geopolitical tensions or changes in foreign ownership regulation could affect the appeal of Chiang Mai's property market to Chinese investors. To effectively address these potential distractions, Chinese investors should remain flexible, diversify their portfolios, and keep abreast of market developments.

## CHAPTER 3

### METHODOLOGY

#### 3.1 Introduction

The dissertation aims to analyze Chinese investment in the Chiang Mai property market within the framework of the Belt and Road Initiative (BRI) using Multi-Criteria Decision Analysis (MCDA). As a result, Chinese investors have increasingly looked at real estate markets in BRI-participating countries, including Thailand. Chiang Mai, a major city in northern Thailand, has emerged as a key destination due to its strategic location, economic potential, and cultural appeal. To provide a comprehensive evaluation of Chinese investment in Chiang Mai's property market, this study employs MCDA, a decision-making tool that considers multiple criteria to assess investment opportunities. This methodological approach is particularly relevant given the complex nature of real estate investment decisions, which involve various financial, economic, political, and social factors. The following sections outline the research design, data collection methods, and analytical techniques used in this research.

#### 3.2 Research Design

The research design is structured to systematically address the research objectives, which include identifying key investment criteria, evaluating the attractiveness of the Chiang Mai property market, and providing strategic insights for Chinese investors. The study follows a mixed-methods approach, integrating both qualitative and quantitative data to ensure a holistic analysis.

1. Literature Review: A comprehensive review of existing literature forms the foundation of the research, covering topics such as Chinese outbound real estate investment, the Belt and Road Initiative, MCDA methodologies, and the Chiang Mai property market. This review helps in identifying relevant criteria and factors influencing investment decisions.

2. Expert Interviews: Semi-structured interviews with industry experts, including real estate professionals, economists, and policymakers, provide qualitative insights into the local market dynamics, regulatory environment, and the impact of the BRI on Chiang Mai's property sector.

3. Survey Questionnaire: A structured survey is administered to Chinese investors and real estate developers to gather quantitative data on their investment preferences, risk perceptions, and evaluation criteria.

### **3.2.1 Types of the Data**

The data collection process involves multiple sources to ensure a comprehensive dataset for the MCDA. The following methods are applied:

#### **3.2.1.1 Primary Data:**

Primary data is collected through expert interviews and surveys. Experts are selected based on their knowledge and experience in the Chiang Mai property market and Chinese investment trends. The survey targets Chinese investors who have either invested or are considering investing in Chiang Mai.

#### **3.2.1.2 Secondary Data:**

Secondary data is sourced from academic journals, industry reports, government publications, and market studies. This data includes information on market trends, property values, investment incentives, and regulatory frameworks.

#### **3.2.1.3 Case Studies:**

Specific case studies of successful Chinese investments in Chiang Mai are analyzed to identify best practices and lessons learned. These case studies provide practical examples of how investment criteria are applied in real-world scenarios.

### **3.2.2 Analytical Techniques**

The core of the methodology is the application of MCDA, which involves several analytical techniques to evaluate and prioritize investment criteria. The following steps outline the MCDA process:

### **3.2.2.1 Criteria Identification and Weighting:**

Based on the literature review and expert inputs, key investment criteria are identified. These criteria are then weighted using the Analytic Hierarchy Process (AHP), which involves pairwise comparisons to determine the relative importance of each criterion.

### **3.2.2.2 Alternative Evaluation:**

Different investment alternatives in the Chiang Mai property market are evaluated against the identified criteria using the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). This technique ranks the alternatives based on their proximity to an ideal solution, providing a clear indication of the most attractive investment options.

### **3.2.2.3 Sensitivity Analysis:**

To assess the robustness of the results, a sensitivity analysis is conducted by varying the weights of the criteria. This helps in understanding the impact of changes in the importance of different criteria on the overall ranking of investment alternatives.

The methodology outlined in this research integrates qualitative and quantitative approaches to provide a comprehensive evaluation of Chinese investment in the Chiang Mai property market under the Belt and Road Initiative. By employing MCDA, the research systematically analyzes multiple investment criteria, offering strategic insights and recommendations for Chinese investors. The subsequent sections will detail the specific criteria, data analysis, and findings of the research.

## **3.2.3 Development of a multi-criterion decision model:**

### **3.2.3.1 Understanding of multi-attribute value theory (MAVT):**

Deeply explain MAVT, emphasizing its applicability in dealing with complex decision problems. Key concepts such as attribute weights, utility functions as well as integration of preferences are discussed.

### **3.2.3.2 Determine relevant criteria for real estate investment:**

Enumerate and define criteria for evaluating real estate investment opportunities as necessary. Discuss the reasons for choosing each criterion and its importance in the decision-making process.

### **3.2.3.3 Apply MAVT to develop real estate investment strategies:**

Demonstrate the gradual application of MAVT through actual scenarios and develop a multi-criterion decision model. Using hypothetical scenarios to demonstrate how MAVT aids decision-making under uncertain conditions.

### **3.2.3.4 The Belt and Road Initiative Impact Analysis:**

Provides a comprehensive context for the Belt and Road initiative, including its goals, scope, and geographic coverage. Discuss the importance of BRI in promoting international cooperation and infrastructure development.

### **3.2.3.5 BRI and its impact on real estate investment:**

Explore how BRI influences real estate investment decisions, including policy support, economic opportunities, and related risks. Analyze case studies or empirical evidence to demonstrate the impact of BRI on the global housing market.

Case study to China's investment in Chiang Mai's real estate market: Conduct an in-depth case study, focusing on China's investment in Chiang Mai. Investigate how BRI shapes investment trends, the regulatory environment, and the overall real estate pattern of Chiang Mai.

Integration of Multi-criterion Decision Model and BRI Impact Analysis:

Integration of findings: Combine the results of the developed multi-criterion decision model with an impact analysis of China in Chiang Mai. Identify the commonalities, differences, and potential synergies between the two methods.

Suggestions for real estate investors: To provide practical suggestions for real estate investors based on the integrated findings.

Strategies for integrating multi-criterion decision models and BRI-related considerations are discussed.

Conclusion: Summarize the main findings, contributions, and effects of the study. Discusses the potential application of the developed multi-criterion decision models in other property markets, and the generality of the insights gained from the Chiang Mai case studies. Emphasize possible directions for future research, including optimizing decision models or exploring other factors that influence property investment.

### 3.3 Proposed Method

#### 3.3.1 Intuitionistic Fuzzy Correlation Theory

Let  $X$  be a non-empty set, called the intuitive fuzzy set, where  $\mu_A(x)$  and  $\nu_A(x)$  represent the membership and non-membership of subset  $A$  of element  $x$  in set  $X$ , satisfying the following conditions:

$$A = \{ \langle x, \mu_A(x), \nu_A(x) \rangle \mid x \in X \} \quad (3.1)$$

$$0 \leq \mu_A(x) \leq 1, 0 \leq \nu_A(x) \leq 1, 0 \leq \mu_A(x) + \nu_A(x) \leq 1 \quad (3.2)$$

Where,

$$\pi_A(x) = 1 - \mu_A(x) - \nu_A(x). \pi_A(x) \text{ represents the set } X \quad (3.3)$$

The middle element  $x$  belongs to the uncertainty or hesitation of set  $A$ . The element composed of membership, non-membership, and hesitation is called an intuitive fuzzy number.

The size of any intuitive fuzzy number  $A$  can be compared by the similarity function and the exact function. as follows:

$$L(a) = (1 - \nu_a) / (1 + \pi_a) \quad (3.4)$$

$$H(a) = \mu_a + \nu_a \quad (3.5)$$

Let  $a_1$  and  $a_2$  be two intuitive ambiguous numbers, and the comparison method is as follows:

$$1) \text{ If } L(a_1) < L(a_2), \text{ then } a_1 < a_2; \quad (3.6)$$

2) If  $L(a_1) = L(a_2)$ , there are the following two cases; if

$$H(a_1) < H(a_2), a_1 < a_2; \text{ if } H(a_1) = H(a_2), a_1 = a_2 \quad (3.7)$$

In the AHP method, it is essential to obtain reliable results. Once the given IF preference relationship does not meet the acceptable consistency condition, it is necessary to correct the preference relationship until the new preference relationship meets the acceptable consistency line. Here, the correction step for any layer is the same, which is expressed by  $R_{Bi} = (r_{pq})_{nn} = (u_{pq}, v_{pq})_{nn}$

### 3.3.2 Multi-Criteria Decision Analysis

In daily life, multiple standard and balanced decisions are required. These decisions include answers to questions such as what to eat, which shoes to wear, and when to wake up. These decisions are so simple that they are easily handled in one's mind. For example, deciding what shoes to wear requires a balanced standard, such as the weather, what activities you do, and what impression you want to make on others. In daily work, processing is often intuitive, without considering or even attention to all relevant standards. However, the increase in stakeholders and criteria leads to a situation of conflicting information and complex decision-making. The essence of a multi-standard problem also belongs to the change of information from different views and time courses. These challenges combined with the limited ability to handle multiple factors simultaneously lead to the need for a formal model. (Belton & Stewart, 2012) Multi-standard decision analysis (i. e. MCDA, also known as MCDM, multi-standard decision making) is the study of methods and methods that consider multiple standards when helping decision-makers make important decisions (Belton & Stewart, 2012). The earliest references to multi-standard decision analysis methods date back to the 17th century, when Benjamin Franklin used his simple paper approach to help with decision-making (International MCDM Association, 2012). Now MCDA has become a highly studied field, with many MCDA methods and schools (International MCDM Association 2012, Belton & MCDA, 2012). The MCDA definition highlights points such as the nature of standards involving multiple conflicts and incommensurability, considering the preferences of decision-makers, explicitly addressing decision-making issues, and the structure and synthesis of information. The features can be found in the MCDA definition below. "Multi-standard decision making (MCDM) is the study of methods and procedures, through which standards that focus on multiple conflicts can be formally incorporated into the management planning process." MCDA use in a decision-making context is based on information structure and synthesis. Moreover, it helps with value judgment, which means prioritizing between different criteria.

The application of partition philosophy can serve as the starting point of the MCDA process. This process solves complex problems, first cutting them into smaller ones and studying their simpler forms. In addition, it combines these small parts into a coherent whole. This is a broad concept of how MCDA to clarify the decision process. (SYKE

2008) Multi-criterion problems usually focus too much on the creation of the model, and get some numerical facts from the model, which is not only a process of model creation, but also to better understand the situation considered. Therefore, the MCDA process includes not only the construction and use phase of the model, but also two other steps, namely, the identification and structure of the problems, and the development of an action plan. As the process continues, the situation goes from complex to simple. This means that in this process, the complex multiple standard problems are transformed into simpler forms through structured and integrated information. (Belton and Stewart 2012) We must also pay attention to this photo.

Another early contributor to utility theory was Nobel Prize winner Ronald Blue (Ragnar Frisch), who presented economic equilibrium from the perspective of value theory. Ward Edwards (Ward Edwards), the father of the behavioral decision theory, introduced the expected utility theory into psychology in nian, which published the behavioral decision theory and created a new field of behavioral decision making. Nobel Prize winner Herbert Simon (Herbert Simon) proposed the idea that "decision making does not abide by 'rational man' " and developed the theory of behavioral decision-making. Peter Fishburn (Peter Fishburn) is a very prolific contributor to utility theory, and his two contemporary works have made many fundamental contributions to social choice theory and utility theory.

The selection and elimination method is another family of multi-criterion decision-making methods, which is not based on utility theory, but based on graph theory, and was first used by Bernard Roy.

George Danzger (George Dantzig), the father of linear planning, laid the foundation of multi-objective mathematical planning. The publication of Soulas (Saul Gass) enabled the application of linear planning in more areas. In the early 1990s, Nobel Prize winner Jialin unmans (Jan Tinbergen) introduced the concept of "effective vector" into the problem of resource allocation, paving the way for multi-objective mathematical planning.

It is worth mentioning that the new algorithms published by Gas and Thomas Sati in and are widely used for multi-objective mathematical planning. Abraham Czarnowski (Abraham Charnes) and William Cooper have inspired many researchers. Joreen published two important articles on solving the problem of combination optimization and

vector maximization, which consolidated the foundation of multi-objective mathematical planning. Lu (Lotifazoles) established the fuzzy set theory and made innovative contributions to the now-famous robustness analysis. Zader's fuzzy set theory and fuzzy logic have been widely used in various fields, from control theory to artificial intelligence, and of course, it has also been controversial by many scientists.

### **3.3.3 Multi-Attribute Value Theory**

There are a variety of different decision analysis methods to model the preferences of decision-makers (von Wifelier and Edwards 1986, Clemen 1996, Belton and Stewart 2012). Although the process is largely the same, there are large differences, for example, in how to compare between different targets. This research outlines a decision analysis method called multi-attribute value theory (MAVT), which is one of the more widely used theories in MCDA (Keeney & Raiffa, 1996). In MAVT, the degree to which a decision option may be preferred is described in a hierarchical model called a value tree. The value tree includes basic objectives, standards, attributes, and alternatives. The model attempts to establish the strength of evidence for the tendency to choose one option rather than another effect of changes in standard weights on the overall value.

