

Artificial Intelligence and the Evolution of Singapore's Foreign Trade

الذكاء الاصطناعي وتطور التجارة الخارجية لسنغافورة

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Abstract:

This research investigates the synergistic relationship between artificial intelligence (AI) and Singapore's evolution as a global trade hub. By examining AI's integration across the trade ecosystem, the study elucidates its impact on trade efficiency, competitiveness, and innovation. Specifically, AI's role in optimizing supply chains, enhancing predictive analytics, and automating customs processes is analyzed.

The findings reveal that AI has emerged as a critical enabler of trade operations, contributing to increased efficiency and cost reductions. Moreover, AI-driven platforms have facilitated cross-border trade by streamlining processes. However, the study also identifies challenges, such as the need for substantial AI infrastructure and talent development, as well as the imperative of addressing ethical considerations related to data privacy and algorithmic bias.

Keywords: Artificial Intelligence (AI) , Foreign Trade , cross-border trade , Singapore.

JEL Classification Codes: F10, O32, D83, K31 .

ملخص:

يدرس هذا البحث العلاقة التكاملية بين الذكاء الاصطناعي (AI) وتطور سنغافورة كمركز تجاري عالمي. من خلال فحص دمج تقنيات الذكاء الاصطناعي في مختلف مجالات النظام البيئي التجاري، تسعى هذه الدراسة إلى توضيح تأثير الذكاء الاصطناعي على كفاءة التجارة وقدرتها التنافسية والابتكار. يقوم البحث بتحليل دور الذكاء الاصطناعي في تحسين سلاسل الإمداد وتعزيز التحليلات التنبؤية وأتمتة العمليات الجمركية .

تكشف النتائج أن الذكاء الاصطناعي قد برز كعامل تمكين أساسي لعمليات التجارة، مما يساهم في زيادة الكفاءة وخفض التكاليف. علاوة على ذلك، سهلت المنصات التي تعمل بالذكاء الاصطناعي التجارة عبر الحدود من خلال تبسيط العمليات .

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ومع ذلك، حددت الدراسة أيضاً تحديات مثل الحاجة إلى بنية تحتية كبيرة للذكاء الاصطناعي وتطوير المواهب، فضلاً عن ضرورة معالجة الاعتبارات الأخلاقية المتعلقة بخصوصية البيانات والتحيز الخوارزمي.

كلمات مفتاحية: ذكاء اصطناعي ، تجارة خارجية، تجارة عبر الحدود، سنغافورة.

تصنيفات JEL : F10 ، O32 ، D83 ، K31

1. INTRODUCTION

Singapore serves as a prime exemplar of a globalized economy, having solidified its position as a preeminent international trade center. The nation's strategic geographic location, coupled with robust infrastructure and forward-thinking policies, has been instrumental in its ascent to a dominant role in global commerce.

Singapore has concurrently emerged as a global pioneer in technological innovation, positioning itself at the vanguard of artificial intelligence (AI) advancements. The city-state's strategic vision, underpinned by substantial research and development investments, has fostered a conducive environment for AI maturation.

The convergence of AI and international trade presents a transformative opportunity. This research investigates the symbiotic relationship between these domains, analyzing how AI technologies are reconfiguring trade processes, augmenting efficiency, and generating novel opportunities.

➤ Research Problematic:

Consequently, the following research problem was formulated :

How does artificial intelligence (AI) influence the strategic positioning of Singapore as a global trade hub?

To further explore the core research problem, the following research questions are posited :

- 1) To what extent has Singapore's foreign trade directly contributed to its evolution as a global financial center?
- 2) What are the primary challenges and opportunities confronting Singapore in sustaining its position as a leading global financial center amidst evolving trade dynamics and increasing global competition?
- 3) How does AI enhance supply chain efficiency and logistics operations

in Singapore's international trade?

➤ **Hypotheses:**

The present study seeks to verify the following hypotheses :

Hypothesis 1: The adoption of AI technologies will significantly enhance Singapore's global trade competitiveness by optimizing logistics and supply chain operations.

Hypothesis 2: AI-driven data analytics will enable Singapore to identify new market opportunities and tailor trade strategies accordingly, strengthening its global trade position.

Hypothesis 3: Singapore's investment in AI research and development will foster a robust AI ecosystem, leading to the development of innovative trade solutions and maintaining its global trade leadership.

➤ **Research Objectives:**

Based on the research problem, the following objectives are established:

- Examine the current state of artificial intelligence (AI) adoption within Singapore's international trade sector.
- Identify specific AI technologies and applications that have the potential to significantly impact Singapore's trade operations.
- Analyze the ways in which AI can enhance various stages of the international trade process.
- Assess the potential benefits and challenges associated with AI implementation in Singapore's trade ecosystem.

