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**Embracing Construction Revolution
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Built Environment**

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WELCOME SPEECH FROM THE CHAIRMAN

RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)

بسم الله الرحمن الرحيم السلام

عليكم ورحمة الله وبركاته

Greetings to all,

It is with great pleasure that I welcome you to the 17th RISM International Surveying Conference for Undergraduates (ISCU 2025), themed “*Embracing Construction Revolution 4.0: Transforming Malaysia’s Built Environment.*” On behalf of the Royal Institution of Surveyors Malaysia (RISM), I also wish to express our sincere appreciation to Universiti Teknologi MARA (UiTM), Perak Campus, for graciously hosting this significant event.

As we navigate the era of the Fourth Industrial Revolution (IR4.0)—or in our context, Construction Revolution 4.0 (CR4.0)—we are witnessing transformative advancements across the global construction sector. Technologies such as Building Information Modelling (BIM), the Internet of Things (IoT), artificial intelligence (AI), robotics, big data analytics, and cloud computing are redefining the way we build, manage, and interact with our built environment. For Malaysia, embracing CR4.0 is a strategic imperative to achieve our socio-economic and environmental goals.

This conference serves as a vital platform to unite surveying undergraduates from various disciplines, fostering critical dialogue on industry challenges, enhancing professional networking, and preparing a new generation of talent for the rapidly evolving construction landscape. It is also an opportunity for employers to engage with and inspire our future professionals.

I would like to extend my heartfelt thanks to all industry speakers, paper presenters, judges, and participants for their time, contributions, and support in making ISCU 2025 a success. I also commend the organising committee for curating a meaningful and dynamic conference experience.

May the knowledge gained, connections formed, and ideas exchanged during this event inspire all participants to lead and innovate in their future endeavours.

Wishing everyone a productive and memorable conference.

Prof. Ts Sr Dr. Adi Irfan Bin Che Ani'

Chairman, Universities' Partnering Committee

RISM Session 2024/2025

May 2025

WELCOME SPEECH FROM CO-CHAIRMAN

RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)

Bismillahirrahmanirrahim.

السلام عليكم ورحمة الله وبركاته and greetings to all.

It is my great pleasure to welcome everyone to the 17th International Surveyor Conference for Undergraduates (ISCU 2025), proudly hosted by Universiti Teknologi MARA (UiTM) Perak Branch in collaboration with the Royal Institution of Surveyors Malaysia (RISM). This event is a meaningful platform for students in the built environment to share ideas, showcase innovations, and build professional networks. We are honoured by your presence and enthusiastic participation, with 135 accepted papers and 78 poster presentations this year.

UiTM Perak, home to the College of Built Environment, has long been a hub for academic excellence in architecture, planning, and surveying. Our commitment remains strong in nurturing competent graduates who meet industry demands and contribute to nation-building.

While you're here, we invite you to experience the heritage and culture of Perak Tengah from the architectural richness of Rumah Kutai to the historical towns of Pasir Salak, Bota, and Kampung Gajah.

To all presenters and winners, congratulations on your achievements. Let your work today be a catalyst for future success and academic growth. We hope this conference will inspire you to explore new ideas, foster collaboration, and make lasting memories.

My deepest thanks to the Royal Institution of Surveyors Malaysia (RISM) and the organising committee for making this event a success.

We hope your experience here will be rewarding and unforgettable.

Thank you. Selamat datang dan selamat berjaya.

Associates Professor Dr. Nur Hisham Ibrahim, *PMP*

Co-Chairman, Universities' Partnering Committee

RISM Session 2024/2025

May 2025

WELCOME SPEECH FROM THE PROJECT DIRECTOR

RISM 17th International Surveying Conference for Undergraduates 2025

Alhamdulillah, all praise to Allah S.W.T. for His guidance and blessings in making the RISM 17th International Surveying Conference for Undergraduates (ISCU) 2025 a reality.

It is with great honour and gratitude that I welcome all participants, guests, academicians, and industry professionals to this prestigious event, proudly organized under the Royal Institution of Surveyors Malaysia (RISM). This 17th edition of ISCU stands as a proud testament to our collective dedication toward academic excellence, professional collaboration, and youth empowerment in the field of surveying.

I extend my heartfelt appreciation to RISM for its unwavering support, to the hardworking ISCU 2025 Organising Committee, and to all 16 partnering universities across Malaysia for their commitment and contributions. Your efforts have shaped this conference into a dynamic platform for knowledge exchange, innovation, and professional growth.

To the academicians and practitioners present, your insights are invaluable in bridging the gap between academic theory and real-world practice. To our undergraduate participants, your passion, curiosity, and commitment are the very foundation of our future. May this conference not only deepen your academic journey but also ignite a spirit of leadership, integrity, and sustainable thinking.

Let this gathering serve as more than an academic milestone. May it foster lifelong networks, inspire transformative ideas, and chart new directions in our shared professional journey.

Wishing everyone a rewarding and inspiring conference experience.