## **3.4 The Collection of the Data**

Impact on Chiang Mai real estate market. The selection of appropriate data collection methods is crucial. This study aims to gain insight into the multifaceted effects of investment, so it is necessary to collect multi-level and multi-dimensional data to fully understand the required analysis dimensions and provide a comprehensive reference for the decision model.

### **3.4.1 Questionnaire Survey:**

The questionnaire is a common data collection method and is especially suitable for studies with large samples. Researchers can design structured questionnaires covering questions about business ethics, social responsibility, and the application of blockchain technology. Participants may fill out the questionnaire via an online survey platform or a face-to-face approach. The questionnaire design should include open-ended questions so that participants can describe in detail their experiences and perceptions of the blockchain application.

Extensive coverage: able to cover large numbers of participants, and access to a variety of data.

Standardized data: A structured questionnaire can provide standardized data to facilitate quantitative analysis.

Subjectivity: The structured questionnaire may limit the depth to which participants can express their true feelings.

Recovery rates: The online questionnaire may be limited by recovery rates and requires measures to improve recovery rates.

#### **3.4.2 In-depth interview:**

In-depth interview is a qualitative research method that is suitable to explore the situation of participants' deep views and experiences. Researchers can choose experts, enterprise managers, and blockchain developers in the field of blockchain technology applications to conduct in-depth interviews. In the interview, researchers can guide participants to discuss their views on business ethics and social sustainability, and the role of blockchain technology in it.

In-depth understanding: You can dig deep into the participants' views to understand their true feelings and opinions.

Flexibility: The researcher can flexibly adjust the questions according to the participants' answers.

Subjectivity: The results are influenced by the subjective factors of the researchers and the participants, and subjective bias should be noted in the analysis.

Resource consumption: In-depth interviews usually require more time and human resources.

#### **3.4.3 Observation method:**

The Observational method is a data collection method that directly observes the participants' behavior and environment. Researchers can choose enterprises or individuals that participate in blockchain transactions and observe their operational behavior, cooperation and so on in practical application. Observation can be conducted through field observation or through online platform monitoring.

Authenticity: You can observe the behavior in the real world and obtain real and objective data.

Details: It can capture the details and interaction information of the participants in the actual operation.

Subjectivity: The interpretation of observations is influenced by the investigator's subjective factors and needs to be analyzed with caution.

Resource consumption: Field observation may require a lot of time and resources, especially in multiple areas.

#### **3.4.4 Text analysis:**

Text analysis is conducted by analyzing participants' written information on social media, forums, news reports, and other platforms to understand their views and attitudes. Researchers can collect relevant text data, use natural language processing technology to analyze it, and mine the keywords, emotional colors, and other information in the text.

Big data: It can process large-scale text data and capture the views of many participants.

Real-time: Text data is usually generated in real-time, giving you access to the latest information.

Semantic understanding: Text analysis needs to deal with complex semantics and context, and the accuracy of the results is limited by natural language processing techniques.

Depth of information: Text analysis makes it difficult to obtain the deep views of the participants, mainly reflecting the public information.

#### **3.4.5 Analysis of policy documents:**

Policy document analysis is a way to gain insight into the "Belt and Road" initiative that can provide research with a detailed understanding of the initiative's goals, implementation plans, and the policy framework related to the housing market. Here are the analysis steps and concerns:

A detailed textual analysis of the official policy documents related to the "Belt and Road" initiative. This may include documents issued by the central government and

policy documents from the relevant provincial and municipal governments. Note the keywords, goals, measures, and schedules.

**Direction and objectives of the initiative:** Determine the overall direction and objectives of the Belt and Road initiative in the policy document. Understand the Chinese government's support policies, infrastructure construction, investment direction, and other planning of the participating countries.

**Investment and economic policy:** Focus on the specific policies in the policy documents concerning investment, trade, and the economy. Understand the policy orientation of the Chinese government's outbound investment under the "Belt and Road" framework, and the policy content related to the real estate market of Chiang Mai.

**Regulatory framework:** Study the part of the policy document on the regulatory framework and regulations, with a particular focus on regulatory measures for cross-border investment and real estate. Understand how the government protects the rights and interests of investors and promotes the development of the Chiang Mai real estate market.

**Local government policies:** If possible, conduct an in-depth study of the "Belt and Road" -related policy documents issued by the local governments in Chiang Mai and its surrounding areas. This helps to understand the attitude and support of local governments towards investment.

**Conference forum Observation:** Observation of meetings and forums is an effective way to gain real-time information and an in-depth understanding of industry views and trends. Here are the key points for the expansion description:

**Participation in international conferences:** Participation in international conferences involving the Belt and Road initiative, especially those focusing on investment, property markets, and infrastructure development. These conferences often bring together government officials, industry leaders, and academic experts to provide unique perspectives and information.

**Focus on professional forums:** Participate in professional forums focusing on real estate and investment and understand the industry experts and practitioners on the "Belt and Road" initiative. These forums may include international real estate exhibitions, investment summits, etc.

Social media engagement: Follow and participate in discussions on relevant social media platforms, "Belt and Road" initiatives, and professional communities in real estate investment areas. This helps to capture real-time industry views and news.

Symposium: Participate in the symposium to learn about the findings and insights into the Belt and Road initiative. Research in academia can provide theoretical support and in-depth analysis.

Industry reports and presentations: Follow presentations and studies from industry experts for their views on initiatives and the real estate market. This can include speeches from corporate executives and reports issued by industry research institutions.

Through policy document analysis and conference forum observation, in-depth information on the influencing factors of the "Belt and Road" initiative, actual policies, and industry attitudes is collected, providing a solid theoretical and empirical basis for multi-standard decision analysis.

#### **3.4.6 Sources of the Data Sample**

In this study, I focus my attention on different stakeholder groups, forming the core of the survey of Chinese investment dynamics in the Chiang Mai real estate market, especially within the framework of the Belt and Road Initiative (BRI). These key participant groups represent all aspects of individuals and entities, and their roles and decisions are integral to understanding the broader impact of Chinese investment in this context. Chinese investors are the central focus of our survey, including individuals and entities that have invested heavily in various properties in Chiang Mai. Their investments range widely, including residential, commercial, and multifunctional properties. By dividing this sample, my aim is to dissect the subtle changes in investment behavior and preferences and reveal the complex decision-making process of Chinese investors in the Chiang Mai real estate market. The study further explores the perspective of real estate developers in the Chiang Mai market. In partnership with the Group, I intend to gather valuable insights into the investment strategies, market positioning, and investment attractiveness employed in specific real estate development projects. This aspect of my study provides a unique point of advantage on the supply side of the housing market, enriching our understanding of how developers navigate this landscape. To understand the impact of Chinese investment on local communities, I turned our attention to Chiang Mai residents. Through surveys and

interviews, I sought to gather first-hand views on the social, economic, and cultural impact of foreign investments within their communities. These insights help us to understand the multifaceted impacts of these investments, ranging from economic growth to cultural dynamics. Using multi-criteria decision analysis (MCDA) for attribute evaluation, I have carefully compiled a sample of attributes for in-depth analysis. My selection is deliberate and includes a range of investment opportunities within the Chiang Mai housing market to facilitate a thorough evaluation guided by pre-determined criteria. This meticulous approach allows me to provide valuable insights into the investment potential of a variety of real estate types.

In addition, my study included local businesses in Chiang Mai, an industry providing insights into the knock-on effects of increased investment activity. By studying changes in demand, supply chains, and economic interactions, I can more comprehensively assess the broader economic impact of Chinese investment. Real estate agents, as intermediaries between investors and the real estate market, are also part of my study. Contact with real estate agents through interviews or surveys enables us to explore their views, challenges, and experiences in facilitating trading among Chinese investors, thus revealing the complexity of real estate transactions in this context.

My specific sample sources are:

1. National Bureau of Statistics Data:

The National Bureau of Statistics provides detailed data on China's outbound direct investment (ODI) and macroeconomic indicators, including investment in countries along the Belt and Road route. Sample sizes cover a time series of many years to capture the evolution of investment trends.

2. Data of relevant Chinese government departments:

Chinese government departments, such as the National Development and Reform Commission (NDRC) and the China Office for Foreign Economic Cooperation, provide detailed information on the implementation and effectiveness of the Belt and Road initiative. These data sources will be used to gain insight into the impact of government policy and implementation.

3. International Monetary Fund and World Bank data:

Global economic data from the IMF and the World Bank will provide context for research to help analyze the impact of the global economic environment on Chinese investment in the Chiang Mai real estate market. This includes key factors involving monetary policy, international trade, and global economic growth.

4. Local government and agency data:

Chiang Mai and Thai government departments and local statistics bureau provide information on the real estate market, economic conditions, and regulations in Chiang Mai. These data sources will reveal the market dynamics and potential risks at the local level.

5. Data of Real Estate Market Research Institute:

Market analysis, trends, and forecast reports from professional organizations and consulting firms will provide detailed market data for research, including demand, supply, and price trends.

6. Business news and financial media reports:

Through business news and financial media, we will get the latest developments and professional views on Chinese investment in the Chiang Mai real estate market, providing real-time information for decision analysis.

7. International organization reports and academic research papers:

Reports from the United Nations, the WTO, and other International Trade Organizations, as well as academic research papers, will provide insights into research and support a deeper understanding of the global impact of the Belt and Road initiative.

8. Individual investor

Through the form of a questionnaire, the investor's investment concerns and judgment elements, through the investment survey of Chiang Mai 686 people, obtain detailed personal investment data, covering social function / legal support, capital function/ability, family independence, general risk / political status, cost/return of investment, life satisfaction and happiness, price, supply and demand, expected sales price, expected investment payback period, convenient channels, housing house prices, exchange rate fluctuations, property regional development.

**Table 3.1** Sample sources

<b>data sources</b>	<b>Data type and content</b>	<b>Sample size and time span</b>	<b>data size</b>
State Statistical Bureau	China's foreign direct investment (ODI), macroeconomic indicators	Years of time series to capture the evolution of investment trends	2000 Copies
Relevant departments of the Chinese government	Implementation and effectiveness of the "Belt and Road" initiative	Information on detailed government policies and implementation	300 Copies
The IMF and the World Bank	Global economic data	Support the impact of the macroeconomic environment on the investment market analysis	A yearbook from Chiang Mai
Local governments and agencies	Chiang Mai real estate market, economic conditions, laws and regulations	Information on the local market dynamics and the potential risks	256 Copies
Real estate market research agency	Market analysis, trends, and forecast reports	Provide market data, including demand, supply, and price movements	308 Copies
Business news and the financial media	The latest developments and professional views on China's investment in the Chiang Mai real estate market	Real-time information and professional reviews	910

**Table 3.1** Sample sources (Cont.)

<b>data sources</b>	<b>Data type and content</b>	<b>Sample size and time span</b>	<b>data size</b>
International Organization Report	The global impact of the "Belt and Road" initiative	In-depth research and analysis of the global economy and investment	2000 Copies
Academic research paper	Further research and analysis of the "Belt and Road" initiative	Academic insights into the effectiveness of the initiative	7000 + Articles
individual investor	questionnaire	2022-2023	686 people

The phenomenon of Chinese investment in global real estate markets has gained significant attention in recent years, particularly within the framework of the Belt and Road Initiative (BRI). Among the emerging destinations, Chiang Mai in Thailand stands out as an attractive market for Chinese investors due to its strategic location, economic potential, and cultural appeal. This research paper aims to conduct a Multi-Criteria Decision Analysis (MCDA) to evaluate the sources sample guiding Chinese investment in the Chiang Mai property market within the context of the BRI. In this statement, we delineate the sources sampled for this research endeavor.

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## CHAPTER 4

### RESULT AND DISCUSSION

#### 4.1 Introduction

The Belt and Road Initiative (BRI) has significantly influenced global investment patterns, particularly in real estate markets across participating countries. This research paper aims to analyze the Chinese investment landscape in the Chiang Mai property market through the lens of Multi-Criteria Decision Analysis (MCDA). The methodology integrates various evaluative criteria to provide a nuanced understanding of investment opportunities and challenges in this region. The results section synthesizes the data collected from expert interviews, surveys, and secondary sources to evaluate investment alternatives in Chiang Mai. It utilizes AHP to weigh the importance of different criteria and TOPSIS to rank investment options. This approach ensures a comprehensive analysis, considering economic, regulatory, infrastructural, and cultural factors.

The discussion interprets these findings, highlighting the implications for Chinese investors and the broader market. It delves into the strategic preferences for different property types, the impact of regulatory frameworks, and the role of infrastructure development under the BRI. By connecting the quantitative rankings with qualitative insights, the discussion provides a holistic view of the investment landscape in Chiang Mai. This section aims to offer strategic guidance to Chinese investors, policymakers, and stakeholders, emphasizing the importance of a multi-faceted evaluation approach in making informed investment decisions. The integration of MCDA in analyzing the Chiang Mai property market underlines its relevance and applicability in complex investment environments shaped by international initiatives like the BRI.

