*Social Sciences and Humans Review*
*Available online at https://www.asjp.cerist.dz/en/PresentationRevue/65*

**ISSN: 1112-685X** **Vol : 19 / Issue: 01 /June 2026**
**EISSN: 2588-2236** **PP : 98 - 116**

# *Digital Transformation as a Driver of Economic Development in Malaysia: Focus on the Agriculture Sector*

# التحول الرقمي كدافع للتنمية الاقتصادية في ماليزيا: التركيز على قطاع الزراعة

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***Received: 02/11/2024 Accepted :18/03/2026 Published :10/06/2026***

**Abstract:**

This study analyzes the impact of digital transformation on Malaysia's economic development, specifically targeting low productivity in the agricultural sector through policy and growth evaluation.

The findings indicate that digital transformation significantly enhances productivity and market access across sectors. However, the agricultural sector faces critical barriers, including limited digital infrastructure and low digital literacy among farmers, which restricts its full potential for digital integration. The study points out that it requires improved digital governance frameworks and increased digital literacy in rural communities to ensure inclusive development. Among the suggestions are grants for small and medium-sized enterprises (SMEs) to help with digital adoption, initiatives to teach specific digital skills, and the expansion of digital infrastructure in rural areas. Additionally, the study suggests strengthening public-private partnerships to promote digital innovation in agriculture and enhancing cyber security frameworks for data protection.

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**Keywords**: Digital Transformation, Economic Development, Economic Growth, Digital Agriculture, Malaysia

**الملخص:**

تهدف هذه الدراسة إلى دراسة تأثير التحول الرقمي على التنمية الاقتصادية في ماليزيا، وبيان سياسات دولة ماليزيا في دعمها لسياسات ومجالات التحول الرقمي من أجل تحقيق التنمية الاقتصادية في البلاد، مع التركيز على القطاع الزراعي ذي الإنتاجية المنخفضة مقارنة بالقطاعات الأخرى. تم استخدام منهجية وصفية تحليلية تجمع بين تحليل السياسات وتقييم إحصائي لمعايير الإنتاجية والنمو، إلى جانب استكشاف تحديات تبني الحلول الرقمية. وأظهرت النتائج أن التحول الرقمي يعزز الإنتاجية ويوسع الوصول إلى الأسواق في مختلف القطاعات، غير أن القطاع الزراعي يعاني من عوائق تتضمن ضعف البنية التحتية الرقمية وانخفاض الوعي الرقمي لدى المزارعين. توصي الدراسة بتوسيع البنية التحتية الرقمية في المناطق الريفية، وتنفيذ برامج تدريبية مخصصة لتطوير المهارات الرقمية، وتقديم دعم مالي للمشروعات الصغيرة والمتوسطة لتسريع اعتماد التقنيات الرقمية. كما تقترح تعزيز الشراكات بين القطاعين العام والخاص لدعم الابتكار الرقمي في الزراعة وتحسين أطر الأمن السيبراني لضمان حماية البيانات.

**الكلمات المفتاحية**: التحول الرقمي، التنمية الاقتصادية، النمو الاقتصادي، الزراعة الرقمية، ماليزيا.

## *1/ Introduction*

Digital transformation is a fundamental driver in reshaping modern economies, characterized by integrating advanced technologies that bridge physical and digital domains. This evolution in digital technology impacts various sectors, creating efficiencies, fostering innovation, and enabling new business models. Digital transformation also drives a competitives advantages by improving operational processes, expanding market reach, and enhancing overall economic productivity. Organization for Economic Corporation and Development (The OECD) describes this shift as transitioning from analog processes to digitized, interconnected systems that redefine organizational activities and capabilities. As economies increasingly adopt digital strategies, understanding the broader implications of economic development becomes crucial. The transformative effects of digitalization particularly in emerging economies have made digital transformation a vital focus for sustained economic growth, promising greater inclusivity, efficiency, and resilience in the face of global challenges.