Sr Dr. Nurul Fadzila Zahari

Project Director

RISM 17th ISCU 2025

THE FACTORS INFLUENCES INDUSTRIAL REAL ESTATE DEMAND: A CONCEPTUAL FRAMEWORK

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ABSTRACT

Industrial real estate plays a pivotal role in supporting global economic activities by providing essential infrastructure for manufacturing, logistics, and supply chain operations. This study aims to identify and rank the key factors influencing industrial real estate demand in Klang, Malaysia. The factors examined include e-commerce growth, locational advantages, market trends, economic conditions, technological advancements, infrastructure, government policies, and environmental considerations. A quantitative research methodology was employed, utilizing survey data collected from 153 registered real estate agents. The data will be analysed using pilot test, descriptive analysis, reliability test, validity test and ranking test to derive meaningful insights into the determinants of industrial real estate demand. The findings of this study are expected to enhance the understanding of industrial real estate dynamics, offering valuable insights for developers, investors, and policymakers. By aligning strategies with market demands, stakeholders can make informed decisions that foster sustainable industrial development in Klang. Additionally, this research underscores the evolving nature of industrial real estate and its critical role in economic growth. Future studies should further explore the impact of technological advancements and environmental factors to optimize industrial real estate strategies. The insights generated from this study will contribute to improving the sector's resilience, efficiency, and long-term sustainability in Klang and comparable regions.

Keywords: Industrial Real Estate, E-Commerce, Locational Factors, Demand Drivers, Klang

I. INTRODUCTION

Industrial real estate underpins modern economic activities, offering essential manufacturing, warehousing, and logistics infrastructure. It is critical in enabling global supply chains and supporting industrial growth. With globalization and technological advancements reshaping industries, the demand for industrial real estate is evolving, particularly in strategic regions like Klang, Selangor, Malaysia (CBRE,2024).

Klang, located near Port Klang—one of Southeast Asia's busiest ports—is a major hub for industrial operations (Klang, 2024). Its strategic location and strong infrastructure make it a preferred choice for logistics, manufacturing, and warehousing activities (Shahrilm, 2024). However, research on the factors driving industrial real estate demand in Klang remains limited, creating a gap in understanding the market dynamics.

This study aims to identify and analyze the key factors influencing industrial real estate demand in Klang. By employing a quantitative approach, it seeks to provide actionable insights for developers, policymakers, and investors. These findings will support sustainable industrial growth and inform strategic planning, contributing to optimizing industrial real estate investment and development in rapidly expanding regions.

1.1 Research Background

The demand for industrial real estate in Malaysia, particularly in Klang, is driven by a multifaceted set of interrelated

factors. Each factor plays a pivotal role in shaping the market dynamics and influencing the evolution of industrial properties in the region. This research aims to identify and rank how these factors influence the demand for industrial real estate in Klang.

Government policy factors are integral to the demand for industrial properties, as evidenced by the shift from traditional factory buildings to more modern, high-tech industrial facilities. This transition reflects the evolving land use policies and zoning regulations that govern industrial developments (Kamarudin, 2006). The influence of government policies and regulatory frameworks is particularly pronounced in sectors such as petrochemicals, where slow decision-making processes can limit the availability of industrial sites and affect supply (Ishak, 2008). These factors highlight the importance of timely and adaptive policymaking to meet the demands of a rapidly changing industrial landscape.

Economic factors, particularly the inflow of Foreign Direct Investment (FDI), play a central role in driving demand for industrial real estate in Malaysia. The relationship between FDI, labor productivity, and economic growth significantly influences the need for modern, specialized industrial spaces that cater to the requirements of international investors. As FDI increases, the demand for high-quality industrial facilities grows, underscoring the importance of aligning property supply with foreign capital needs (Karim & Fleming, 2012). Moreover, the rising emphasis on sustainability within the industrial sector is reshaping the market for industrial real estate. Financial incentives and the growing availability of green technologies drive the shift toward more environmentally conscious industrial properties (Joachim, 2017).

Additionally, as population growth accelerates and urban infrastructure expands, the need for strategically located industrial properties rises. This interconnectedness between industrial and residential markets highlights the importance of integrated planning to ensure balanced growth across sectors. For example, expanding transportation networks in response to urbanization can increase the accessibility and attractiveness of industrial sites, driving demand in key locations like Klang (Ismail et al., 2012).

This research seeks to comprehensively analyse the various factors influencing industrial real estate demand in Klang, Malaysia. By examining these factors in greater detail, the study aims to enhance the understanding of the forces shaping the market and their implications for future industrial development in the region.

1.2 Problem Statements

The industrial real estate market in Klang, Malaysia, has been notably impacted by a combination of factors, such as the growth of e-commerce, strategic locational advantages, economic conditions, and government policies. Despite the rapid urbanization and economic growth in Malaysia, particularly within the Klang Valley, there is a lack of comprehensive understanding regarding how these factors interact and collectively shape the demand for industrial properties.

While macroeconomic factors such as location, economic stability, and government intervention are recognized drivers of industrial real estate demand, the interplay with microeconomic factors, such as property characteristics and industrial agglomeration, remains underexplored (Razali et al., 2020). Additionally, with the post-COVID-19 economic recovery and shifting market conditions, the industrial sector faces new challenges and opportunities that may significantly alter demand patterns (Hamzah et al., 2020).

The strategic location of Klang, coupled with Malaysia's competitive property market, suggests a potential for industrial real estate growth; however, an understanding of the broader economic and infrastructural context is critical for capitalizing on these trends. Furthermore, the impact of rising property prices in suburban areas, driven by urban sprawl, complicates the broader real estate landscape, including the industrial sector.