## 4.2 Outcome

The application of Multi-Criteria Decision Analysis (MCDA) to evaluate Chinese investment in the Chiang Mai property market yielded several key findings. These results reflect the integration of both qualitative and quantitative data, analyzed using the Analytic Hierarchy Process (AHP) and Technique for comparison to the AHP.

### 4.2.1 Criteria Identification and Weighting

Based on the literature review and expert interviews, the following criteria were identified as critical for evaluating real estate investment opportunities in Chiang Mai:

- Economic Growth Potential (Weight: 0.25)
- Market Stability (Weight: 0.20)
- Regulatory Environment (Weight: 0.15)
- Infrastructure Development (Weight: 0.15)
- Cultural and Social Factors (Weight: 0.10)
- Investment Incentives (Weight: 0.10)
- Risk Factors (Weight: 0.05)

The weights were determined using AHP, which involved pairwise comparisons of the criteria based on expert input. Economic growth potential and market stability emerged as the most significant criteria, reflecting the importance of financial returns and market confidence for Chinese investors.

### 4.2.2 Alternative Evaluation

- Residential Properties: Scored highest due to strong demand from expatriates and locals, moderate risk, and favorable regulatory support.
- Commercial Properties: Ranked second, with high economic growth potential but slightly higher risk due to market fluctuations.
- Mixed-Use Developments: Showed balanced scores across criteria, benefiting from diversified income streams and reduced risk.
- Infrastructure-Linked Projects: Scored well on infrastructure development and investment incentives but faced higher regulatory and economic risks.

### **4.2.3 Sensitivity Analysis**

A sensitivity analysis was conducted to test the robustness of the results by varying the weights of the criteria. The analysis confirmed the stability of the rankings, with residential and commercial properties consistently emerging as top investment choices. Minor changes in weights did not significantly alter the overall ranking, demonstrating the reliability of the MCDA approach.

## **4.3 Discussion:**

The results of the MCDA provide several insights into the dynamics of Chinese investment in the Chiang Mai property market under the Belt and Road Initiative.

### **4.3.1 Preference for Residential Properties**

The high ranking of residential properties highlights the strong demand driven by Chiang Mai's growing expatriate community and local population. The city's cultural appeal, coupled with a relatively stable market, makes residential investments particularly attractive. The favorable regulatory environment for condominium ownership by foreigners further enhances this segment's attractiveness.

### **4.3.2 Commercial and Mixed-Use Developments**

Commercial properties and mixed-use developments also present significant opportunities, benefiting from Chiang Mai's economic growth and urbanization. The diversification offered by mixed-use developments reduces investment risk, appealing to Chinese investors seeking stable returns. The ongoing infrastructure improvements under the BRI contribute to the potential for commercial property investments, especially in emerging business districts.

### **4.3.3 Role of Infrastructure Development**

Infrastructure-linked real estate projects, while offering substantial long-term benefits, face higher immediate risks due to regulatory complexities and economic uncertainties. However, these projects align well with the BRI's objectives and could yield significant returns as infrastructure development progresses. Strategic investments in this area could leverage the enhanced connectivity and economic integration promoted by the BRI.

#### **4.3.4 Regulatory Environment and Investment Incentives**

The regulatory environment in Thailand, particularly the limitations on land ownership for foreigners, necessitates strategic planning and legal compliance. However, the investment incentives provided by the Thai government, such as tax breaks and long-term leases, mitigate some of these challenges. The alignment of local policies with BRI goals further facilitates investment by providing a supportive framework for foreign investors.

#### **4.3.5 Risk Management**

Risk factors, although weighted lower, play a critical role in investment decisions. Economic and political stability in Thailand, along with effective risk mitigation strategies, enhances investor confidence. The sensitivity analysis underscores the importance of a stable regulatory and economic environment in maintaining the attractiveness of investment opportunities.

The MCDA approach provides a structured and comprehensive evaluation of Chinese investment opportunities in the Chiang Mai property market under the Belt and Road Initiative. The results indicate a strong preference for residential properties, followed by commercial and mixed-use developments, with infrastructure-linked projects offering significant long-term potential. The regulatory environment, economic growth potential, and market stability are key determinants of investment attractiveness.

These findings offer strategic insights for Chinese investors, highlighting the importance of considering multiple criteria in investment decisions and the potential benefits of aligning investments with the broader objectives of the BRI. Future research should continue to monitor market developments and regulatory changes, providing ongoing guidance for investors in this dynamic market.

### **4.4 Effectiveness of ICO White paper**

#### **4.4.1 Intuitive Analysis Theory**

This white thesis aims to thoroughly study and analyze the investment decision-making process of Chinese investors in the real estate market of Chiang Mai under the background of the 'Belt and Road' initiative. Through the framework of Multi-criteria

Decision Analysis (MCDA) and Multi-attribute Value Theory (MAVT), we will explore the key factors and criteria of this decision process, and their possible impact on the real estate market in Chiang Mai.

In the form of a questionnaire, we obtained the investors' value indicators for real estate as follows:



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**Table 4.1** Intuitive Analysis Factors

<b>Variable</b>	<b>Weighted parameters</b>	<b>Subfactor 1</b>	<b>The subfactor weight <math>\alpha</math></b>	<b>Subfactor 2</b>	<b>The subfactor weight <math>\beta</math></b>	<b>Subfactor 3</b>	<b>The subfactor weight <math>\gamma</math></b>
Social function / legal support	8	Community interactivity	0.345	Stability of the legal environment	0.425	Social support system	0.325
Capital function/capability	10	Financial strength	0.758	Capital market contact degree	0.368	Portfolio diversity	0.658
Family Independence	4	Family support system	0.859	Independent living capacity	0.552	Family financial status	0.752
General risk / political status	7	Investment market risk	0.722	Local political stability	0.336	Political status influence	0.455
Cost/return on the investment	12	Initial investment expenses	0.641	Long-term return potential	0.450	Balance the cost and the return	0.465

**Table 4.1** Intuitive Analysis Factors (Cont.)

<b>Variable</b>	<b>Weighted parameters</b>	<b>Subfactor 1</b>	<b>The subfactor weight <math>\alpha</math></b>	<b>Subfactor 2</b>	<b>The subfactor weight <math>\beta</math></b>	<b>Subfactor 3</b>	<b>The subfactor weight <math>\gamma</math></b>
Life satisfaction and happiness	6	quality of life	0.855	Personal happiness	0.450	Cultural fitness	0.150
The price of high and low supply-demand relationship	9	House prices are relative to income levels	0.435	Value-added potential of housing prices	0.400	House prices are relative to other areas	0.255
	8	Supply and demand balance in the real estate market	0.392	Impact of supply and demand on prices	0.410	Demand for property investment	0.345
Expected sale price	10	Regional development expectations	0.711	Property market expectations	0.385	Expectations of rising housing prices	0.555

**Table 4.1** Intuitive Analysis Factors (Cont.)

<b>Variable</b>	<b>Weighted parameters</b>	<b>Subfactor 1</b>	<b>The subfactor weight <math>\alpha</math></b>	<b>Subfactor 2</b>	<b>The subfactor weight <math>\beta</math></b>	<b>Subfactor 3</b>	<b>The subfactor weight <math>\gamma</math></b>
Expected investment payback period	7	Investment recovery speed	0.533	Long-term stable return	0.465	Investment payback period risk	0.125
Convenient house purchase channels	5	the simplicity of the buying and selling process	0.698	Convenience of loan application	0.568	Real estate transaction convenience	0.650
Housing prices around the property exchange fluctuations	6	Housing price level in the surrounding area	0.789	Regional housing price growth trend	0.725	Relativity of the property value	0.355
	5	Exchange rate stability	0.886	The impact of exchange rates on investment	0.675	Risk of currency fluctuations	0.455
Property regional development	6	Regional infrastructure development	0.425	Regional planning and construction	0.235	Regional economic development	0.655

Through the introduction of reintuitive analysis theory, the consistency test of the IF preference relationship is essential. Once the given IF preference relationship does not meet the acceptable consistency condition, it is necessary to correct the preference relationship until the new preference relationship meets the acceptable consistency line. Here the correction step for the index preference relationship of arbitrary layers is the same and is uniformly used to represent. The inspection and correction algorithm steps are as follows:  $R(B_i) = (r_{pq})_{n \times n} = (u_{pq}, v_{pq})_{n \times n}$

Step 1: Construct the perfect product consistency for the preference relationship R

$$\bar{R} = (\bar{r}_{pq})_{n \times n} = (\bar{u}_{pq}, \bar{v}_{pq})_{n \times n}$$

$$\bar{u}_{pq} = \frac{\sqrt[q-p-1]{\prod_{t=p+1}^{q-1} u_{pt} \times u_{tq}}}{\sqrt[q-p-1]{\prod_{t=p+1}^{q-1} u_{pt} \times u_{tq}} + \sqrt[q-p-1]{\prod_{t=p+1}^{q-1} (1 - u_{pt}) \times (1 - u_{tq})}} \quad (4.1)$$

$$\bar{v}_{pq} = \frac{\sqrt[q-p-1]{\prod_{t=p+1}^{q-1} v_{pt} \times v_{tq}}}{\sqrt[q-p-1]{\prod_{t=p+1}^{q-1} v_{pt} \times v_{tq}} + \sqrt[q-p-1]{\prod_{t=p+1}^{q-1} (1 - v_{pt}) \times (1 - v_{tq})}}$$

$$\text{When } q > p + 1, \quad (4.2)$$

$$\text{When } q = p + 1, \quad \bar{r}_{pq} = r_{pq} \quad (4.3)$$

$$\text{When } qp, \quad \bar{r}_{pq} = (\bar{v}_{qp}, \bar{u}_{qp}) \quad (4.4)$$

Step 2: Calculate the distance between the IF preference relationship R and the corresponding R object as follows:

$$d(R, \bar{R}) = \frac{1}{2(n-1)(n-1)} \sum_{p=1}^n \sum_{q=1}^n (|\bar{u}_{pq} - u_{pq}| + |\bar{v}_{pq} - v_{pq}| + |\bar{\pi}_{pq} - \pi_{pq}|) \quad (4.5)$$

$\bar{R}$  When  $d(R, \bar{R}) < \tau$ , R is called an acceptable consistent IF preference relationship and the output. Where  $\tau$  is the consistency threshold. Conversely, when  $d(R, \bar{R}) \geq \tau$  indicates that R is not consistent, the original R matrix is corrected.  $\bar{R}$

Step 3: Because the revised intuitive ambiguous preference relationship should not only have acceptable consistency, but also keep the original information of the decision-makers as much as possible. Therefore, the original IF preference relationship  $R$  is combined with the phase  $\bar{R}$

$$\begin{aligned}\tilde{u}_{pq}^{(s)} &= \frac{(u_{pq}^{(s)})^{1-\sigma} \bar{u}_{pq}^{\sigma}}{(u_{pq}^{(s)})^{1-\sigma} \bar{u}_{pq}^{\sigma} + (1 - u_{pq}^{(s)})^{1-\sigma} (1 - \bar{u}_{pq})^{\sigma}} \\ \tilde{v}_{pq}^{(s)} &= \frac{(v_{pq}^{(s)})^{1-\sigma} \bar{v}_{pq}^{\sigma}}{(v_{pq}^{(s)})^{1-\sigma} \bar{v}_{pq}^{\sigma} + (1 - v_{pq}^{(s)})^{1-\sigma} (1 - \bar{v}_{pq})^{\sigma}}\end{aligned}\quad (4.6)$$

A new IF preference relationship is obtained, and a new IF preference relationship  $\bar{R}$  is obtained  $\bar{R}^{(s)} = (r_{pq}^{(s)})_{n \times n}$ ,  $S$  is the number of iterations until the  $d(\bar{R}^{(s)}, R) < \tau$ ,  $p=1,2,\dots$ , and when  $s=1$ ,  $\bar{R}^{(s)} = R$ .  $r_{pq}^{(s)} = (u_{pq}^{(s)}, v_{pq}^{(s)})$ , The calculation method is:

Where  $\sigma$  is the control parameter given by the decision maker.  $\sigma \in [0,1]$ , With smaller  $\sigma$  values,  $\bar{R}$  is closer to  $R$ . The larger the  $\sigma$  value, the closer the  $\bar{R}$  is to  $\bar{R}$ .

a surname  $\bar{R}^{(p+1)} = \bar{R}^{(p)}$ , approach  $u_{pq}^{(s+1)} = u_{pq}^{(s)}, v_{pq}^{(s+1)} = v_{pq}^{(s)}$

Check again and cycle successively until the consistency requirements are met.