➤ **Research methodology :**

This investigation employs a descriptive research methodology to comprehensively assess the influence of artificial intelligence (AI) on Singapore's global trade hub status. The study seeks to elucidate the fundamental concepts, roles, and contributions of AI in fostering Singapore's foreign trade through a rigorous examination of scholarly literature. To provide in-depth contextual understanding, a case study approach is adopted in conjunction with statistical analysis to evaluate AI's impact on key trade performance indicators in Singapore

2. Foreign Trade as a Catalyst for Singapore's Global Financial Center Status

Singapore serves as a compelling case study in rapid economic development. Historically a preeminent maritime trading hub due to its strategic geographical location, the city-state's trajectory transformed dramatically in the latter half of the 20th century, culminating in its status as a global economic powerhouse.

1.1. Key Features of Singapore's Foreign Trade:

Dependence on Trade Singapore's economy is heavily reliant on external trade, with international commerce constituting a substantial component of its Gross Domestic Product.

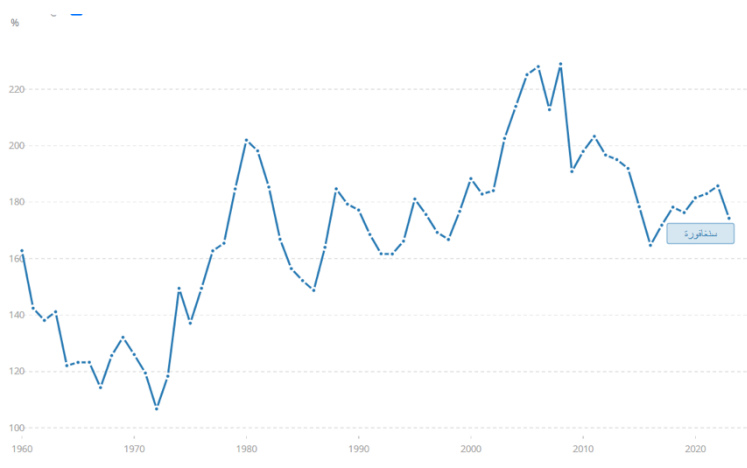
1.1.1. The Dynamics of Singapore's Export-Import Relationship

Singapore stands as a paradigmatic example of an open economy that has capitalized on its strategic geographic positioning and sophisticated infrastructure to emerge as a global trading epicenter. The intricate correlation between the nation's export and import functions has been instrumental in shaping its economic trajectory. This section seeks to elucidate the dynamics underpinning Singapore's export-import relationship.

▪ Analysis of Singapore's export structure :

Singapore derives a significant portion of its revenue from foreign trade. Its largest export, accounting for 43% of total exports, is machinery and equipment. The country also exports petroleum (19%), chemical products (13%), miscellaneous manufactured products (8%), and fuel products (7%). Singapore's primary export partners include: China (15% of total exports), Hong Kong (12%), Malaysia (11%), Indonesia (8%), the United States (6%), and Japan (5%). **(TRADING ECONOMICS, 2024)**

Figure 01 : Exports of goods and services (% of GDP) - Singapore, 1960-2023



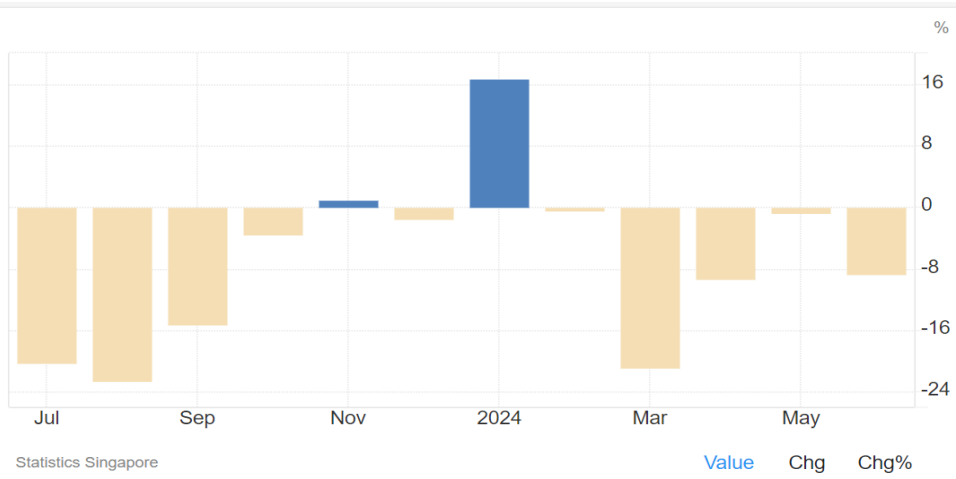
Source : (World Bank data, 2024)