This research seeks to bridge the gap in knowledge by determining what factors affect the demand for industrial real estate in Klang. Understanding these dynamics is essential for investors, developers, and policymakers to make informed decisions and navigate the evolving market. This study aims to comprehensively analyse the factors driving industrial real estate demand in Klang.

1.3 Research Questions

This study aims to address the following research questions:

- i) What factors influence the demand of industrial real estate in Klang?
- ii) How do these factors rank in significance?

1.4 Research Objectives

This research has two main objectives:

- i) To identify factors influencing industrial real estate demand.
- ii) To rank the factors by their significance

1.5 Scope of the Study

This study focuses on industrial real estate located in Klang, Selangor, using quantitative methods to collect data regarding factors influencing demand. The data gathered are from registered real estate agents under the Board of Valuers, Appraisers, Estate Agents & Property Managers Malaysia (BOVAEP) who are knowledgeable and responsible about the space market.

1.6 Significance of the Study

Findings will guide developers, policymakers, and investors in understanding demand drivers, fostering informed decision-making, and optimizing industrial real estate utilization in Klang.

(a) Developers and Investors

The study provides data-driven insights into the key factors influencing industrial real estate demand in Klang, helping stakeholders identify lucrative opportunities and mitigate risks in their investment strategies.

(b) Policymakers and Urban Planners

Findings highlight critical areas for policy intervention, such as enhancing transportation infrastructure and optimizing zoning regulations to support sustainable industrial growth.

(c) Real Estate Sector

Offers a localized analysis of market dynamics, enabling real estate agents and professionals better to understand the needs of the Klang industrial market.

(d) Academic Research

Contributes to the limited literature on industrial real estate demand in Klang, setting a foundation for future studies on regional industrial markets

II. LITERATURE REVIEW

The literature review thoroughly synthesizes existing research and theoretical frameworks related to industrial real estate demand dynamics. Critically analyzing prior studies aims to highlight key findings that have shaped the current understanding of the field while identifying significant gaps that warrant further exploration. It also adds to the current findings in the field by reviewing important academic work and highlighting areas that need more research. By addressing these gaps, the researcher enhances the academic understanding of the factors influencing demand in industrial real estate.

2.1 Industrial Real Estate

Industrial real estate includes manufacturing, storage, and distribution properties, such as warehouses and processing plants. These properties play a critical role in supply chains by supporting production, logistics, and inventory management (Benjamin et al., 2003; Hughes et al., 1994).

Typically used for behind-the-scenes commercial activities like mechanical engineering, research, and parcel deliveries, industrial properties vary widely in size. Many exceed 100,000 square feet and are designed to accommodate heavy machinery, storage systems, and specialized equipment, enabling businesses to scale efficiently (Ambrose, 1990).

The demand for industrial real estate has grown significantly in recent years due to the rise of e-commerce and the need for efficient supply chain management. This sector supports local economies and global supply chains, making strategic investments essential. Properties often have specific requirements, such as ceiling heights and loading facilities, which are vital for operational efficiency (Ambrose, 1990). Technological advances also continue to shape

industrial property design, enhancing productivity and adaptability.

2.2 Types of Industrial Real Estate

The types of industrial real estate can be broadly categorized into four categories, including warehouses and distribution facilities, manufacturing facilities, flex spaces and data centers, each serving distinct purposes as the table 1 shown below:

Table 2.0: Types of Industrial Real Estate

Type	Definition	Sub-category	Key Features	Primary Function
1. Warehouse and Distribution Facilities	Facilities designed for the storage, transfer, and distribution of goods within the supply chain.	<i>(a) Distribution Warehouse</i>	High ceilings (24–36 ft), multiple loading docks, strategic location near cities, highways, railways, harbors, airports (Tyler, 2024)	To receive, store, and distribute goods efficiently, often serving e-commerce and logistics industries.
		<i>(b) General Warehouse</i>	Lower door-to-square-footage ratio, long-term storage, cold storage options for perishable goods (Tyler, 2024).	Primarily for long-term storage of goods; can accommodate various industries, including temperature-sensitive items.
		<i>(c) Truck Terminal</i>	Smaller facilities with parking areas, loading docks, and fueling stations (Sam & Sam, 2024).	Facilitate the transfer of goods between trucks, optimizing distribution routes.
2. Manufacturing Facilities	Properties designed for the production of goods, supporting light and heavy manufacturing operations.	<i>(a) Heavy Manufacturing</i>	10–16 ft ceilings, Specialized, machinery, robust electrical systems, reinforced floors, ventilation systems, large-scale operations (Benjamin et al., 2003).	For large-scale production, housing complex equipment for industrial manufacturing (Bitton, 2024).
		<i>(b) Light Manufacturing</i>	More flexible spaces, portable equipment, smaller scale, light assembly and basic manufacturing.	For light assembly and small-scale manufacturing, focusing on flexibility and adaptability.

3.Flex Spaces	Versatile properties combining office, industrial, and showroom space to support diverse business needs.		Combination of office space (one-third), flexible areas for warehousing, production, or product showcases (Bitton, 2024).	Designed for businesses needing adaptable space for R&D, production, or industrial showrooms.
4. Data Centers	Highly specialized facilities housing computer servers and telecommunications equipment.		High-capacity electrical systems, cooling systems, security measures, backup generators, specialized infrastructure.	To house servers and telecommunications equipment, ensuring continuous digital infrastructure support.