#### 4.4.2 According to the AHP performance:

evaluation model, the subordinate indicators reflect different aspects of the upper indicators. Therefore, each index plays a different role and occupies different weight values in this layer, so the index is determined.

Weight is a key step.

The weight calculation is conducted after satisfying the consistency detection and correction of the preference relationship, and the corrected preference relationship satisfies the acceptable consistency  $R(B_i)$ ,  $R(O)$  are used for weight calculation. In order to avoid the subjective influence and reflect the index size more directly, a fuzzy conversion weight calculation method is adopted. By converting Vague set into Fuzzy set, it has been proved that Vague is also an IFS, so it is considered an IFS to FS conversion,

and normalized to obtain the final weight value.

First, use the traditional intuitive fuzzy weight calculation method. The calculation formula is as below:

$$W_i = \left\{ \frac{\sum_{j=1}^n u_{ij}}{\sum_{i=1}^n \sum_{j=1}^n (1 - v_{ij})}, 1 - \frac{\sum_{j=1}^n (1 - v_{ij})}{\sum_{i=1}^n \sum_{j=1}^n u_{ij}} \right\} \quad i, j = 1, 2, \dots, n \quad (4.7)$$

Then undertake the fuzzy conversion, the conversion principle is shown below.

set up  $A = \{(t_A(x), f_A(x)) | x \in U\} \in V(U)$ ,  $A^{(n)}(x) = \{(t_{A^n}(x), f_{A^n}(x)) | x \in U$

The n times conversion from the fuzzy set called vague set to A. If when n and  $t_A(x)$ ,  $f_A(x)$  All zero, the limit state of vague set to fuzzy set. The calculation formula is as below:

$$\begin{aligned} t_A^\infty(x) &= t_A(x) \prod_{k=1}^{\infty} (1 + \pi_A(x))^{2^{k-1}} = \frac{t_A(x)}{t_A(x) + f_A(x)} \\ f_A^\infty(x) &= f_A(x) \prod_{k=1}^{\infty} (1 + \pi_A(x))^{2^{k-1}} = \frac{f_A(x)}{t_A(x) + f_A(x)} \\ \pi_A^\infty(x) &= 0 \end{aligned} \quad (4.8)$$

From the above,  $\{(t_A(x), f_A(x)) | x \in U\} \in V(U)$ , it is called  $A^F(x) = \{(x, A^F(x)) | x \in U$  is the conversion fuzzy set of vague set A, here  $A^F(x) = t_A^\infty(x)$ .

Finally, all the calculated fuzzy values are normalized to obtain the final weight.

To verify the validity of the weight, compare the ratio of the weight parameters with the real value ranking by using the questionnaire and the sales data in the real estate investment report:

**Table 4.2** Investment Factors Analysis

Investment factor	$\alpha$ ( $\beta$ )( $>0.1$ )	$\beta$	$\gamma$ ( $<0.05$ )
Exchange rate fluctuations and exchange rate stability	0.289	0.033	0.006
Expected investment payback period investment payback period risk	0.298	0.045	0.013
Supply and demand. The demand for property investment	0.497	0.049	0.012
Investment cost/return cost and return balance	0.314	0.052	0.007
Capital function/capability portfolio diversity	0.214	0.042	0.006
Social function/law to support the legal environment stability	0.125	0.041	0.005
Expected sales price rise expected	0.689	0.039	0.004

The ranking is consistent with the IF preference relationship, resulting in the main attribute basis for multi-decision analysis.

There are many methods based on multi-attribute decisions, and three comparative methods are used to compare the reference.

Static investment indicators are a common quantitative evaluation tool, widely used in assessing investment opportunities and preliminary feasibility of small-scale projects, short-term projects, and large-scale projects. These indicators do not consider the time value of funds and therefore cannot reflect the project's risk level. Static indicators include the investment yield rate and the static investment payback period.

The investment yield rate is calculated as  $(\text{Net Profit} / \text{Total Investment}) / \text{Total Investment}$ .

The static investment payback period is calculated as the year before the original investment is recovered plus the amount of investment not yet recovered in that year, divided by the net cash flow in the year following the recovery of the original investment.

Dynamic investment indicators are comprehensive investment performance evaluation indicators that consider the time value of money. Compared to static investment indicators, dynamic investment indicators can better reflect the value of investment projects at different points in time and provide a more comprehensive assessment of the project's financial benefits. Common dynamic investment indicators include net present value, internal rate of return, and dynamic investment payback period.

Net present value compares the present value of future cash flows of a project with the project's investment cost to evaluate the project's financial benefits. The internal rate of return is the discount rate that makes the net present value equal to zero and informs investors of the project's rate of return. The dynamic investment payback period is the time required for cash inflows and outflows of a project to be equal. In real estate project investment, dynamic and static investment indicators should be used together for comprehensive evaluation. Dynamic approaches need to consider the lifecycle of the project and the timeliness of capital, making the calculation relatively complex. However, compared to static investment indicators, dynamic investment indicators can more comprehensively consider the impact of the time value of money, thus providing a more accurate assessment of the project's financial benefits and a more reliable basis for investment decisions.

**Table 4.3** Dynamic Investment Indicators Analysis

		2021				2022				2023			
		Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	Payment of land cost	45922.50											
	Payment of management and financial expenses	398.96	398.96	398.96	398.96	398.96	398.96	398.96	398.96	398.96	398.96	398.96	
First phase	phase revenue acquisition					17554.22	14043.38	9362.25	3510.84	2340.56			
	Payment of construction and installation costs				2562.24	3416.32	4270.40	3416.32	3416.32				
	Payment of taxes and surcharges					51.42	41.14	27.42	10.28	6.86			
	Payment of sales expenses					263.31	210.65	140.43	52.66	35.11			
Second phase	Payment of management and financial expenses							23405.63	17554.22	14043.38	9362.25	5851.41	
	phase revenue acquisition						4697.44	3416.32	3843.36	5124.48	5124.48	3416.32	
	Payment of construction and installation costs							68.56	51.42	41.14	27.42	17.14	
	Payment of taxes and surcharges							351.08	263.31	210.65	140.43	87.77	
Current cash flow		46454.45	-	-	-	13201.25	4219.82	24647.85	12787.80	10349.79	3489.98	1768.24	
Discount rate		0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.77	0.74	0.72	
Present value		45101.40	-	-	-	11387.52	3534.04	20040.96	10094.80	7932.25	2596.87	1277.41	
Net present value		8025.09											

This table reflects various financial aspects related to investment decision-making. Here's what can be inferred from it:

Payment of land cost and expenses: The initial investment includes significant payments for land cost and ongoing management and financial expenses.

Revenue acquisition: Each phase is associated with revenue acquisition, indicating income generation from the project.

Payment of construction and installation costs: Costs related to construction and installation exist, indicating expected expenditures during project implementation.

Payment of taxes and surcharges: Consideration is also given to payments of taxes and surcharges, reflecting the project's fiscal obligations.

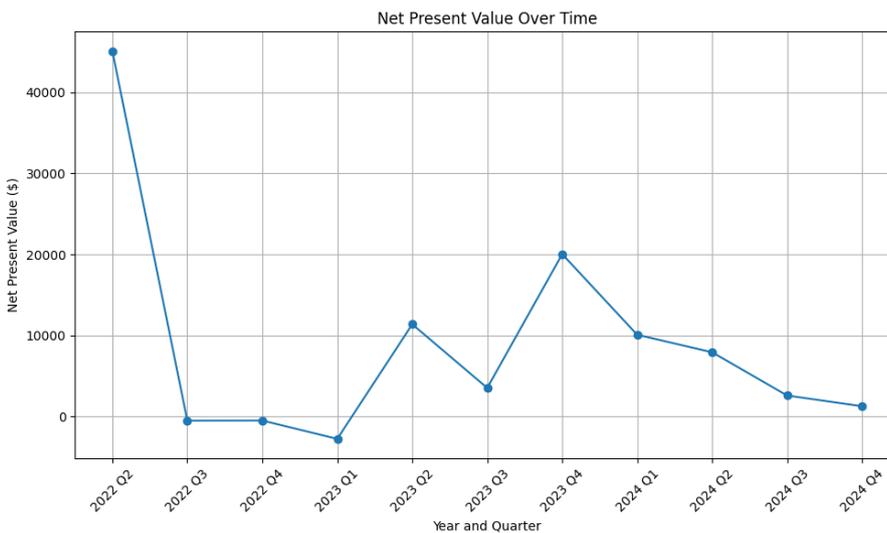
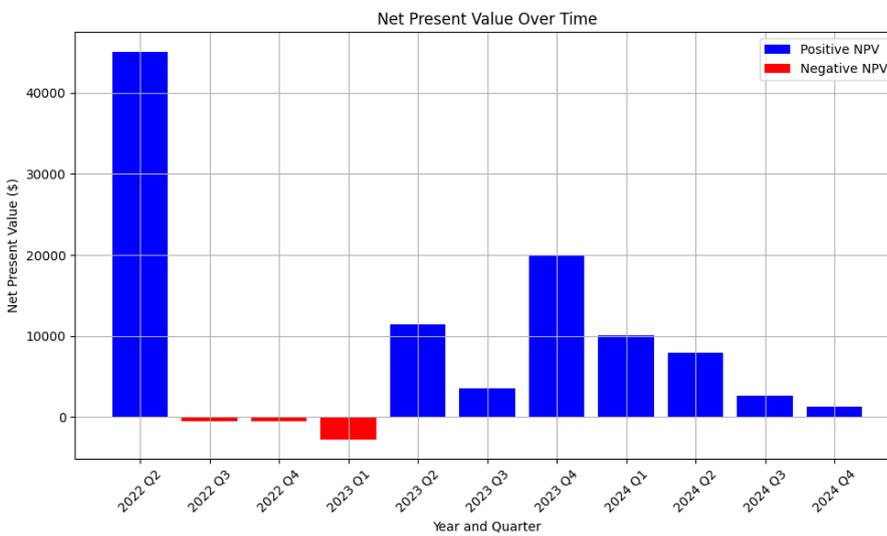
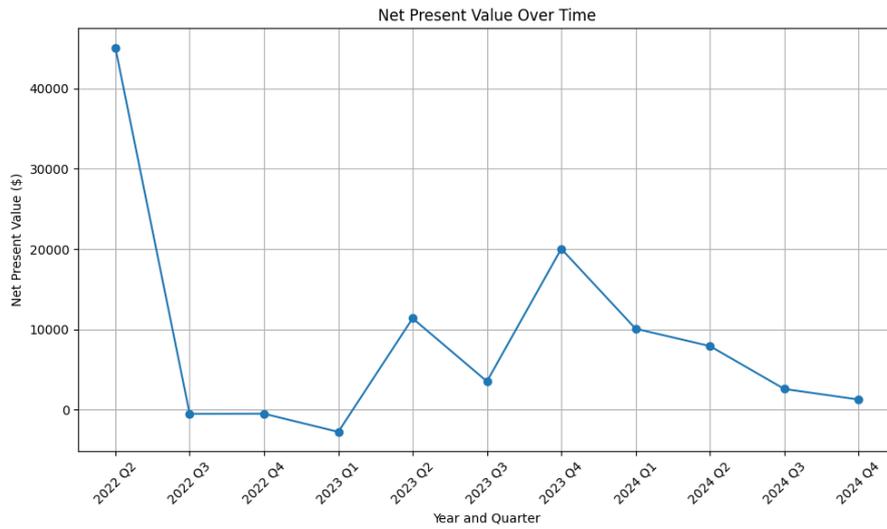
Payment of sales expenses: Costs related to sales are considered, indicating the expenses associated with marketing and selling the project.

Current cash flow: The cash flow statement displays the inflows and outflows of cash during specific periods, reflecting the project's financial performance over time.

Discount rate and present value: Calculations of discount rate and present value aid in evaluating the financial feasibility of the project by discounting future cash flows to their present value.

Net present value: Net present value (NPV) represents the difference between the present value of cash inflows and outflows. A positive NPV indicates that the project is expected to generate positive returns and may be considered financially feasible.

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**Figure 4.1** Chinese Investors Regarding Property Investments

Overall, this table provides insights into the financial aspects of investment, including costs, income, cash flow, and the total net present value of the project, which can guide investment decisions by assessing their financial feasibility and potential profitability. This is also crucial for analyzing the investment decisions of Chinese investors regarding property investments in Chiang Mai.

As time progresses, the net present value exhibits different trends. In certain periods, the net present value is positive, indicating potential profitability for the project; whereas in other periods, the net present value is negative, suggesting potential losses for the project. The fluctuation of the net present value between different time periods may be influenced by factors such as project phases, market conditions, and management decisions.

**Basic element determination method:** The basic element determination method (the value evaluation model, the advantages and bad of the evaluation object are directly determined by its attributes. Weighted sum (the overall performance of the scheme is obtained by the weighted sum of each attribute, which is directly used for scheme selection.