The graph displays the evolution of Singapore's goods and services exports as a percentage of its Gross Domestic Product (GDP) from 1960 to 2023. The data presented graphically illustrates a sustained upward trajectory in Singapore's export ratio over the past several decades, underscoring the pivotal role of foreign trade in driving the nation's economic growth. Periods of accelerated export growth, particularly during the 1970s, 1980s, and 1990s, are evident. Subsequently, the export ratio has exhibited relative stability, indicative of a mature export-oriented economy.

Several factors have contributed to this remarkable export performance. Prudent economic policies, characterized by the attraction of foreign direct investment, streamlined customs procedures, and robust infrastructure development, have created a conducive environment for trade. The nation's industrial transformation from an agrarian base to a manufacturing powerhouse focused on high-value-added sectors, such as electronics and petrochemicals, has significantly enhanced export competitiveness. Furthermore, Singapore's seamless integration into global supply chains has expanded market access and fostered economic dynamism. In recent years, the burgeoning services sector, encompassing finance and logistics, has emerged as a critical component of the export landscape.

The following graph presents projected annual growth rates for Singapore's non-oil domestic exports (NODX) spanning July 2024 to May 2025.

Figure 02 : Singapore - Annual Growth Rate of Non-oil Domestic Exports



Source : (TRADING ECONOMICS, 2024)

A pronounced volatility in these growth rates is evident, suggesting that Singapore's NODX sector is susceptible to short-term economic disturbances and global macroeconomic conditions.

Singapore's NODX predominantly comprises electronic products, notably integrated circuits, and chemical goods. The performance of this export sector is significantly influenced by a confluence of factors, including global demand dynamics, trade policies, and geopolitical developments.

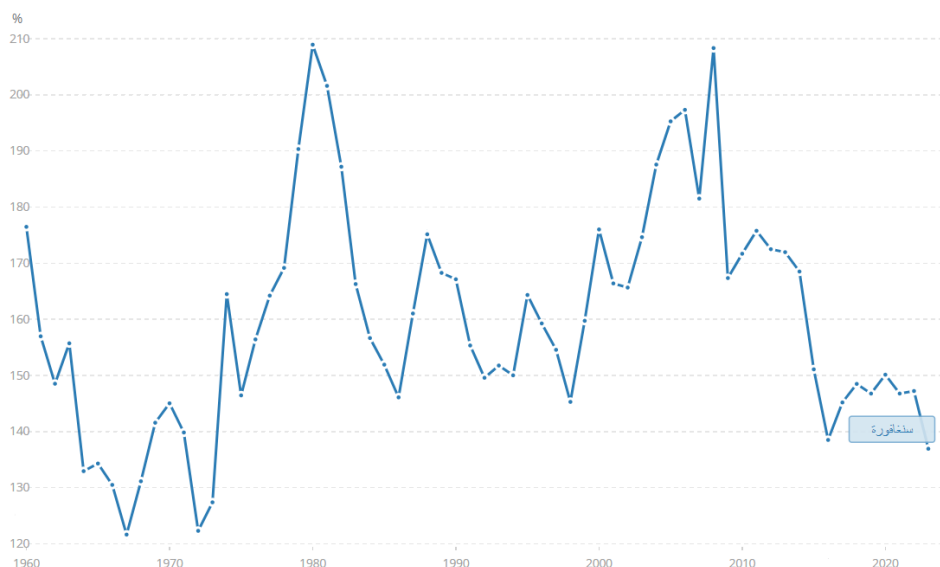
The observed fluctuations underscore the imperative of vigilant monitoring of the global economic landscape, strategic diversification of export markets, and the cultivation of a robust domestic industrial competitiveness to sustain the growth trajectory of Singapore's NODX.

▪ **Analysis of Singapore's Imports structure :**

Singapore's imports reflect its dynamic and diversified economy. By understanding the structure of imports and the primary trading partners, we can gain a deeper insight into the strengths and weaknesses of the Singaporean economy.

Singapore's diminutive domestic market and strategic geographic position necessitate a substantial reliance on imports to sustain economic growth. Empirical evidence, as reflected in the upward trajectory of import values over time, corroborates this assertion. Such growth is intrinsically linked to the nation's economic expansion and the commensurate escalation in demand for goods and services. The data further underscores the susceptibility of Singapore's import sector to global economic fluctuations, exhibiting pronounced correlations with international business cycles.