2.3 Characteristics of Real Estate

Industrial real estate refers to properties designed for manufacturing, storage, distribution, and other industrial operations. These properties are strategically located, designed with specific features to support industrial activities, and influenced by zoning regulations and lease structures tailored to their needs. The following summarize the key characteristics of industrial real estate.

(a) Location

Industrial properties are strategically located near transportation hubs (highways, railroads, ports, and airports) to enhance logistics and distribution efficiency. Factors such as land cost, traffic, and local policies also play a role in determining their location (Zhi, 2015).

(b) Building Design and Layout

Industrial buildings feature high ceilings (often over 30 feet), open floor plans, and specialized loading docks for efficient goods movement (Goddard & Marcum, 2012). Design varies by property type: warehouses may have 18–30 ft ceilings, manufacturing buildings typically have lower ceilings (10-16 feet), and flex spaces are adaptable with flexible loading options.

(c) Zoning Regulations

Industrial properties are governed by zoning laws that determine the types of activities allowed on the land (e.g., light or general industry). These regulations ensure legal compliance and optimize property use.

(d) Utilities and Infrastructure

Industrial properties require robust utilities and infrastructure, such as high-capacity electrical systems (e.g., three-phase power), water, gas, and specialized systems like cooling or refrigeration for certain facilities (e.g., data centers or cold storage units).

(e) Lease Structures

Triple-net (NNN) leases are common in industrial real estate, where tenants cover property expenses such as taxes, insurance, and maintenance, reducing the landlord's operational burden.

(f) Technological Advancement and Market Changes

The industrial sector is evolving with technological advancements and market shifts, such as the rise of e-commerce and logistics facilities. Technologies like Geographic Information Systems (GIS) are aiding location decisions, emphasizing the need for flexibility and innovation in industrial real estate management.

2.4 Factors Influence Industrial Real Estate

(a) E-Commerce Factors

The rise of e-commerce has greatly increased demand for industrial real estate, especially warehouses and distribution centers, to support efficient logistics and storage for online retail (Dong, 2024). Properties near urban centers are highly sought after for their proximity to large consumer bases, enabling fast and cost-effective order fulfillment (Dong, 2024). E-commerce growth has also highlighted the need for effective inventory management and timely customer responses, driving demand for strategically located industrial spaces (Pourhejazy, 2020). Cross-border e-commerce, with its diverse products and short procurement times, has further amplified this demand (Wang et al., 2023).

(b) Locational Factors

Proximity to major transportation hubs like highways, airports, and central business districts greatly increases industrial land value by improving logistics and distribution, reducing transportation costs, and enhancing supply chain efficiency (Callahan, 2017). Furthermore, the availability of social amenities and infrastructure, such as schools, healthcare, and recreational facilities, enhances location desirability. These amenities improve employees' quality of life and attract a skilled workforce, influencing real estate investment decisions (Peter et al., 2024).

(c) Market Trend

Urbanization trends are driving demand in metropolitan areas, leading to more infrastructure development and a reassessment of property values (Dong, 2024). As cities grow, industrial land, especially in urban areas, is being transformed due to rising land prices and the anticipation of future value increases. This trend often involves redeveloping older industrial sites into modern facilities to meet the changing needs of businesses (Yang et al., 2022).

(d) Economic Factors

Macroeconomic indicators like GDP, inflation, interest rates, and exchange rates have a significant impact on the rental value and demand for industrial properties. These factors reflect overall economic health and stability, influencing investment decisions (Jibrin et al., 2024). Economic growth boosts industrial activity and increases demand for industrial spaces, while inflation and interest rates can raise borrowing costs and affect investment returns. Furthermore, higher incomes in surrounding populations positively impact industrial land values, as increased income levels drive both consumption and production (Callahan, 2017).

(e) Technological Advancement

Technological innovations like artificial intelligence and blockchain are revolutionizing real estate transactions and management, improving market efficiency and transparency (Dong, 2024). The integration of technology in logistics and supply chain management has driven up the demand for technologically advanced industrial spaces. These innovations enhance operational efficiency, reduce costs, and provide real-time data for informed decision-making, making properties equipped with advanced technology more appealing to tenants (Dong, 2024).

(f) Government Policies

Land use regulations and government policies play a significant role in shaping industrial land values. Strict regulations can raise land values by limiting supply, whereas favorable policies can stimulate development and attract investment (Callahan, 2017). Government initiatives, such as infrastructure investments and tax incentives, can further drive demand for industrial real estate by fostering a business-friendly environment (PETER et al., 2024).

(g) Infrastructure

The availability and quality of infrastructure, such as transportation networks, utilities, and communication systems, are key factors influencing industrial real estate demand. Well-developed infrastructure facilitates efficient operations and logistics, lowering costs and boosting productivity (Ustaoglu et al., 2020). Government investments in infrastructure can improve the competitiveness of industrial locations, making them more appealing to businesses (PETER et al., 2024).