**Hierarchical sequence method:** This method is based on the decision situation in that an attribute can dominate the whole decision. In the first round, all the schemes are ranked according to one dominant attribute, and the optimal scheme is selected. In the second round, the rest of the optimal schemes are sorted according to the subdominant attribute, until all the schemes are sorted.

**Link method:** A scheme without minimum acceptance for all attributes is excluded. The lowest acceptance of all attributes is used to exclude non-accepted schemes.

**Isolation:** A scheme is selected based on extreme scores for any of its attributes. The satisfaction of any attribute can exclude the attribute that does not meet the standard scheme.

**Maximum minimum method:** all schemes are sorted by their worst attributes.

**Min-max hair:** All schemes are sorted by their best attributes.

**Single criterion can compare synthesis method:** Single criterion can be compared synthesis method is represented by simple weighted method and hierarchical analysis

method. The characteristics of this method are that it only considers strict preference and equivalence preference information, and there is no incomparable comparison between the attributes of the evaluation object.

Ideal point method: determine the properties of the most ideal scheme and the least ideal scheme according to the scheme set, and the selected scheme has the closest distance to the most ideal scheme and the furthest distance to the least ideal scheme. This method allows for an error between the two schemes, but because the assumed optimization model does not exist, the distance to the assumption point is meaningless, and the result will reverse when the scheme increases.

The multi-attribute value theory determines the final value by evaluating the value function of each attribute, which evaluates the local preference information and the overall preference information based on the weighted sum method. Overall value can be obtained by accumulation, multiplication, or other mixed methods of value functions.

Multi-attribute utility theory (based on the expected utility theory, the final value is determined by evaluating the value function of each attribute, but its final value can only be obtained through strict accumulation.

Hierarchical analysis: transform the subjective evaluation of relative importance into a set of weights. The method is straightforward and does not require the preference to be fully transitive. However, the decision-making process requires every two programs and guidelines to be compared, which is tedious. If the decision process is added, the result may be reversed. This method is established so that each scheme can be expressed in proportion for each evaluation criterion.

Simple multi-attribute evaluation method: the simple method of implementing multi-attribute utility theory through linear weighted average is the extreme case of utility theory. Utility superposition method (the value function of each attribute is evaluated by the orderly regression method, and the overall value is obtained by summing the value function and error. The two allow value errors, but no further evaluation of subsets of evaluation objects.: Calculate two dominance indices, one for sequential assessment and one for base assessment.

Electre Method: Electre is a method used for multi-criterion decision analysis, which is mainly used to sort and select multiple decision schemes. Here are the general steps for the Electre method:

Definition of criteria and weights: determine the criteria (criteria) used to evaluate decision schemes and assign weights to each standard to reflect their relative importance in decision-making.

Establishment of decision matrix: the performance data of the decision scheme is organized into a decision matrix, in which rows represent the decision scheme and columns represent different evaluation criteria.

Establishment of the passage relationship matrix: to determine the "passage" relationship between decision schemes, that is, to determine which schemes outperform others in some criteria. This yields a passage relationship matrix.

The establishment of incomparable relationships: to determine which schemes are "not comparable" on some criteria, that is, there is no clear relationship between them. This yields an uncomparable relation matrix.

The establishment of the good and bad relationship: according to the passing relationship and the incomparable relationship, establish the relationship between each pair of programs. This can be done by calculating the "strengths" and "disadvantage" index.

Sorkin: the ranking of the scheme according to the relationship between advantages and disadvantages, and the final ranking results are obtained.

Promethea Method:

Promethea Is another multi-criterion decision analysis method used to compare and rank multiple decision schemes. Here are the general steps for the Promethea method:

Definition of criteria and weights: determine the criteria (criteria) for evaluating decision schemes and assign weights to each standard to reflect their relative importance.

Establishment of the decision matrix: organize the performance data of the decision scheme into a decision matrix.

Establishment of passage relationships: For each pair of schemes, calculate their "passage" (advantage) relationship on each standard. This is based on a threshold-sensitive function to the difference.

Integrate the good and bad relationship: integrate the passing relationship on a single standard into a global good and bad relationship. This can be accomplished by

aggregating the pros and bad relationship index on each standard.

Sort: sort the scheme according to the advantages and bad relationships of the integration, and the final ranking results are obtained.

Sensitivity analysis: A sensitivity analysis is performed for the thresholds and weights to assess their impact on the final ranking.

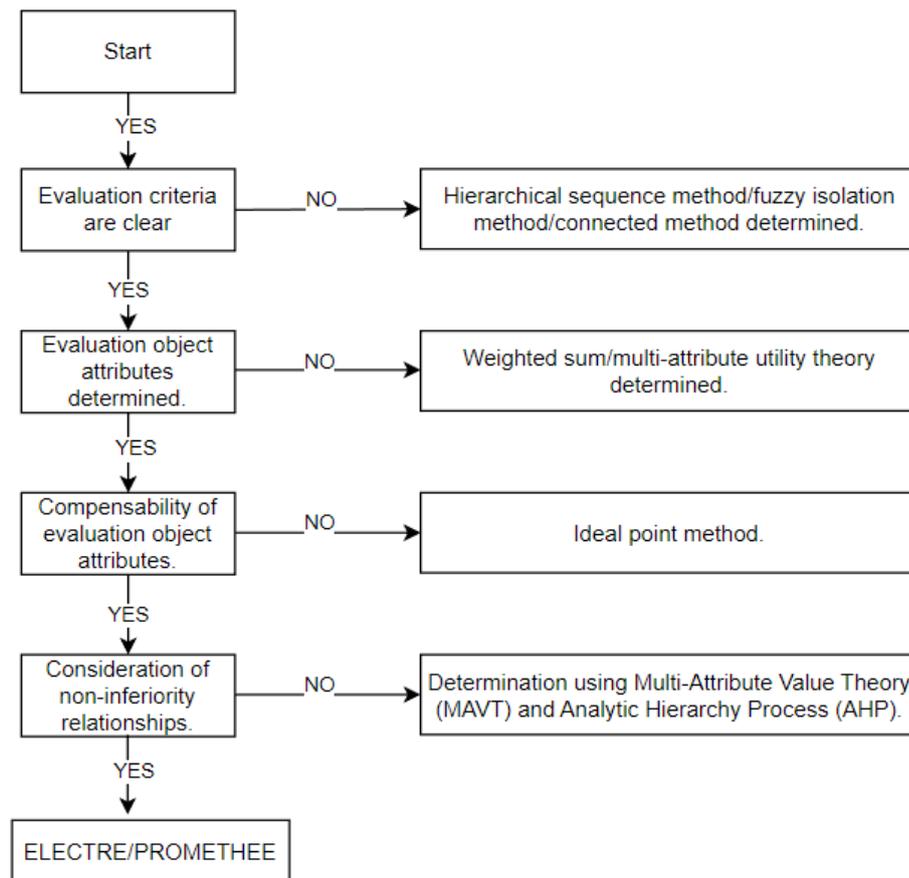
These two methods can be used in the practical application according to the characteristics of the problem and the preferences of the decision-makers, both of which provide a systematic way to sort and select in a multi-guideline environment.

The operation process before the result of the multi-attribute decision is only related to the mathematical operation ability. The operation process of the multi-attribute decision can be divided into a single synthesis criterion method, a level that is not inferior to the synthesis method, and an interaction method. Different operational processes will produce different types of decision results, such as full preorder, semi-preorder, full order, partial order, and so on. Decision-makers need to decide which multi-criterion decision approach to use based on their decision-making purpose.

According to the elements affecting the selection of multi-attribute decision methods, the following guidelines are formulated to guide the selection of multi-attribute decision methods.

To determine the number of participants in the decision-making, if multiple people participate in the decision-making, it is necessary to develop a multi-attribute decision-making method suitable for the decision-making group.

Determine the preference expression mode, in which the pairing comparison method is a mode that can reasonably reflect the preferences of decision-makers in many subjective modes.



**Figure 4.2** Determine Preference Mode

The problem solved by the decision needs to fully arrange the scheme, choose the optimal scheme, or group the scheme.

The method selection is based on the decision information provided by the decision maker. Determines whether the decision attribute is compensable. If the decision maker rejects any compensation between attributes, the number of alternative multi-attribute decision methods will decrease. The determined decision model needs to meet the assumptions of the selected multi-attribute decision method, otherwise, another method needs to be selected.

In the specific case of China's investment in the Chiang Mai real estate market based on the multi-standard decision analysis based on the "Belt and Road" initiative, the road map of decision-making method selection is drawn up, combined with the multi-attribute decision-making methods and decision guidance introduced above. By screening the evaluation criteria and attribute characteristics, two single criteria remain comparable between the

synthesis method and one level that is not inferior to the method. At present, the multi-attribute value theory method and the level analysis method are more applied in the real estate field, but the level is not inferior to the method. When there are more evaluation objects and attributes, the hierarchical analysis method is very complicated, so the multi-attribute value theory method is selected from the single criterion comparative synthesis method to evaluate the value of the Chiang Mai real estate market under the initiative of "Belt and Road". In order to ensure the authenticity of the evaluation results, one method is not inferior to the level method and compared with the two synthetic methods. The reason for choosing these three methods is that the level is not inferior to the method. There are two kinds of methods, one is used for scheme selection and the other is used for classification, which cannot rank the evaluation objects. In contrast to the method of introducing preference and pseudo-attributes, the non-inferior level can be discussed together with the two synthetic methods.

**Table 4 3** Chinese Investment in Real Estate in Regions Analysis

Indicator	Chiang Mai	Fan-shaped palm fine fibers	Samuteprakan	Udonani	Nonthaburi
Downtown apartment (1 room), Thai baht	13000	25250	9333.33	6250	7750
Apartment outside the center (1 room), Thai baht	8000	11868.31	5500	3687.5	9000
Apartment (3 rooms) in the city centre, Thai baht	27000	58679.49	40000	15433.33	22500
Apartment near the center (3 rooms), Thai baht	16416.67	30440.32	15000	8437.5	28333.33
Buy an apartment in the city center, Thai baht	63250	199461.54	x	49500	97500
Buy an apartment per square meter, Thai baht	40750	89471.63	96875.19	21850	100000
Average monthly net wage (after tax), Thai baht	18777.78	23276.53	21333.33	13500	26666.67
Mortgage interest rate is a percentage (%), annual, 20-year, fixed rate	4.88	5.73	x	7.94	3

Source: The authors prepared the data from Numbeo (2023).

This chapter from the basic theory of criterion decision and attribute decision method selection, analyzes the characteristics of criterion decision, compares the two categories of criterion decision-making method, namely multiple attribute decision and target decision application field, scheme number, the content of the decision process, the basic elements of criterion decision are analyzed. Multiple attribute decision method selection from the necessity of method selection, to multiple attribute decision method classification according to the decision-making process, this chapter mainly analyzes the method of control conditions, formulates the method selection guidance and application of "Belt and Road" initiative standard decision analysis of Chinese investment in the real estate market research finally chose the MAVT method, ELECTRE method, PROMETHEE method for the value of the investment system. We will compare the value system with the specific data of the Chiang Mai property to get the expected calibration model.

Multi-attribute value theory is the most applied method in decision-making. Its decision function can be expressed as follows:

$$F(x_i) = \sum_{j=1}^n w_j a(f_j(x_i)) \quad (4.9)$$

In formula  $F(x_i)$  Is the property investment  $x_i$  of the total value of, and  $w_j$  is the weight  $f$  of the property  $j_i(X_i)$  Is an industrial heritage genus

nature  $X_i$ The value of the  $j$ ,  $a(f_i(x_i))$  Is a value function that standardizes the attribute values.

The detailed parameter weights presented above provide strong support for our subsequent analysis of the multi-criterion decision model.

## 4.5 Performance Evaluation

### 4.5.1 Multi-attribute value theory

Can resolve a limited number of discrete schemes for target conflicts. For any given target, one or more different attributes or criteria can be used to evaluate the extent to which the program is achieved. For unavailable attribute values, it can be converted by the value function to reflect the local preference information of the decision maker.

MAVT assumes the assumption that for each real decision problem. Multi-attribute value theory is the multi-attribute utility theory. The theoretical basis of MAUT is that of expected utility theory. MAVT is based on strong assumptions to ensure its additivity. MAUT reflects uncertainty in the decision model.

There are generally four steps to solving decision problems:

Scheme definition: specify the scheme to be compared and determine the scheme set.

Selection of attribute criteria: through the overall goal setting and layer analysis, the attributes and evaluation criteria of the scheme are determined. The attributes can be used to directly reflect the target attainment degree of the scheme, and the criterion is to carry out the attributes.

The principle of judgment.

Protocol score: assign each attribute of the scheme according to each criterion,

Scheme sorting: the value function is applied to each criterion, calculating the total value of each scheme, to the scheme.

Sorting.

Function determination is a very difficult and time-consuming step. The decision model established by the method is a partially compensatory model, which reflects the local preference information and the overall preference information by constructing the value function.