Figure 03 : Imports of goods and services (% of GDP) - Singapore, 1960-2023



Source : (World Bank data, 2024)

Analysis of Singapore's Imports Based on the Provided graph
Introduction Singapore, a global trade hub, relies heavily on foreign trade to fuel its economy.

The graph shows a steady increase in Singapore's imports as a percentage of GDP from 1960 to 2023; this indicates that Singapore has become increasingly dependent on foreign goods and services over the past six decades.

Import composition has evolved in tandem with Singapore's industrial transformation, shifting from an agrarian base towards a manufacturing and service-oriented economy. Consequently, demand for intermediate inputs

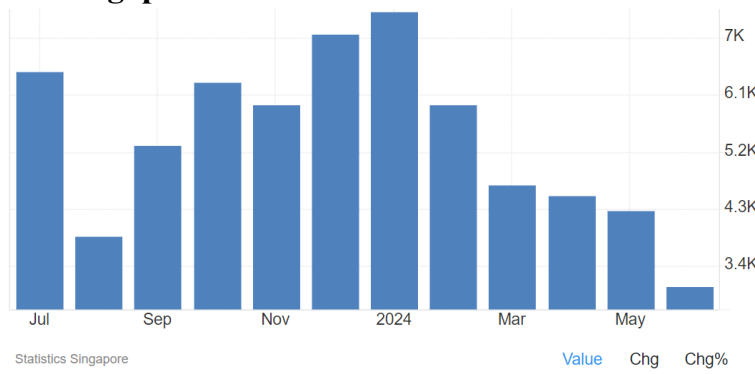
has surged. Moreover, the intensification of globalization has facilitated access to a broader spectrum of foreign goods, thereby expanding import possibilities. Rising domestic incomes have fueled consumer expenditure, augmenting demand for imported consumer products. The steady increase in Singapore's import-to-GDP ratio since 1960 attests to the deepening integration of the domestic economy into global supply chains.

Singapore's import profile is heavily reliant on machinery and equipment, particularly electronics. The country also imports significant amounts of crude oil for energy needs. While these are the primary imports, a diverse range of manufactured goods and chemicals also contributes to the import mix. China and Malaysia are key trading partners, with other major contributors including the United States, South Korea, Japan, and Indonesia. (TRADING ECONOMICS, 2024)

1.1.2. An Analysis of Singapore's Trade Balance

Singapore, a global trade hub, has consistently demonstrated a remarkable ability to navigate the complexities of international commerce. Central to understanding Singapore's economic prowess is an examination of its trade balance.

Figure 04 : Singapore's trade balance



Source : (TRADING ECONOMICS, 2024)

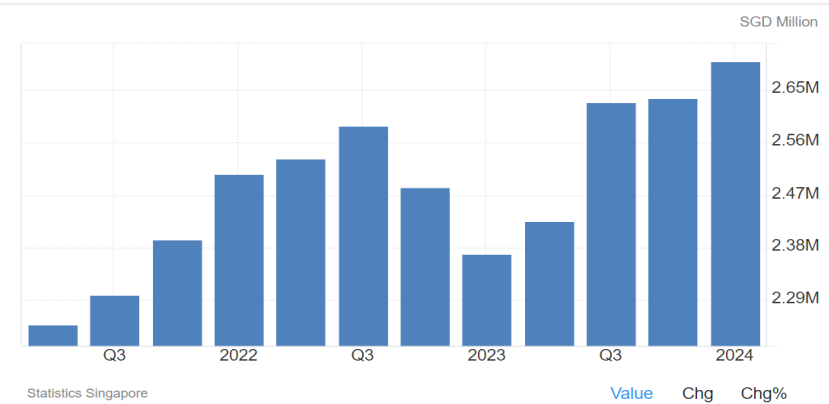
The graph depicts pronounced fluctuations in Singapore's trade balance over the twelve-month period from July 2023 to June 2024. The data series exhibits considerable volatility, characterized by significant peaks and troughs. These variations are attributable to a confluence of factors, including shifts in global demand for Singaporean exports, volatility in commodity prices, and the influence of geopolitical events on

international trade. Additionally, seasonal patterns linked to holidays and climatic conditions may contribute to observed fluctuations in the trade balance.

