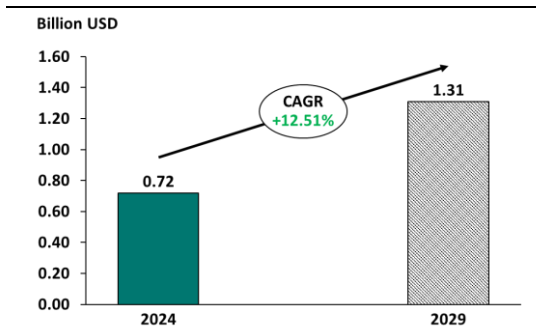


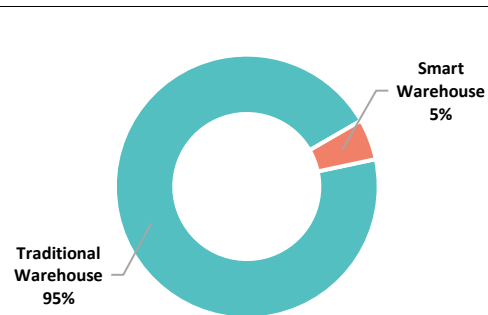
## Business Overview

- Smart Warehouse is a process of planning, operating, and controlling the movement and storage of goods within a warehouse using automated systems in an efficient and effective manner such as automated racking system, warehouse management systems (WMS) etc.** The goal is to reduce steps, minimize complexity, decrease the chances of errors, enhance accuracy in terms of quality and time, reduce accidents, and ensure the safety of personnel and assets. **The implementation of smart warehousing offers several advantages, including enhanced efficiency, precise inventory management, accelerated order processing, and reduced operational expenses.** The use of cutting-edge technologies enables warehouses to streamline storage space, mitigate errors, and boost overall productivity. The implementation of real-time data analytics and predictive maintenance further enhances operational reliability, enabling businesses to adapt to market demand. Furthermore, smart warehousing optimizes supply chain visibility, enabling businesses to monitor the flow of goods and ensure timely deliveries, thereby enhancing customer satisfaction.

**Figure 1 Smart Warehouse Market Size in ASEAN<sup>1</sup>**



**Figure 2 Share of Smart Warehouse in Thailand<sup>2</sup>**



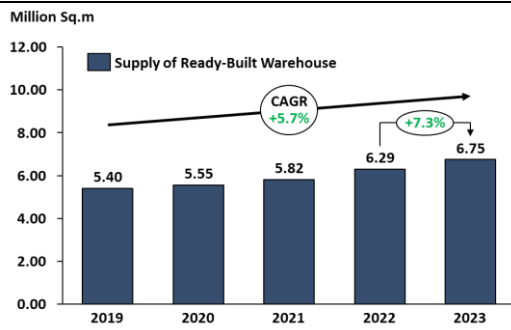
Source: LH Bank Business Research based on data from <sup>1</sup>Mordor Intelligence and <sup>2</sup>CBRE & KMITT (data as of 2021)

- The ASEAN Smart Warehouse Market is projected to reach a value of USD 0.72 billion in 2024 and is expected to grow to USD 1.31 billion by 2029,** with a compound annual growth rate (CAGR) of 12.51% during the forecast period (2024-2029). The market's growth in ASEAN will be driven by three key factors: increasing production complexity, technological advancements, and the rapid expansion of the e-commerce industry. Furthermore, the emergence of numerous startup firms with robust technological expertise and financial backing reinforces the market's expansion. **With investments in automation now a common occurrence across all industrial sectors, warehouse operators are increasingly turning to automation technologies with the aim of improving operational efficiency and productivity while reducing the time spent on handling tasks.** The ASEAN market is expected to experience a gradual expansion in the near future thanks to a range of investment and value-creation opportunities in the region. Increasing demand for e-commerce is expected to be the driving force for the industry in the future.
- Warehouse automation is becoming an essential tool for companies seeking a competitive advantage, particularly in the fast-growing e-grocery market,** where traders are facing challenges in keeping up with the rising number of transactions and related last-mile shipping needs. According to the International Trade Administration (ITA), the e-commerce market in Singapore is expected to reach USD 10 billion by 2026. **Moreover, Thailand's deployment of autonomous guide vehicles in industries and warehouses, with a focus on the healthcare sector, reached over 700,000 units in 2022,** according to the International Federation of Robotics. This growth is anticipated to continue in the coming years. During the forecast period, the expansion of the ASEAN market will be bolstered by the growing adoption of robotic technology across different industries.

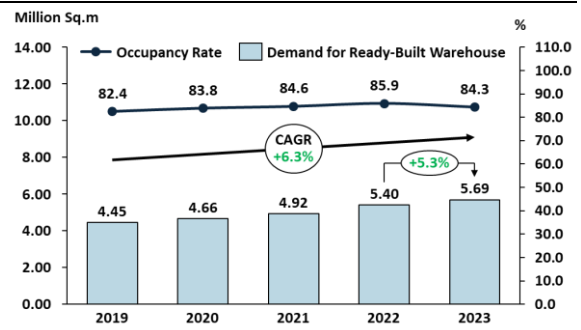
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**Figure 3 Supply of Ready-Built Warehouse in Thailand**