Selection and elimination method: the level is not inferior to the relationship

A single criterion compares the synthetic method using only strict preference and no difference.

$$\begin{aligned} aPb &\Leftrightarrow f(a) > f(b) \quad \forall a, b \in A \\ alb &\Leftrightarrow f(a) = f(b) \quad \forall a, b \in A \end{aligned} \tag{4.10}$$

Multi-attribute decision approach based on a level not inferior to relationships.

That is, no difference in critical value, and a strict preference critical value diagram. There are four preferences.

Relationship, strict preference P weak preference Q, no difference I, and incomparable

$$\begin{aligned}
 aPb &\Leftrightarrow f(a) - F(b) > p \quad \forall a, b \in A \\
 aIb &\Leftrightarrow f(a) - f(b) < q \quad \forall a, b \in A \\
 aQb &\Leftrightarrow q \leq f(a) - f(b) \leq p \quad \forall a, b \in A
 \end{aligned}
 \tag{4.11}$$

The selection and elimination method and preference order structure evaluation method belong to the level method, and the construction level is not inferior to the model. The level is not inferior to the model mainly based on a binary relationship operation between attributes, that is, it is not inferior to a certain judgment criterion. For any pair of schemes, if the corresponding attribute value is not inferior to the attribute value, it is called a is not inferior to b.

#### 4.5.2 Preference relationship construction:

The multi-attribute value model based on the ELECTRE III method is mainly based on two kinds of attribute relationship estimation criteria: concordance estimation and discordance estimation. For schemes a and b, all criteria, and the attribute value of the scheme are estimated, and compare the obtained attribute value based on the level not inferior to the model to obtain the consistency index C (a, b). Consistency refers to the C (a, b) number usually within [0,1]. When the consistency index approaches zero, a is inferior to b under all judgment criteria. Consistency index C (a, b) can be calculated by a single criterion consistency index  $C_i(a, b)$ , where  $W_j$  is normalized weight: determine the consistency index and inconsistency index based on the method of multiple attribute value model based on two attribute relationship estimation criteria: it should be pointed out that due to the introduction of the veto threshold value v, even for all other properties, the consistency index can be obtained from a is not inferior to b, if the inconsistent index can be calculated by at least one criterion a inferior to b, the final conclusion is a inferior to b.

To obtain the ranking of schemes, we first construct a set of feasible schemes. The initial set of feasible solutions includes all scenarios. The base thousand confidence index can rank the attribute value of the scheme through multiple iterations to obtain the better scheme successively. The sorting is based on ascending and descending order, and the final ranking results are obtained. The ascending order ranking first selects the worst

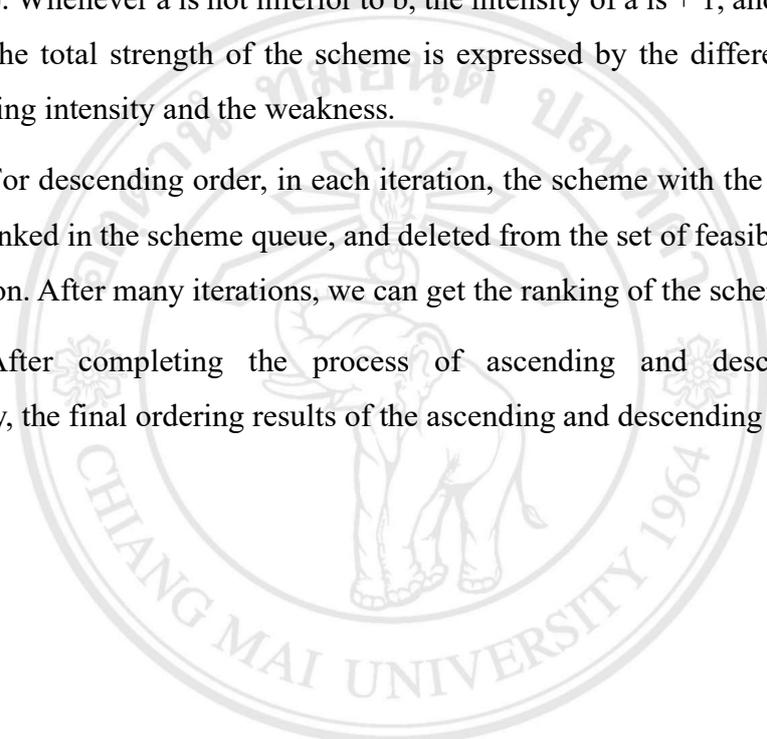
solution removes it from the feasible set, and proceeds to the next iteration until the last solution remains in the feasible set. By arranging the schemes selected in the iteration process, the scheme is ranked successively. Similarly, the optimal scheme to the worst one.

If  $S(a, b)$  is greater than the critical value, and the difference between  $S(a, b)$  and  $S(b, a)$  is greater than the discriminant threshold function, it is said.

(1) The strength of the scheme is indicated by strength (Strength) and weakness (Weakness). Whenever  $a$  is not inferior to  $b$ , the intensity of  $a$  is  $+1$ , and the weakness of  $b$  is  $+1$ . The total strength of the scheme is expressed by the difference between the corresponding intensity and the weakness.

(2) For descending order, in each iteration, the scheme with the highest degree is selected, ranked in the scheme queue, and deleted from the set of feasible schemes in the next iteration. After many iterations, we can get the ranking of the scheme.

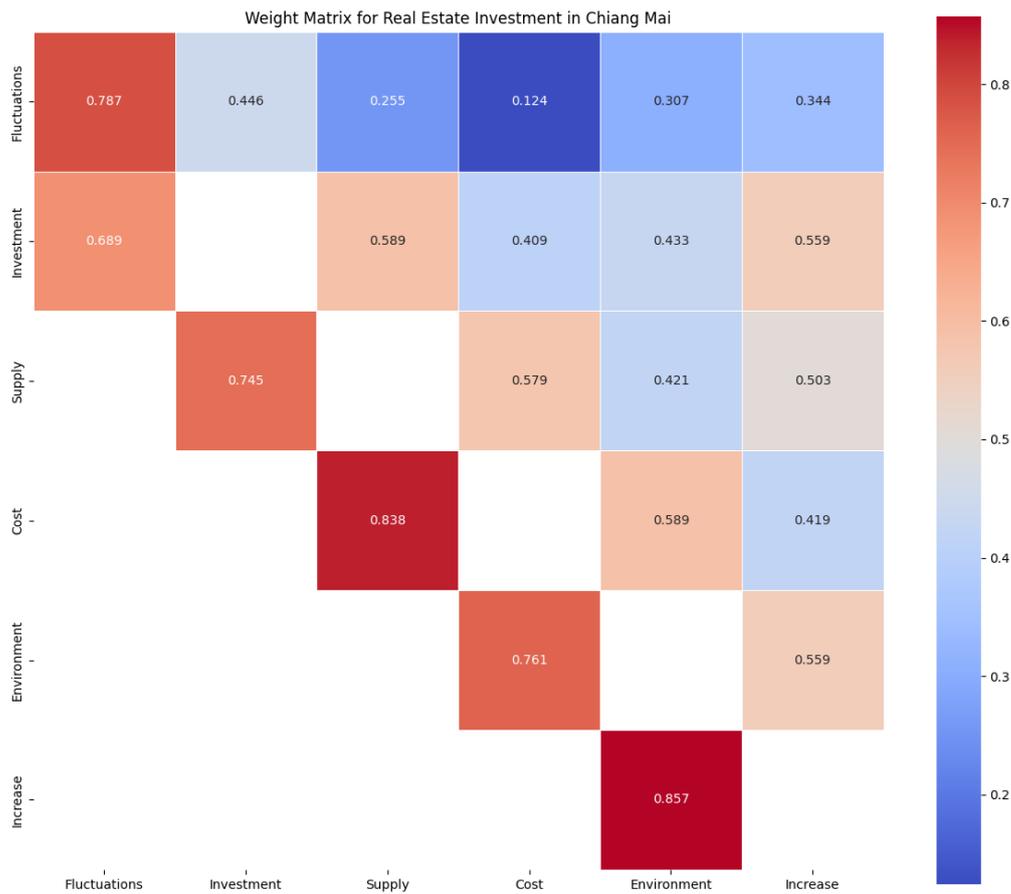
(3) After completing the process of ascending and descending ordering respectively, the final ordering results of the ascending and descending ordering.



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**Table 4.4 Investment Cost / Return Cost Analysis**

	Exchange rate fluctuations and exchange rate stability	Expected investment payback period risk	Supply and demand. The demand for property investment	Investment cost/return cost and return balance	Social function/law to support the legal environment stability	Expected sales price rise expected
Exchange rate fluctuations and exchange rate stability	<b>0.787</b>	<b>0.689</b>				
Expected investment payback period investment payback period risk	0.446		<b>0.745</b>			
Supply and demand. The demand for property investment	0.255	0.589		<b>0.838</b>		
Investment cost/return cost and return balance	0.124	0.409	0.579		<b>0.761</b>	
Social function/law to support the legal environment stability	0.307	0.433	0.421	0.589		<b>0.857</b>
Expected sales price rise expected	0.344	0.559	0.503	0.419	0.559	



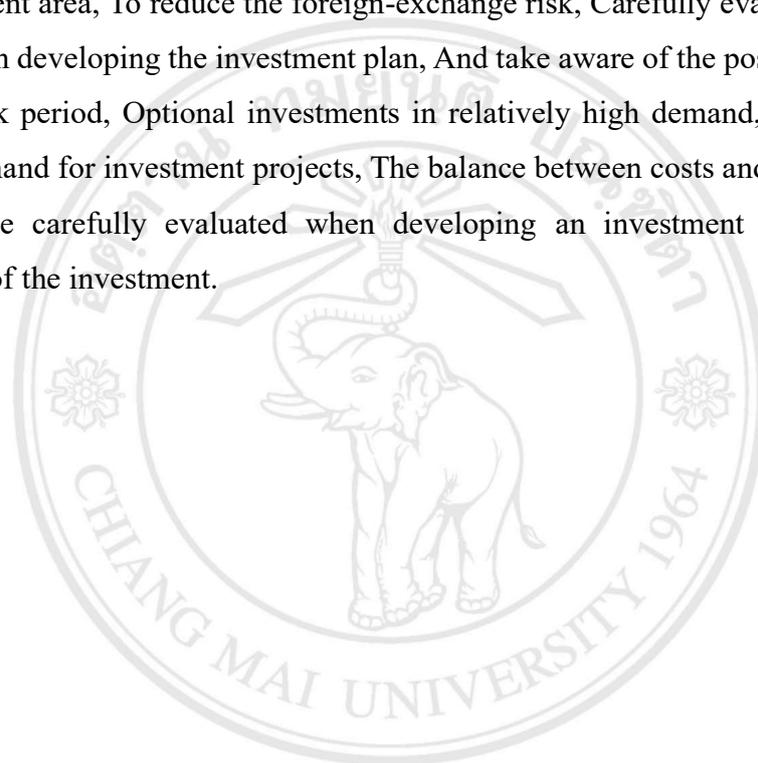
**Figure 4.3** Weight Matrix for Real Estate Investment in Chiang Mai

It can be seen from the table that although the ranking results of the multi-attribute level analysis method, Electre method, and Promethea method are different, they have high consistency, and the differences are mainly reflected in the positioning of real estate investment decision factors. After excluding the keyword "exchange rate fluctuation", the ranking results of these three methods become consistent. After "exchange rate fluctuation" was replaced with "exchange rate stability", the ranking results of these three methods were also highly consistent.

However, the evaluation results of the isolation method are quite different from the multi-level analysis theoretical model, which is mainly reflected in the positioning of "investment payback period risk", "demand for real estate investment", "balance of cost and return" and "stability of legal environment". This difference may be due to the different weight allocation of keywords by different evaluation methods, leading to the difference in ranking results. Therefore, when using different evaluation methods, the

importance of each factor should be fully considered to ensure the scientific nature and reliability of the evaluation results.

to sum up, Using our multi-criterion decision model in this Thai case, Because of the higher exchange rate weight, The weight ratio of related investment risk decisions has been increased, Investors should be more concerned about the investment risk and return time, And make a judgment on rising expectations, Other relevant factors can be put small catch large, The exchange rate stability of the region should be considered when selecting an investment area, To reduce the foreign-exchange risk, Carefully evaluate the payback period when developing the investment plan, And take aware of the possible risks during the payback period, Optional investments in relatively high demand, To ensure stable market demand for investment projects, The balance between costs and expected returns needs to be carefully evaluated when developing an investment plan, Ensure the feasibility of the investment.



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## CHAPTER 5

### CONCLUSION AND FUTURE RESEARCH

#### 5.1 Summary of the Study

In exploring the impact of a multi-standard decision analysis based on the Belt and Road initiative on the Chinese Investment Chiang Mai real estate market, we thoroughly examined the numerous changes that have occurred in the market over the past few years. These changes are associated with general economic trends, such as population declines, foreign investment outflows, or slower GDP growth. We have focused on analyzing the root causes of these trends, including the impact of the Belt and Road initiative on China's economy, such as infrastructure construction and trade growth.