1.1.3. Singapore's foreign debt

Singapore, a preeminent global financial hub, is widely recognized for its robust economic performance and conservative fiscal stance. Notwithstanding its reputation for financial prudence and substantial sovereign wealth reserves, a comprehensive examination of the nation's foreign debt profile is warranted.

Figure 05 : The External Debt of Singapore



Source : (TRADING ECONOMICS, 2024)

The graph reveals a consistent upward trajectory in Singapore's external debt throughout the specified quarters. This sustained growth signifies a persistent dependence on external financing to underpin domestic economic activities. essential drivers of this trend include infrastructure development, investment projects, and government fiscal operations. Notably, despite its diminutive territorial expanse, Singapore's burgeoning external debt underscores its pivotal position as a global financial center and its involvement in substantial economic undertakings. Given its open economic structure and regional economic prominence, Singapore's borrowing patterns are likely influenced by the vicissitudes of the global economic environment.

1.1.4. Singapore's Maritime and Shipping Preeminence

Singapore has solidified its position as a global maritime and shipping powerhouse, leveraging its strategic geographic location and robust infrastructure.

Table 01 : The most performant countries in the international shipments performance index

Economy	International Shipments Score	International Shipments Grouped Rank
Finland	4,1	1
Singapore	4,0	2
Hong Kong SAR, China	4,0	2
Austria	3,8	4
Belgium	3,8	4
United Arab Emirates	3,8	4
Greece	3,8	4

Source : (World Bank data, 2024)

The table highlights a robust performance in international shipments for Singapore, ranking second with a score of 4.0. This positions Singapore as a global leader in facilitating international trade. Its high ranking, tied with Hong Kong SAR, China, underscores its strategic location, efficient infrastructure, and business-friendly environment.

1.1.5. Infrastructure and Logistics in Singapore

In today's interconnected global marketplace, logistical efficiency plays a pivotal role in economic success. This analysis aims to benchmark the performance of leading nations in the logistics sector, with a particular focus on Singapore.

Table 02 : The most performant countries in LPI Score

Economy	LPI Score	LPI Grouped Rank
Singapore	4,2	1
Switzerland	4,1	2
Denmark	4,1	2
Finland	4,0	4

Canada	4,0	4
Sweden	4,0	4

Source : (World Bank data, 2024)

The provided table presents a comparative analysis of countries based on their Logistics Performance Index (LPI) scores, a metric quantifying the efficiency and reliability of logistics services. Singapore emerges as a frontrunner with a LPI score of 4.2, indicative of exceptional logistical capabilities. This preeminent position is attributable to several key factors. Firstly, Singapore possesses a sophisticated infrastructure network encompassing advanced port, airport, and highway facilities, thereby optimizing goods movement. Secondly, a stable political climate, transparent regulatory framework, and skilled workforce render the country an attractive business destination. Thirdly, Singapore's strategic geographic location in Southeast Asia positions it as a pivotal global shipping hub. Finally, the nation has been at the vanguard of technological integration within its logistics sector, leveraging automation and data analytics to enhance operational efficacy.

1.2. Reasons for the Success of Singapore's Foreign Trade:

Singapore's economic ascension to a global powerhouse is inextricably linked to its strategic investments in infrastructure development. The construction of a robust transportation network, encompassing state-of-the-art ports, airports, and highways, has been instrumental in facilitating the efficient movement of goods and people, thereby underpinning the nation's economic growth.

Table 03 : Global Infrastructure Index: A Comparison of Leading Economies

Economy	Infrastructure Score	Infrastructure Grouped Rank
Singapore	4,6	1
Switzerland	4,4	2
Canada	4,3	3
Germany	4,3	3
Finland	4,2	5
Netherlands	4,2	5

Sweden	4,2	5
Japan	4,2	5
Denmark	4,1	9

Source : (World Bank data, 2024)

The table presents a comparative analysis of national infrastructure development, as quantified by an infrastructure score. Singapore is identified as a preeminent leader in this domain, with Switzerland occupying a proximate position. This ranking underscores Singapore's substantial investment in and unwavering commitment to the construction and maintenance of a world-class infrastructure network.

Key determinants of Singapore's infrastructure excellence encompass strategic planning, efficient governance, a resolute focus on quality, and the seamless integration of advanced technologies. The resultant robust infrastructure has proven instrumental in catalyzing economic growth, attracting foreign direct investment, and enhancing the overall quality of life for Singaporean citizens. Singapore's conducive environment, characterized by political and economic stability, has fostered an attractive climate for foreign direct investment.

Moreover, the nation boasts a highly skilled and educated workforce, optimally aligned with the demands of the trade sector. The Singaporean government's implementation of sound economic policies has further cultivated a business-friendly environment conducive to trade and investment.