(h) Environmental Factors

Environmental factors, such as land features, climate, and sustainability practices, play a significant role in industrial real estate demand. Developed sites with favorable characteristics, like stable soil and low flood risk, are more valuable (Callahan, 2017). Additionally, the growing focus on sustainable development and green building practices is influencing industrial real estate decisions. Properties with eco-friendly designs, energy-efficient systems, and sustainable materials are increasingly sought after as businesses strive to meet regulatory standards and

consumer expectations (Dong, 2024).

Table 2 summarizes. Eight factors are found, which are E-Commerce, Locational, Market Trend, Economic, Technological Advancement, Government Policies, Infrastructure and Environmental

Table 3.0: Summary of Factors Influence Industrial Real Estate Demand

Researcher (Year)	Factors influence Industrial Real Estate Demand	Summary from previous study
Dong (2024).	• E-Commerce Factors • Market Trend • Technological Advancement • Environment Factors	• E-CommerceFactors • Locational Factors • Market Trend • Economic Factors • Government Policies • Technological Advancement • Infrastructure • Environment Factors
PETER et al., (2024).	• Locational Factors • Government Policies • Infrastructure	
Jibrin et al., (2024).	• Economic Factors Macroeconomic indicators such as GDP, inflation, interest rates, and exchange rates significantly influence the rental value and demand for industrial properties. These factors reflect the overall economic health and stability, affecting decisions investment	
Wang et al., (2023).	• E-Commerce Factors The rise in cross-border e-commerce transactions, characterized by a wide variety of products and short procurement times, has further intensified the need for well positioned industrial real estate	
Yang et al., (2022).	• Market Trend This trend is often accompanied by the redevelopment of older industrial sites into modern facilities to meet the evolving needs of businesses.	
Ustaoglu et al (2020)	• Infrastructure The availability and quality of infrastructure, including transportation networks, utilities, and communication systems, are critical determinants of industrial real estate demand. Well-developed infrastructure supports efficient operations and logistics, reducing operational costs and improving productivity	
Pourhejazy, (2020).	• E-Commerce Factors The growth of e-commerce has heightened the need for efficient inventory management and timely responses to online customer demand. This has led to a higher demand for strategically located warehouses and distribution centers to facilitate quick and cost-effective order fulfillment	
Callahan, M. F. (2017)	• Locational Factors • Economic Factors • Government Policies • Environment Factors	

2.5 Conceptual Frameworks

A conceptual framework was formed to show the relationship between "Independent variables", i.e. the factors that determine demand that affect "dependent variables", i.e. the determination of industrial real estate demand. The details of the conceptual framework are shown in Figure 1.0 :

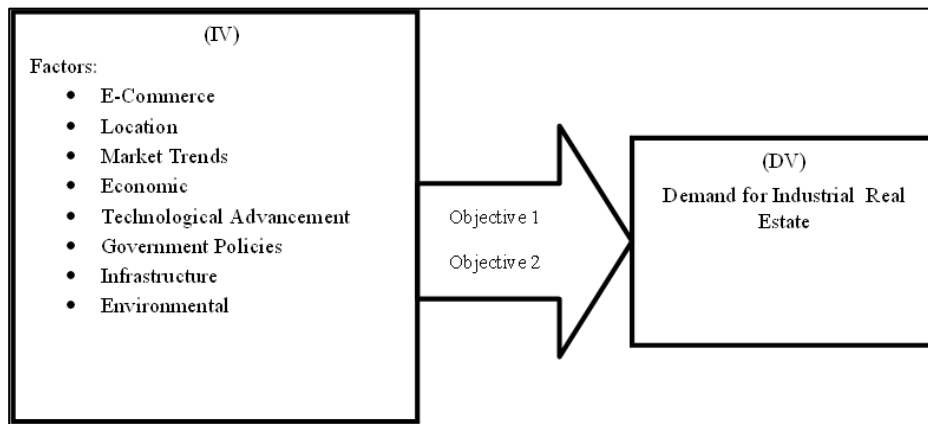


Figure 2.0 : Conceptual Frameworks

Furthermore, the conceptual framework for data collection is formed according to the suitability aspect to ensure that the study's objectives are achieved. Therefore, the suitability of the research instruments used is very important to obtain the necessary data (Chua, 2006). This data will then be analyzed in the form of descriptive analysis and frequency analysis. Therefore, the suitability of the research instruments used is very important to enable the necessary data to be obtained for the continuation of the formation of quantitative data collection. The following is a summary of the quantitative data collection as shown in Table 3.0:

Table 4.0: Conceptual Frameworks (Quantitative Data Collection)

Research Objectives	Method	Data Analysis	Expected Outcome
Objective 1	Quantitative Method (Questionnaire Instrument)	Descriptive Analysis	Researchers can identify factors influence industrial real estate demand.
Objective 2		Frequency Analysis	Researchers can rank the factors influencing industrial real estate demand.

III. METHODOLOGY

The research methodology includes detailed information regarding workflow, strategy, and approach. This study adopts a quantitative approach; according to Creswell (2013), the quantitative method is a research approach centred on numerical data. This study follows a structured quantitative process, covering research design, data collection, sampling, instruments, pilot studies, and analysis, ensuring accuracy and alignment with the study's objectives for reliable results. Appendix A shows the research flowchart used in this study.