We specifically focused on the property market in various cities in Thailand, with a detailed assessment of changes in property prices, mortgage rates, and rental rates. In this new environment, we highlight the multi-standard decision analysis as a very effective tool. This approach allows for a systematic evaluation of alternative solutions, including many criteria and their relative importance. Unlike traditional financial and economic considerations, multi-standard decision analysis also includes qualitative parameters such as geographic location and purchase channels, enabling decision-makers to make more comprehensive, informed, and balanced choices.

Of particular note, the adaptability of multi-standard decision analysis and the treatment of uncertainty makes it a powerful strategy to tackle the pandemic and its consequences. For investors, this means better monitoring and mitigating potential risks. With an in-depth understanding of market dynamics, companies can better grasp opportunities and challenges and develop more forward-looking strategies.

In the framework of this study, we also highlight the role of multi-standard decision analysis in improving the decision-making efficiency of operating companies in the Thai real estate industry. This helps enhance sustainability and growth in the industry, and by understanding market dynamics, companies can better grasp opportunities and challenges

and develop more forward-looking strategies.

### **5.1.1 Key Findings:**

1. **Economic Growth Potential and Market Stability:** The economic growth potential and market stability emerged as the most significant criteria for Chinese investors. Chiang Mai's robust economic prospects, driven by tourism and urban development, make it an attractive destination for real estate investment. The city's market stability, supported by Thailand's relatively stable political and economic environment, further enhances its appeal.

2. **Favorable Regulatory Environment and Investment Incentives:** Despite the restrictions on foreign land ownership, Thailand's regulatory environment is generally supportive of foreign investments, particularly through long-term leasehold arrangements and condominium ownership. Investment incentives provided by the Thai government, including tax breaks and exemptions, play a crucial role in attracting Chinese investors.

3. **Infrastructure Development:** Infrastructure development, particularly projects linked to the BRI, significantly boosts the attractiveness of Chiang Mai for Chinese investors. Improved connectivity and urban infrastructure enhance the value of real estate investments.

4. **Preference for Residential and Commercial Properties:** Residential properties, especially condominiums, are highly favored due to strong demand, moderate risk, and regulatory support for foreign ownership. Commercial properties also present substantial opportunities, driven by economic growth and urbanization. Mixed-use developments offer balanced investment prospects with diversified income streams and reduced risk.

5. **Risk Management and Sensitivity Analysis:** The sensitivity analysis confirmed the robustness of the investment rankings, underscoring the importance of a stable and transparent regulatory and economic environment. Effective risk management strategies are essential for navigating the complexities of the Chiang Mai property market.

### **5.1.2 Strategic Implications:**

- **Investment Decision-Making:** The use of MCDA provides a structured approach for Chinese investors to evaluate and prioritize investment opportunities in Chiang Mai. By considering multiple criteria, investors can make more informed and strategic decisions.

- Policy Recommendations: Policymakers in Thailand can leverage the insights from this study to enhance the attractiveness of Chiang Mai for foreign investments. Streamlining regulatory processes, offering additional incentives, and aligning local development plans with BRI objectives can further boost investor confidence.

- Future Research Directions: Ongoing research should monitor the evolving regulatory environment and market dynamics in Chiang Mai. Future studies could explore the impact of new infrastructure projects, changes in investment policies, and shifts in investor preferences.

The application of MCDA in analyzing Chinese investment in the Chiang Mai property market under the Belt and Road Initiative provides a comprehensive and nuanced understanding of the investment landscape. The findings highlight the significant role of economic potential, market stability, regulatory support, and infrastructure development in shaping investment decisions. By integrating multiple evaluative criteria, this study offers strategic guidance to Chinese investors and contributes to the broader discourse on international real estate investment in BRI-participating countries. The insights gained from this research underscore the importance of a multifaceted approach to investment analysis, ensuring that stakeholders can navigate the complexities of the global real estate market effectively. Finally, we mention the need for further research on the state of the housing market in other countries and the performance of companies in these countries in the previous year and beyond. This kind of transnational experience reference is also very important for the Thai real estate industry, which can provide useful inspiration for the industry. Through this research, investors will be able to develop more sensible real estate investment strategies based on the multi-guideline decision model to promote the sustainable development of the whole industry.

## **5.2 Limitations**

Despite the comprehensive analysis presented in this research paper, several limitations must be acknowledged to provide a balanced perspective on the findings and their applicability. These limitations highlight areas where caution is warranted and suggest directions for future research. The study focuses exclusively on the property market in Chiang Mai. While Chiang Mai is a significant city in Thailand with

considerable investment potential, the findings may not be generalizable to other regions within Thailand or other countries in Southeast Asia. The unique characteristics of Chiang Mai's market, including its economic conditions, regulatory environment, and cultural factors, may limit the applicability of the results to other contexts.

### **5.2.1 Static Analysis:**

The research adopts a static approach to analyzing the investment criteria and market conditions at a specific point in time. This approach does not account for the dynamic nature of markets, where economic conditions, regulatory frameworks, and investor preferences can change rapidly. A longitudinal approach that tracks changes over time would provide a more comprehensive understanding of the evolving investment landscape.

### **5.2.2 Data Limitations:**

The study relies on both primary and secondary data sources. While efforts were made to ensure the reliability and validity of the data, there may be limitations related to data availability, accuracy, and completeness. In particular, primary data collected through surveys and interviews may be subject to biases, such as respondent bias or sample bias, which could affect the findings.

### **5.2.3 Regulatory and Policy Changes:**

The regulatory environment for foreign investment in Thailand is subject to change, influenced by political, economic, and social factors. This study's findings are based on the current regulatory framework, which may not remain constant over time. Future regulatory changes could significantly impact the investment climate and alter the relevance of the identified criteria.

### **5.2.4 Technological and Market Innovations:**

The study does not fully account for the potential impact of technological advancements and market innovations on the property market. Developments in PropTech, digital platforms, and smart city initiatives could significantly influence investment decisions and market dynamics. Future research should incorporate these factors to capture their potential effects.

While the research provides valuable insights into the factors influencing Chinese

investment in the Chiang Mai property market under the Belt and Road Initiative, it is essential to recognize these limitations. Addressing these limitations in future research will enhance the robustness, applicability, and comprehensiveness of the findings, contributing to more informed decision-making and effective policy development.

### **5.3 Future Research**

The future research directions aim to build on the current study's findings by expanding the scope, adopting advanced methodologies, and exploring new dimensions of the investment landscape. These efforts will contribute to a more comprehensive understanding of Chinese investments in the Chiang Mai property market under the Belt and Road Initiative, supporting informed decision-making and promoting sustainable investment practices.

#### **5.3.1 Expansion of Geographical Scope**

While this research has focused on Chiang Mai, future studies could expand the geographical scope to include other key regions in Thailand and Southeast Asia. The comparative analysis of different regions could provide a broader understanding of how the Belt and Road Initiative (BRI) influences Chinese investment patterns across various markets. This would help identify regional differences and commonalities in investment criteria and outcomes, providing more granular insights for investors and policymakers.

#### **5.3.2 Integration of Advanced Analytical Techniques**

The current study employs Multi-Criteria Decision Analysis (MCDA) with the Analytical Hierarchy Process (AHP) framework. Future research could integrate more advanced analytical techniques such as machine learning and artificial intelligence (AI) to enhance the decision-making process. These techniques could analyze large datasets more efficiently, identify hidden patterns, and provide more accurate predictions. The integration of AI could also facilitate real-time decision support systems for investors.

#### **5.3.3 Sectoral Analysis**

While the current research provides a comprehensive analysis of the property market, future studies could delve deeper into specific sectors within the property market, such as residential, commercial, industrial, and tourism-related real estate. Sectoral

analysis could reveal distinct investment dynamics, risks, and opportunities within each sector, offering more targeted insights for investors. This would require sector-specific data collection and analysis, as well as the development of tailored MCDA models.

#### **5.3.4 Impact of Regulatory Changes**

Future research could investigate the impact of regulatory changes on Chinese investment in the property market. As regulatory environments evolve, it is crucial to understand how these changes affect investment decisions and outcomes. This could involve examining new policies, amendments to existing regulations, and their implications for foreign investors. Comparative studies across different regulatory regimes could also provide valuable lessons for policymakers aiming to attract and manage foreign investments effectively.

#### **5.3.5 Cultural and Social Factors**

Cultural and social factors play a significant role in investment decisions and outcomes. Future research could explore how cultural differences influence Chinese investment strategies and interactions with local stakeholders in Chiang Mai. This could involve qualitative studies, such as interviews and case studies, to understand the cultural dynamics at play and their impact on investment success. Such insights could inform strategies to enhance cross-cultural collaboration and mitigate potential conflicts.

#### **5.3.6 Technological Advancements**

With rapid technological advancements, future research could investigate the role of technology in shaping Chinese investment in the property market. This could include exploring the impact of digital platforms, smart city initiatives, and PropTech innovations on investment decisions and market dynamics. Understanding the technological landscape and its implications for property investment could help investors leverage new opportunities and stay competitive in a rapidly evolving market.

In summary, the proposed directions for future research highlight the need for a multi-faceted approach to understanding and enhancing Chinese investment in the Chiang Mai property market under the Belt and Road Initiative. By expanding the geographical scope, adopting longitudinal studies, integrating advanced analytical techniques, focusing on sectoral and sustainability aspects, and exploring cultural, technological, and policy

dimensions, future research can provide deeper and more comprehensive insights. These efforts will contribute to more informed decision-making, promote sustainable investment practices, and support the long-term success of the Belt and Road Initiative.



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## APPENDIX A

### Questionnaires:

#### Chinese Purchases Property in Chiang Mai (Thailand)

Dear Sir/Madam: Hello! I am a Chinese doctoral candidate studying at Chiang Mai University. My research and graduation thesis focus on Chinese buying property in Chiang Mai (Thailand). I need to know more information and views on buying Thai property. Please mark accordingly and rate the questions by range and compare the relative importance of the two indicators mentioned: the questionnaire is a 1-9 scale method. All the contents of this survey will definitely not be used for any commercial purpose, thank you for your support and help!

#### Part A: Single or Multiple choices

1. Gender? (Single answer)

- Male
- Female

2. Age? (Single answer)

- Below 20
- 21-30
- 31-40
- 41-50
- Over 50

3. Occupation? (Single answer)

- Student
- Civil servant
- Teacher
- Company Staff
- Retirees
- Self-employment
- Institution Units
- Other

4. Personal income monthly? (Single answer)

- Below 2000 RMB
- 2001-5000
- 5001-10000
- 10001-15000
- 15001-20000
- Over 20,000

5. Where do you live in China? (Single answer)
- Beijing
  - Shanghai or Guangzhou or Shenzhen
  - Provincial capitals (please list city names)
  - Other second-tier cities
  - Third tier cities
  - Other
6. Do you have your own property in China ? (Multiple answer)
- Yes, own commercial housing
  - Yes, own housing villa
  - Yes, own apartment
  - Yes, commercial housing rental
  - Yes, villa rental
  - Yes, apartment rental
  - No have any property
7. How long have you bought property in Chiang Mai? (Single answer)
- Less than one year
  - One to two years
  - Two to three years
  - Three to five years
  - Five to ten years
  - More than 10 years
8. Where the property locations you bought in Chiang Mai?
9. The price of your purchase property in Chiang Mai is in which of the following ranges? (Single answer)
- Below 200,000 RMB
  - 200,000-500,000 RMB
  - 500,000-800,000 RMB
  - 800,000-1,200,000 RMB
  - Over 1,200,000 RMB
10. Which of the following types that the property you purchased in Chiang Mai? (Multiple answer)
- Condominium
  - Single house
  - Townhouses
  - Residential land (Brown color)
  - Other
11. What's purpose of your purchase property in Chiang Mai? (Multiple answer)
- Investment
  - Vacation
  - Rental
  - Children's education
  - Old and retire age living
  - Other

12. What's the "advantages" of buying property in Chiang Mai?

(Multiple answer)

- Have permanent property rights, all fine decoration and no have shared area
- Low transfer fees, high rental return rates, and stable house prices
- Chinese people can find a mortgage loan from Bank of China (Thailand) and Industrial and Commercial Bank of China (Thailand) when buying property in Thailand
- Thailand has beautiful natural environment, people friendly to Chinese and suitable for old-age care and stay
- Matched kitchen appliances such as air conditioners and refrigerators when buying
- The property fee is low, and the owner use the public facilities such as swimming pool, gym for free
- Compare to the United States, Britain, Canada, Australia, New Zealand and other countries, not far distance from China

13. What are the main decision factors for buying property in Chiang Mai? (Multiple answer)

- Property comprehensive cost performance
- No winter, comfortable living environment
- Lower cost of living
- Buddhist countries and safe social security
- Enabling child education in a foreign language environment
- Medical service and old-age care considerations
- Other

14. Purchases property in Chiang Mai, what's main concern issues? (Multiple answer):

- Thailand policy changes and implications for foreigners buying property
- How integrate into local life
- Communication barriers with local people
- Political conflict and social security
- language is not available
- Traffic congestion
- Other

15. What is the price range (RMB/m<sup>2</sup>) for Chiang Mai property you currently purchased? (Single answer)

- Within 5,000
- 5000-8000 RMB
- 8000-12000 RMB
- 12000-20000 RMB
- Over 20,000

16. How do you think it's better to buy property in Thailand in hot tourist areas (Bangkok, Chiang Mai, Pataya, Phuket, Hua Hin, Krabi). ) or buy freely in any area?