3. The impact of Artificial Intelligence on Singapore's foreign trade development

Singapore has established itself as a premier global financial center, distinguished by a robust regulatory framework and strategic geographic positioning. In recent years, the city-state has experienced rapid growth in the fintech sector, fundamentally altering the financial landscape.

1.3. An Assessment of Singapore's Artificial Intelligence Readiness Index

Artificial intelligence (AI) has emerged as a disruptive force, profoundly reshaping industries and economies worldwide. Singapore, characterized by its technological acumen and forward-thinking policies,

has positioned itself as a global leader in AI development and implementation.

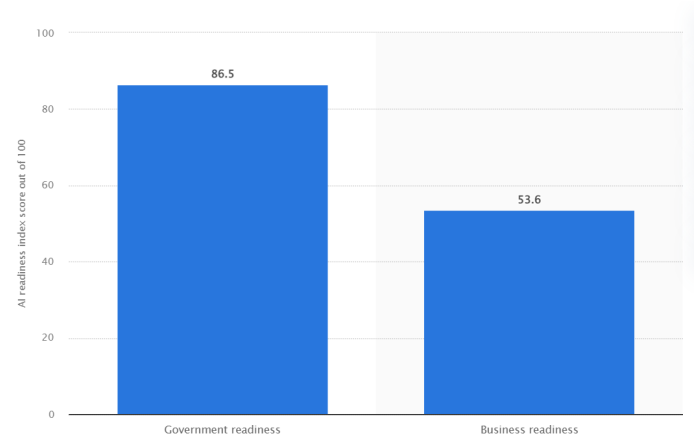
Table 04: Ranking of Leading Economies

	Overall	Talent	Infrastructure	Operating Environment	Research	Development	Government Strategy	Commercial
	↓	↕	↕	↕	↕	↕	↕	↕
 United States	1	1	1	28	1	1	8	1
 China	2	20	2	3	2	2	3	2
 Singapore	3	4	3	22	3	5	16	4
 United Kingdom	4	5	24	40	5	8	10	5
 Canada	5	6	23	8	7	11	5	7
 South Korea	6	12	7	11	12	3	6	18

Source : (Cesareo & White, 2024)

Countries are ranked by their AI capacity at the international level. This is the fourth iteration of the Global AI Index, published on 28 June 2023. **The Global AI Index evaluates countries' AI capabilities across seven key areas ; talent, infrastructure, regulatory environment, research, development, government support, and commercialization.** It combines data from various sources to provide a comprehensive assessment. (Cesareo & White, 2024)

Figure 06 : Artificial intelligence (AI) readiness index score of Singapore in 2023, by sector

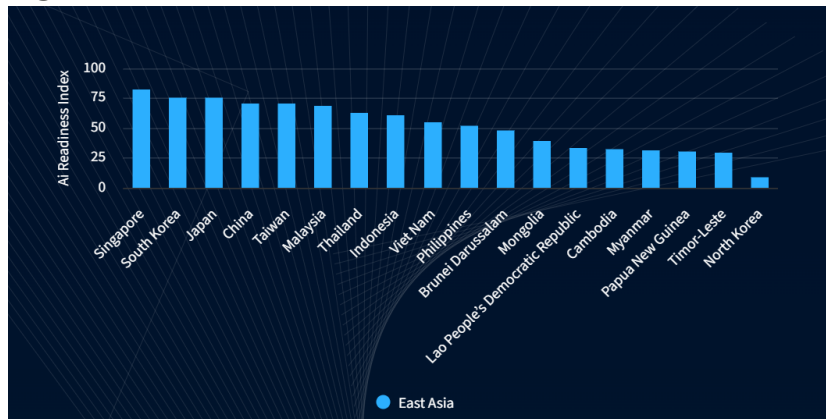


Source : (Romero, 2024)

In 2023, in an index to assess artificial intelligence (AI) readiness, Singapore scored 86.5 out of a hundred for government readiness, and 53.6 for business readiness. Government readiness is based on various indicators

to assess the level to which public sector actors enable AI through funds and frameworks. Consumer readiness is defined by the way consumers perceive, understand and trust AI. Business readiness represents the level of equipment in the private sector to adopt AI

Figure 07: Government AI Readiness Index 2023



Source : (Government AI Readiness Index 2023, 2024)

The presented data visualizes a comparative analysis of Artificial Intelligence (AI) readiness across East Asian nations. Singapore emerges as a preeminent entity within this context, exhibiting a pronounced capacity for AI integration and utilization. A substantial disparity in AI maturity is evident between the leading economies—Singapore, South Korea, and Japan—and their regional counterparts. This regional cluster, particularly the aforementioned trio, has solidified its position as a global epicenter for AI research, development, and deployment.