3.1 Research Design

A research design outlines the approach for data collection, measurement, and analysis (Sridhar, 2022). It acts as a prerequisite to be completed before initiating the research. This study employs a quantitative research design, utilizing a structured questionnaire to identify and rank the factors influencing the demand for industrial real estate. The quantitative approach is selected due to its effectiveness in collecting and analyzing data in measurable numerical form (Shah, 2014), with structured surveys distributed to registered real estate agents in Klang. The data was then analyzed using SPSS. This systematic plan ensures a methodical and effective execution of the study.

3.2 Data Collection

(a) Primary Data

Primary data is information collected directly by the researcher through methods like interviews, surveys, and observations (Creswell, 2013). This study gathers primary data using surveys where structured questionnaires are distributed to the target population. Surveys are distributed to real estate agents in the Klang area who register under BOVAEP.

(b) Secondary Data

Secondary data consists of information previously collected and published by others for purposes unrelated to the current research (Hassan, 2024). This study utilizes secondary data from academic journals, industry reports, government statistics, and online resources. The study gains a broader perspective and deeper understanding of factors influencing industrial real estate demand in Klang by using secondary data.

3.3 Sampling Techniques

The population and sampling of the study is a technique that explains matters related to the population, sample, and respondents. This study's sample is based on the number of estate agents in Klang. Therefore, the questionnaire instrument will be distributed to the register estate agency under BOVAEP. These agents chosen because their professional expertise, market knowledge, and direct involvement in industrial property transactions make them well-suited to provide accurate and reliable insights into the factors influencing industrial real estate demand. To determine the sample size, the number of respondents for this study is determined using Yamane's (1967) formula and calculated as follows:

$$n = \frac{N}{1 + N(e)^2} \qquad n = \frac{248}{1 + 248(0.05)^2} = 153 \text{ respondent}$$

Where:

- n is the sample size
- N is the population size
- e is the margin of error (0.05)

The sample size calculation is made by identifying the number of estate agents in the Klang district. The study area consists of 248 estate agents and 13 registered estate agencies under BOVAEP in Klang. After the calculation, it was found that the number of respondents required for this study was 153 respondents.

3.4 Research Instruments

The questionnaire aims to enhance and complete the information gathered during the study. Designed to be concise and straightforward, it ensures ease of understanding for respondents while providing an overview of the study's purpose and facilitating data analysis. The 5-point Likert scale (1 = No influence, 5 = Very important influence) is employed for its high reliability and validity, as supported by Hartley and MacLean (2006) and McMillan et al. (2006), who found it effective in assessing views and beliefs. Respondents should be selected based on their registration with BOVAEP, active involvement in industrial real estate transactions, relevant working experience, and familiarity with market trends to ensure they can provide informed and credible insights; these criteria were assessed in Section A: Respondents' Background.

The questionnaire is divided into two sections:

Section A: Respondent's background.

Section B: Factors influencing industrial real estate demand.

The instrument is shown in **Appendix B**

3.5 Pilot Test

The pilot study validates the questionnaire's content, ensures clarity for respondents, and confirms the suitability of research methods and survey instruments to achieve desired results (Dikko, 2016). It identifies unclear questions,

eliminates less important ones, and refines the questionnaire for the actual survey.

Although the literature does not specify an exact sample size for pilot studies, several researchers recommend a range: Isaac and Michael (1995) and Hill (1998) suggest a sample size of 10 to 30 respondents, emphasizing simplicity, ease of calculation, and hypothesis testing. Maiyaki and Mokhtar (2011) similarly recommend 15 to 30 respondents. Van Belle (2002) advises a minimum of 12 participants, a figure supported by Julious (2005), highlighting that this range is sufficient for a reliable pilot study.

The pilot test involved 10 estate agents. The sample size for the pilot study was obtained from a portion of the actual study population. Respondents were randomly selected, and the background of the pilot study respondents is shown in Appendix A. Referring to the respondents' background in Appendix B, the pilot study respondents have above 5 years of experience (70%) in the industrial real estate sector, which is considered reliable and valid for this pilot study.

(a) Reliability Test

A reliability test was conducted on the pilot study data to ensure internal consistency among respondents in answering the given questionnaire. In this test, the Cronbach's alpha value is used as an indicator to measure reliability. According to Yahaya et al. (2007), the minimum reliability level is where the Alpha value is at 0.6. There are 24 items for factors influencing industrial real estate demand in the questionnaire, grouped into 8 categories as shown in **Appendix C**.

Based on **Appendix C** the reliability test analysis of the pilot study found that all the factors are above 0.6 meaning all 8 factors considered as their reliability levels are good, high, and effective (Bond & Fox, 2015).

The Cronbach's Alpha value in **Appendix D** shows that the reliability level for the overall pilot study is good, indicating that respondents are consistent in answering the questions and thus the questionnaire is reliable for the actual survey.

3.6 Data Analysis

This study employs a structured data analysis approach to examine the factors influencing industrial real estate demand in Klang. Data collected through the questionnaire will be analysed using SPSS software, a widely used tool for quantitative research (Saun, 2021). The analysis includes descriptive statistics such as mean and standard deviation to identify trends and patterns (Intisar Turki, 2021). A validity test was conducted to ensure the questionnaire accurately reflects the intended concepts, supported by expert evaluation (Muijs, 2004; Souza et al., 2017). Reliability was assessed using Cronbach's alpha to evaluate internal consistency, with values above 0.70 considered acceptable (Sekaran & Bougie, 2016; Thanasegaran, 2009). A pilot study involving 10 estate agents helped refine the instrument. Ranking analysis was also employed by calculating mean scores for each factor, and standard deviations were used to resolve ties, ensuring accurate prioritization (Rumsey, 2015). This comprehensive approach enhances the reliability and validity of the findings.