(Single answer)

- Bangkok, capital
- Chiang Mai
- In hot spots

- Anywhere in Thailand
  - Not easy to say
17. How do you think it would be better to know more Chiang Mai before buying property? (Multiple answer)
- Field visits
  - Know more through local friends
  - Search online information
  - Compared to China's local property
  - Compared to other countries
  - Research legal safeguards
  - Find an Real Estate Agent
  - Other
18. How long will it take you to sell Chiang Mai property if you have such plans? (Single answer)
- Nearly a year or two
  - About three to five years
  - Five years later
  - After retirement
  - Not easy to say
19. What do you think of Chinese people allocating personal assets in abroad (e.g. Buying property in Chiang Mai): (Multiple answer)
- It's normal
  - It's risk
  - Need a lot of property knowledge
  - Need information on international property markets
  - Should not make blind decisions
  - Unsafe to buy property in abroad
  - Other
-

**Part B: Following please rate the questions by range and compare the relative importance of the two indicators mentioned: the questionnaire is 1-9 scale method.**

Notes:The investment decision of residential property project mainly evaluates the value of investment from the investment cost, the forecast of value-added income and the investment risks. Investment risks mainly includes: market risk (such as purchase price, sales schedule, market supply and demand change) economic risk (such as sales revenue profit margin, investment payback period and financial difficulty), and social risk (such as land price change, exchange rate impacts, regional development plan adjustment, etc.). Therefore, the risk assessment system of residential property investment is established, and the evaluation system is divided into three layers.

Level 1 Focus : Property investment risk

Level 2 Criteria: Market risk, Economic risk, Social risk

Level 3 Subcriteria: List 9 indicators and risk interactions

According to the 1-9 scale method from low to high selection, please mark in the corresponding form.

Q1 What's the price range of the property you purchased?

1	2	3	4	5	6	7	8	9

Q2 Is the property you purchased is implemented according to the sales schedule?

1	2	3	4	5	6	7	8	9

Q3 Is the supply and demand of the property market changes greatly?

1	2	3	4	5	6	7	8	9

Q4 What is the expected range sales value of your property?

1	2	3	4	5	6	7	8	9

Q5 What is the expected investment recovery period of the property you purchased?

1	2	3	4	5	6	7	8	9

Q6 Is it convenient for you to invest the money to buy the property?

1	2	3	4	5	6	7	8	9

Q7 What is the regional price increase range of your property area?

1	2	3	4	5	6	7	8	9

Q8 What is the impact of exchange rates in your investment properties in Chiang Mai?

1	2	3	4	5	6	7	8	9

Q9 What is the impact of the development of your property location area?

1	2	3	4	5	6	7	8	9

The comparison of market risk and economic risk factors in your property investment.

	The former has the same effect as the latter	Between the two	The former has a slightly stronger effect than the latter	Between the two is stronger	The former is stronger than the latter	Between them is better than the latter	Between the two	The former has a stronger influence than the latter
	1	2	3	4	5	6	7	8
Comparison of purchase prices and investment recovery margins								
Comparison of Property Purchase Progress and Capital Investment								
Property markets supply and demand changes and financial market changes								

The comparison of economic risk and social risk factors in property investment.

	The former has the same effect as the latter	Between the two	The former as a slightly stronger effect than the latter	Between the two is stronger than the latter	The former is stronger than the latter	Between them is better than the latter	Between the two has a stronger influence than the latter	The former has a stronger influence than the latter	
	1	2	3	4	5	6	7	8	9
Investment pay back period compared with regional development changes									
Comparison of Capital Input and Financial Exchange Rate Changes									
Comparison of Financial Market Change and Property Land Price Change									

The comparison of market risk and social risk factors in property investment.

	The former has the same effect as the latter	Between the two	The former has a slightly stronger effect than the latter	Between the two former is stronger than the latter	The former is stronger than the latter	Between them is better than the latter	Between the two has a stronger influence than the latter	The former has a stronger influence than the latter	
	1	2	3	4	5	6	7	8	9
Comparison of purchase prices with regional development plans									
Investment recovery margins versus changes in financial interest rates									
Property market supply and demand change and Property land price change comparison									

## APPENDIX B

The topics in my Dissertation are published as the Following:

### Journal papers:

- 1) Zhai Fan, Ahmad Yahya Dawod , Somsak Chaimaim and Naret Suyaroj (2024) A new perspective on real estate in Thailand in the post-epidemic era: Multi criteria decision analysis, Journal of Apuntes del Cenes ( Publish pending)
- 2) Zhai Fan, Piang-or Loahavilai, Nopasit Chakpitak, Tanarat Rattanadamrongaksorn (2020) Growing Properties Investment in Thailand Based on Fuzzy Analytic Hierarchy Process” In IJTEF 2021 Vol.12(6): 160-164 (Published)

### International conference papers:

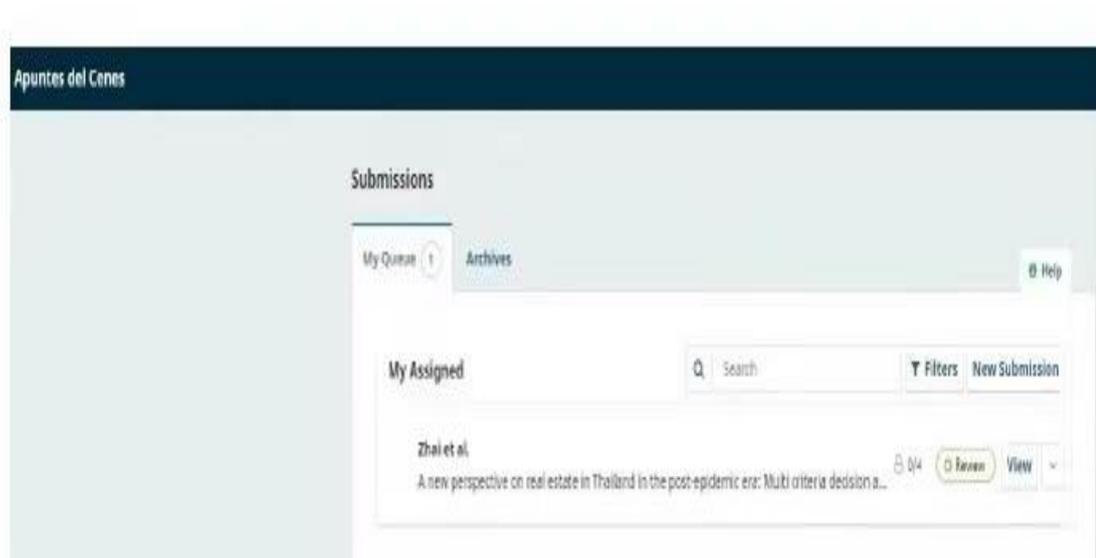
- 1) Zhai Fan and Nopasit Chakpitak (2019) China’s BRI and Chinese Investment in Thailand’s Residential Property Market: What are the Linkages? ASAR Asian Society for Academic Research conference in Bangkok (Published and presentation)

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## APPENDIX C

### JOURNAL PAPER 1

Zhai Fan, Ahmad Yahya Dawod , Somsak Chaimaim and Naret Suyaroj (2024) A new perspective on real estate in Thailand in the post-epidemic era: Multi criteria decision analysis, Journal of Apuntes del Cenes ( Publish pending)



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Passport number

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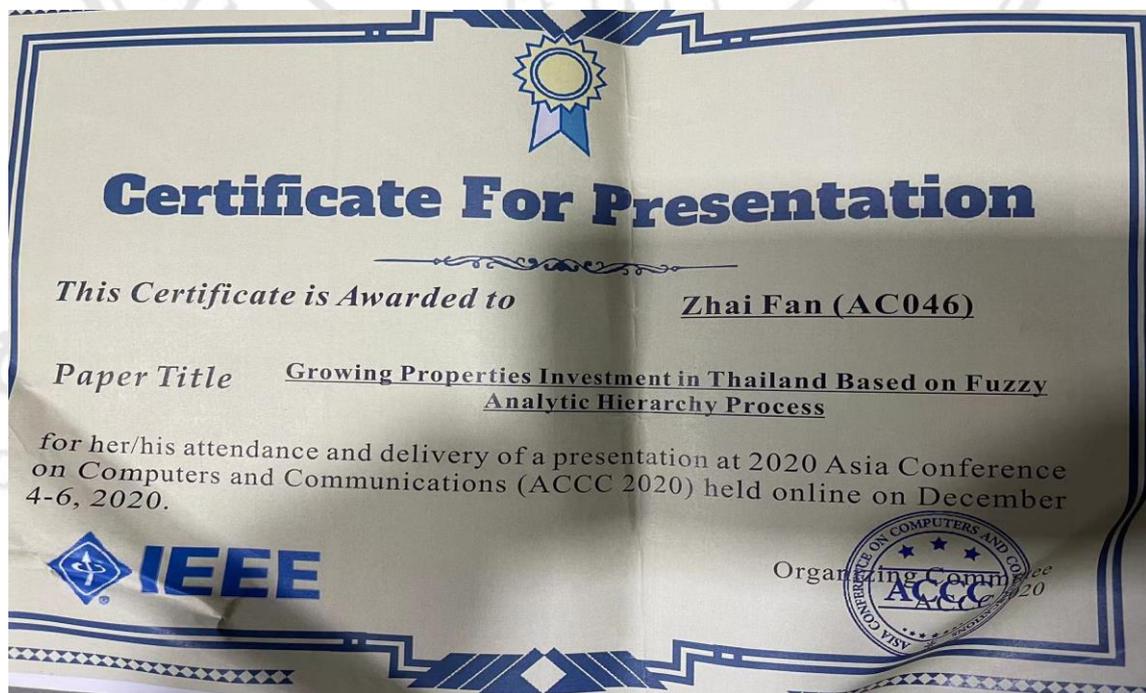
Date of birth

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## JOURNAL PAPER 2

Fan, Z., Loahavilai, P. O., Chakpitak, N., & Rattanadamrongaksorn, T. (2021). Growing Properties Investment in Thailand Based on Fuzzy Analytic Hierarchy Process. *International Journal of Trade, Economics and Finance*, 12(6). (Published)



**INTERNATIONAL CONFERENCE PAPERS:**

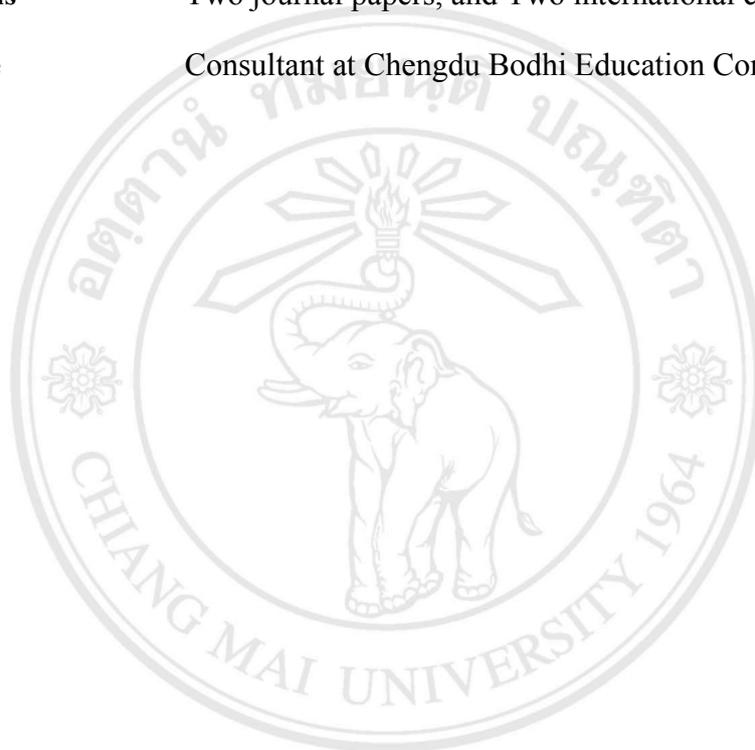
Zhai Fan and Nopasit Chakpitak (2019) China’s BRI and Chinese Investment in Thailand’s Residential Property Market: What are the Linkages? ASAR Asian Society for Academic Research conference in Bangkok (Published and presentation)

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