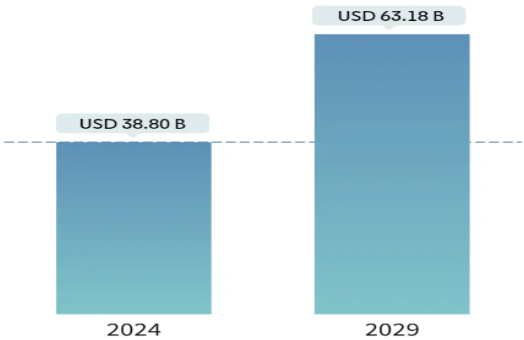
Singapore's sustained dominance in the AI Readiness Index underscores its strategic commitment to technological advancement and its proficiency in harnessing AI as a catalyst for economic progress.

1.4. Analysis of Singapore's Fintech Market

This part delves into a comprehensive analysis of Singapore's fintech market, examining its growth trajectory, key players, regulatory landscape, and challenges.

Figure 08 : Singapore Fintech Market Size

Singapore Fintech Market
Transaction Value in USD Billion
CAGR 10.24%

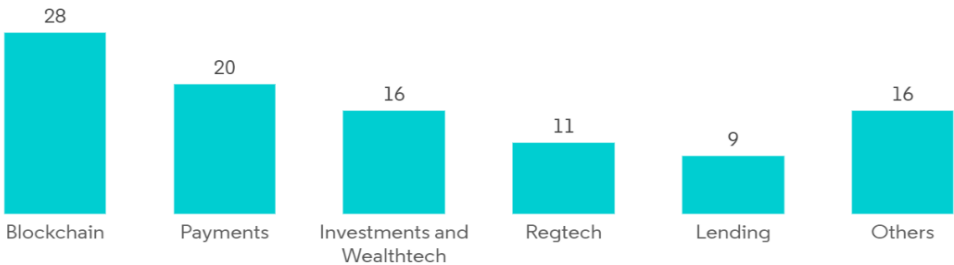


Source : (Mordor Intelligence, 2024)

The provided graph illustrates a substantial expansion of Singapore's fintech market between 2024 and 2029. The Singaporean fintech market is projected to experience substantial growth in transaction value, expanding from US\$38.80 billion in 2024 to US\$63.18 billion by 2029, exhibiting a compound annual growth rate (CAGR) of 10.24% over the forecast period (2024-2029)

This CAGR indicates a robust and accelerating growth trajectory for the fintech sector in Singapore during the forecast period. The data suggests a growing reliance on technology-driven financial solutions within both the corporate and consumer domains.

Figure 09 : Fintech Sector Distribution in Singapore, 2021



Source : (Mordor Intelligence, 2024)

The provided graphical representation offers a comprehensive overview of the sectoral distribution within Singapore's fintech industry during the calendar year 2021. A salient characteristic of this data is the pronounced predominance of blockchain technology, which constitutes a

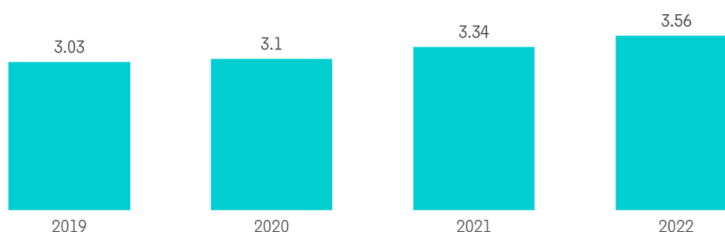
substantial 28% of the total fintech activities. This significantly overshadows the contributions of other sectors, encompassing payments, investments, wealth management, regulatory technology, and lending.

The concentrated emphasis on blockchain underscores its pivotal role in shaping the trajectory of Singapore's financial services sector. This prominence can be attributed to the heightened interest exhibited by investors and entrepreneurial endeavors in blockchain-driven innovations, exemplified by cryptocurrencies and decentralized systems.