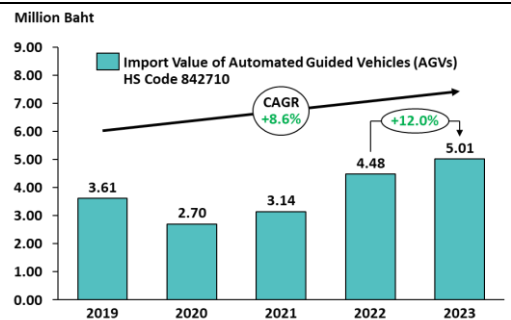


**Figure 4 Demand for Ready-Built Warehouse in Thailand**

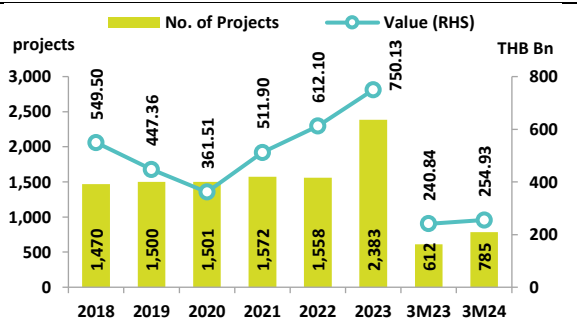


Source: LH Bank Business Research based on data from Knight Frank (Thailand) cited in WHART One Report 2023

**Figure 5 Thailand's Import Value of AGVs<sup>1</sup>**



**Figure 6 Investment Promotion Approved by BOI**



Source: LH Bank Business Research based on data from <sup>1</sup>The Customs Department and <sup>2</sup>BOI

- **The warehouse business in Thailand has been consistently expanding over the past five years. The compound annual growth rate (CAGR) of ready-built warehouse space was 5.7% over that period, while the demand for rental space grew at a CAGR of 6.3%.** This growth is driven by public infrastructure development, investment promotion, especially in the Eastern Economic Corridor (EEC), and the continuous expansion of the e-commerce sector. According to the latest data from Knight Frank (Thailand), the total supply of ready-built warehouse space reached 6.75 million sq.m. in 2023, representing a 7.3%YoY increase. Most of the rental warehouse space is concentrated in three main regions: Bangkok and its vicinity (45%), the EEC (38%), and the central and other regions (17%). The demand for ready-built warehouse space was 5.69 million sq.m., an increase of 5.3%YoY, resulting in an occupancy rate of 84.3%.
- **Despite the continued expansion of the warehouse business, the proportion of smart warehouse space remains relatively small. According to data from CBRE (Thailand) and the KMUTT Logistics Innovation Center in 2021, the proportion of smart warehouse space in Thailand is only 5% of the total warehouse space in the country.** This is due to the high cost of smart warehouse systems, which is approximately 15 times higher than that of traditional warehouses. However, the impact of the COVID-19 pandemic, which caused many warehouses to temporarily shut down due to widespread employee infections, has prompted operators to increasingly invest in developing smart warehouses. This is reflected in the value of imports of Automated Guided Vehicles (AGVs), which are mostly used in smart warehouse spaces. In 2023, the import value of AGVs was approximately THB 5.01 billion, representing a 12.0%YOY increase. This growth rate is higher than the CAGR at 8.6% per year during 2019-2023.
- **Furthermore, The Thai Warehouse Management Association reports that the overall investment landscape in the smart warehouse industry is expanding continuously in line with Thailand's investment conditions, especially in Eastern Economic Corridor (EEC) and the growing market demand, in particular driven by the growing of e-commerce.** It is expected that in 2023, investment in smart warehouses will expand by approximately 10-15% compared to the pre-COVID-19 period, with a value estimated at around THB 8,000 million.

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## Business Outlook

- **It is anticipated that the smart warehouse business in ASEAN will continue to experience robust growth. This is reflected in the compound annual growth rate (CAGR) during 2024-2029, which is as high as 12.51%.** The retail sector (including e-commerce) is an important contributor to this growth. Retailers will continue to utilize warehouse automation to keep pace with the rapidly growing e-commerce sector and the evolving expectations of consumers. In order to add value and maintain high brand standards, leading retailers are implementing automation solutions to optimize the final stage of their supply chain. In addition to managing a vast range of SKUs, they prepare and ship a significant volume of orders daily to a diverse range of locations. In light of these constraints, automation represents a highly effective solution for enhancing productivity, ensuring accuracy and expediting order picking operations. **In addition, according to The Business Times in Singapore, most companies intend to leverage their investments in new technology on several levels, with 76% intending to provide customers with a personalized shopping experience by installing identification systems in stores.** In addition to significant automation of operations (i.e. Automated Racking System, Automatic Guided Vehicles (AGVs), Automated Storage and Retrieval Systems) sensors and cameras are also expected to be used for warehouse management.
- **Likewise, the smart warehouse business in Thailand is expected to continue its positive growth trend.** According to the Thai Warehouse Management Association reports, the overall investment landscape in the smart warehouse industry is expanding in line with Thailand's investment conditions, particularly in the EEC area. This is reflected in the continued growth in the value of investment promotion approvals. **In 2023, there were 2,383 projects approved for investment promotion. The value of this total investment was THB 750.13 billion, which represents increases of 53.0% and 22.5%, respectively, from the previous year.** The sectors driving the growth of smart warehouse investment include food retailers, wholesale and retail traders, e-commerce, and manufacturing investments benefiting from the relocation of production bases due to geopolitical conflicts. Additionally, the smart warehouse business has growth opportunities from SMEs, which need to enhance their business capabilities to increase competitiveness. **However, the adoption of smart warehouse solutions by various SMEs is hindered by the significant investment and high upfront costs associated with implementing such systems.**

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