IV. EXPECTED OUTCOME

By completing this study, the researcher hopes that:

- (i) The study will contribute valuable insights to the understanding of industrial real estate demand dynamics and facilitate informed decision-making for industry stakeholders.
- (ii) The findings will help improve the strategic development of industrial real estate to meet the evolving needs of the consumers.

CONCLUSION

In conclusion, this study aims to identify and rank the key factors influencing industrial real estate demand in Klang, Malaysia, based on insights from registered real estate agents. The findings are expected to reveal the most significant drivers—such as e-commerce growth, location, infrastructure, and economic conditions—providing a ranked understanding of their impact. This research is significant as it offers practical value to estate agents in matching properties with suitable buyers, assists owners and investors in planning and decision-making, and helps buyers choose buildings that align with their business needs to maximize yield. It also contributes academically by

enhancing the understanding of industrial real estate dynamics in a key industrial region. Additionally, the study will explore how factors will change the industrial real estate demand in Klang area.

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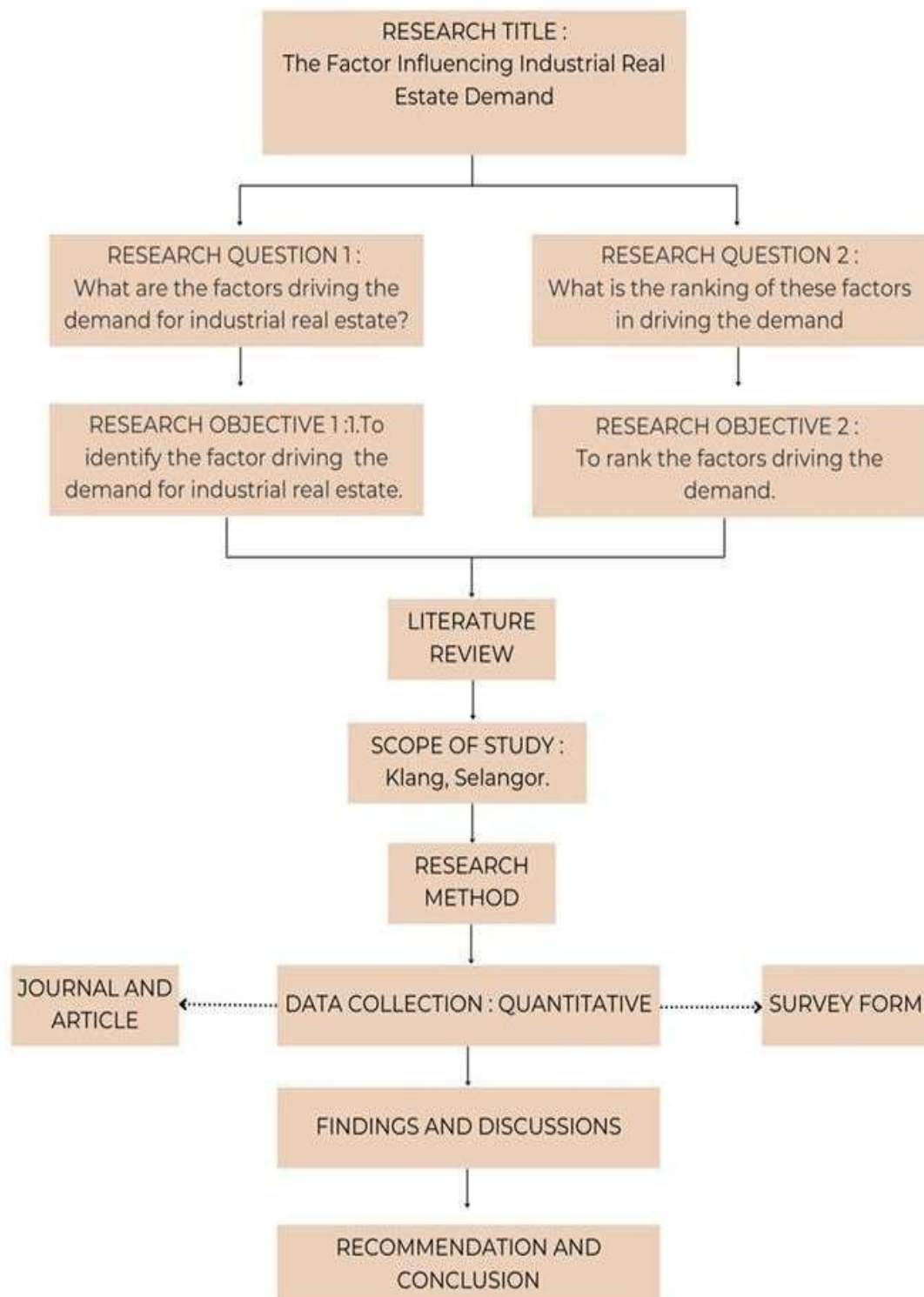
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Appendix A: Research Flowchart



Appendix B: Survey Questionnaire Instruments



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Laman Web: <https://www.uthm.edu.my/en/>

Questionnaire Research Title:

The Factors Influences Industrial Real Estate Demand

Assalamualaikum and Hi,

I hope this message finds you well. My name is Marisha Binti Rizal Harahap, a Real Estate student at Tun Hussein Onn University (UTHM). I am currently conducting research on the factors influencing industrial real estate demand. Your insights as Respondent are invaluable to my study.