1.5. Fintech and Cross-Border Facilitation for Customers and Partners

Singapore's fintech market has demonstrated a remarkable capacity to expand its cross-border reach, thereby creating ample opportunities for industry growth and innovation. This achievement can be attributed to several factors, including a favorable regulatory environment, a highly educated and technologically proficient population, and a robust financial infrastructure. Numerous Singaporean fintech companies have successfully scaled their operations into other regional markets. For instance, Grab, a transportation and fintech company, has expanded its services across multiple Southeast Asian nations, thereby securing access to a significantly larger customer base. Singapore's hosting of international events, such as the Singapore Fintech Festival, provides fintech firms with platforms to showcase their solutions to a global audience. These events further enhance the cross-border reach of fintech companies, facilitating connections with customers and partners worldwide. (Mordor Intelligence, 2024)

Figure 10: Increasing Foreign users In Singapore Fintech, Users in Million, 2019-2022



Source : (Mordor Intelligence, 2024)

The graph depicts a steady increase in the number of foreign users in Singapore's fintech sector from 2019 to 2022. The numerical values demonstrate a consistent increase in the user count, starting from approximately 3.03 million users in 2019 and reaching around 3.56 million users by 2022. This growth can be attributed to a combination of factors such as investment attractiveness, government support, technological advancements, and Singapore's global reputation.

1.6. The Role of AI in Foreign Trade

Artificial intelligence (AI) holds significant potential to revolutionize international trade. While its impact on productivity is still debated, AI can enhance trade through various channels. These include increased efficiency in supply chains, reduced trade costs, and improved decision-making. However, challenges such as the "modern productivity paradox" and the need for further research to establish concrete empirical evidence persist. **(Ferencz, González, & García, p. 12)**

Artificial intelligence (AI) has the potential to significantly influence international trade dynamics beyond the traditional production and sales stages. By optimizing investment portfolios, enhancing market intelligence through data analytics, and facilitating cross-border payments, AI can optimize business operations and decision-making processes. Moreover, AI-driven advancements in financial innovation can streamline trade-related financial transactions. **(Yin & Sieng, 2024, p. 158)**

1.7. CHALLENGE :

In the context of a highly globalized economy such as Singapore's, artificial intelligence (AI) presents a transformative potential for international trade. By enabling predictive analytics, automating customs procedures, and optimizing various operational processes, AI can contribute to cost reduction and efficiency gains. Nonetheless, the integration of AI into trade systems is fraught with challenges. Issues related to data privacy, ethical implications, regulatory inconsistencies, and the potential exacerbation of digital divides necessitate careful consideration and standardized frameworks. **(Tan, 2024)**

The advent of artificial intelligence (AI) has precipitated widespread apprehension regarding job security. Singapore, aspiring to a global

leadership role in AI, has proactively addressed these concerns through a concerted effort to enhance workforce capabilities. Since its inception in 2015, the SkillsFuture Initiative has offered subsidized training programs to citizens and residents aged 25 and above, encompassing a vast array of courses and career transition support. The program's substantial impact is evident in the participation of approximately 520,000 individuals in 2023 alone. As a result of these strategic initiatives, Singapore's workforce has gained global recognition for its rapid adoption of AI skills. (Lung, 2024)

4. CONCLUSION

The integration of artificial intelligence (AI) into Singapore's international trade landscape is transforming the nation's role as a global trade hub. This study has demonstrated the multifaceted impact of AI on trade operations, the findings of this study demonstrate a symbiotic relationship between artificial intelligence (AI) and Singapore's international trade. AI has emerged as a critical enabler, enhancing various facets of trade operations and contributing significantly to Singapore's global trade leadership.

Specifically, the research revealed that AI applications in areas such as supply chain optimization, predictive analytics for market trends, and automated customs clearance have led to increased efficiency and cost reductions for businesses operating within Singapore's trade ecosystem. Additionally, AI-driven platforms have facilitated cross-border trade by streamlining documentation processes and reducing transaction times.

However, the study also identified challenges, such as the need for substantial investments in AI infrastructure and talent development to fully realize the potential benefits. Furthermore, ethical considerations related to data privacy and algorithmic bias require careful attention.

Overall, the results underscore the transformative power of AI in reshaping Singapore's international trade landscape. By capitalizing on AI's capabilities, Singapore can further solidify its position as a global trade hub and remain at the forefront of technological innovation.

Study recommendations:

Based on the findings of this research, several recommendations can be formulated to further enhance Singapore's position as a global trade leader through AI integration:

- Singapore should prioritize investments in AI infrastructure, such as high-performance computing capabilities and data centers, to support the growth of AI applications in trade ;
- Fostering public-private partnerships can facilitate knowledge sharing, resource optimization, and the development of innovative AI solutions ;
- To ensure the ethical and responsible use of AI in trade, Singapore should strengthen its data governance and privacy frameworks ;
- Continuous investment in research and development is essential to maintain Singapore's competitive edge in AI for trade.

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