I would be truly grateful if you could take a few moments to complete my survey. Your participation will greatly contribute to understanding the key factors that influence the industrial real estate demand. Thank you very much for considering this request, and I appreciate your support in advancing this important research.

Prepared by:

MARISHA BINTI RIZAL HARAHAHAP (AP210019), Tel: 018-2495693

Bachelor of Real Estate Management with Honours Faculty of

Technology and Business Management (FPTP)

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SECTION A

A: Respondent's Background :

This section requires the respondent's personal information. Please select the appropriate answer to answer the questions below:

1. Age:

☐
☐

21 - 30 years old
31 - 40 years

☐
☐

41 - 50 years old
Above 51 years old

2. Gender:

☐

Male

☐

Female

3. Occupation

☐
☐
☐
☐

Real Estate Negotiator Probationary
Estate Agent Registered Estate Agent
Others:

4. Type of Industrial Real Estate Managed or Supervised?

☐
☐
☐
☐
☐

Warehouse and Distribution Facilities
Manufacturing Facilities
Flex Spaces Data
Centers
Other:

5. How long have you worked in the industrial real estate sector?

☐
☐
☐
☐

Less than 5 years
5 to 10 years
11 to 15 years
More than 16 years

SECTION B

B: Factors influencing industrial real estate demand

Instruction: For each factor below, please indicate its level of influence on industrial real estate demand by ticking the appropriate box on the scale provided (1 = No Influence, 5 = Very Important Influence).

1	2	3	4	5
No Influence	Limited Influence	Moderate Influence	Important Influence	Very Important Influence

	Factors influencing industrial real estate demand	Scale				
		1	2	3	4	5
1	E-commerce Factors					
.	Growth of Online Retail					
	Demand for Fulfillment Centers					
	Impact on Logistics and Supply Chain					
2	Location Factors					
.	Proximity to Major Highways					
	Access to Public Transportation					
	Distance to Urban Centers					
3.	Market Demand					
	Tenant Demand					
	Vacancy Rates					
	Rental Rates					

4.	Economic Factors					
	Economic Growth					
	Interest Rates					
	Inflation Rates					
5.	Technological Advancements					
	Automation					
	Energy Efficiency					
	Smart Building Technologies					
6.	Government Policies					
	Zoning Regulations					
	Tax Incentives					
	Environmental Regulations					
7.	Infrastructure					
	Quality of Roads					
	Availability of Utilities					
	Proximity to Ports and Airports					
8.	Environmental Factors					
	Sustainability Practices					
	Green Building Certifications					
	Environmental Impact					
9.	Other Factors (please specify):					

THANK YOU

Appendix C : Respondent Background (Pilot Study)

Questions	Items	Frequency	Percentages
Age	21 - 30 years old	3	30%
	31 - 40 years old	3	30%
	41 - 50 years old	4	40%
	51 years old and above	0	0%
Gender	Male	5	50%
	Female	5	50%
Occupation	Real Estate Negotiator	6	60%
	Probationary Estate Agent	3	30%
	Registered Estate Agent	1	10%
How long have you worked in the industrial real estate sector?	Less than 5 years	3	30%
	5 to 10 years	5	50%
	11 to 15 years	1	10%
	More than 16 years	1	10%
What types of industrial properties do you typically assist clients with in terms of leasing, buying, or selling?	Warehouse and Distribution es	9	90%
	Manufacturing Facilities	0	0%
	Flex Spaces	0	0%
	Data Centers	0	0%
	Others	1	10%

Appendix D: Reliability Test (Pilot Study)

Factors	Kod	Item	Alpha Cronbach
1. E-Commerce	F1 a	Growth of Online Retail	0.774
	F1 b	Demand for Fulfillment Centers	
	F1 c	Impact on Logistics and Supply Chain	
2. Location	F2 a	Proximity to Major Highways	0.856
	F2 b	Access to Public Transportation	
	F2 c	Distance to Urban Centers	
3. Market Trends	F3 a	Tenant Demand	0.876
	F3 b	Vacancy Rates	
	F3 c	Rental Rates	
4. Economic	F4 a	Economic Growth	0.862
	F4 b	Interest Rates	
	F4 c	Inflation Rates	
5. Technological Advancementt	F5 a	Automation	0.797
	F5 b	Energy Efficiency	
	F5 c	Smart Building Technologies	
6. Government Policies	F6 a	Zoning Regulations	0.846
	F6 b	Tax Incentives	
	F6 c	Environmental Regulations	
7. Infrastructure	F7 a	Quality of Roads	0.766
	F7 b	Availability of Utilities	
	F7 c	Proximity to Ports and Airports	
8. Environmental	F8 a	Sustainability Practices	0.940
	F8 b	Green Building Certifications	
	F8 c	Environmental Impact	



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