In Malaysia, economic development strategies prioritize digital transformation, viewing it as essential for achieving sustained growth, especially post-pandemic. Malaysia has progressively integrated digital policies across multiple sectors, including agriculture, to bolster economic resilience and improve productivity. The government's efforts to digitize agriculture align with national objectives of enhancing food security, increasing competitiveness, and fostering environmental sustainability.

***Research Problem:***

The research problem centers on understanding how digital transformation impacts economic development in Malaysia, with a specific focus on the agricultural sector. Malaysia has made significant strides towards integrating digital tools in various sectors. However, challenges remain, particularly in agriculture, where productivity growth is stagnant, digital adoption is low, and economic contributions are limited compared to other sectors. The study aims to analyses the effectiveness of Malaysia's digital transformation policies and their role in enhancing economic growth, productivity, and competitiveness, particularly in agriculture.

***Research Sub-questions:***

- How does digital transformation influence economic development in Malaysia, and what are the primary outcomes observed in various sectors?
- How does Malaysia adopt specific digital policies to enhance productivity in the agricultural sector?
- To what extent has digital transformation improved Malaysia's agricultural productivity, efficiency, and economic contribution?
- What are the primary challenges hindering digital adoption in Malaysia's agricultural sector, and how can they be addressed?
- How does Malaysia's digital transformation strategy compare with similar efforts in other high-performing East Asian economies?

***Hypotheses:***

- **Hypothesis 01:** Digital transformation positively impacts economic growth in Malaysia, especially by enhancing productivity, efficiency, and competitiveness across various sectors;
- **Hypothesis 02:** Digital transformation in the agricultural sector is directly linked to improvements in productivity, reduced costs, and increased market access;
- **Hypothesis 03**: The adoption of digital technologies in agriculture is hindered by challenges such as low digital literacy, limited infrastructure in rural areas, and investment in digital skills;

***Significant of the Research:***

This research is significant due to its focus on digital transformation as a catalyst for economic development in Malaysia, a country actively pursuing digitalization to improve its competitiveness. The study highlights the impact of digital transformation on a critical sector -agriculture- which, despite being vital to food security and employment, has lagged in productivity growth. By exploring Malaysia's digital policies and their effectiveness in addressing challenges in the agricultural sector, this research offers valuable insights for policymakers, business leaders, and researchers to understand how digital solutions can bridge productivity gaps, foster economic growth, and contribute to sustainable development in emerging economies.

***Aims and Objectives:***

This research aims to analyze the impact of digital transformation on Malaysia's overall economic growth while examining the effectiveness of national digital policies in enhancing agricultural productivity. Furthermore, it seeks to identify the critical challenges hindering digital adoption within the sector to propose viable solutions. Finally, the study adopts a comparative approach, evaluating Malaysia's digital efforts against other East Asian economies to highlight best practices and strategic areas for improvement.

***Research Methodology:***

Using a descriptive-analytical methodology, this research synthesizes existing literature and analyzes quantitative data from tables and figures to support its findings.

***Literature Review:***

The previous studies reviewed focused on digital transformation and sustainable development across various contexts. (Goi, 2023) aims to investigate the role of digital transformation in achieving Malaysia's Sustainable Development Goals (SDGs), highlighting its impact on economic development, social progress, and environmental protection. This study concludes that Malaysia has a favorable environment for leveraging digital technologies to address social challenges and promote a green economy. (Turner, Nadiah , & Nan , 2024) examine the impact of digital transformation on Malaysia's labor market, focusing on human capital challenges such as critical skill shortages (CSS), remote work (WFH), and work-life balance. This research, aligned with SDG 8 (decent work and economic growth), reveals that digital transformation reshapes labor demands and skills, intensifying Malaysia's existing labor market challenges. Finally, (Valentyna , et al., 2023) explore the digital transformation and rapid economic growth in China, Malaysia, and India, focusing on the 5G industry. Using Agile methodology and forecasting techniques, this study analyses how these countries adapt to digitalization challenges, concluding that rapid technological advancement, AI, and cybersecurity are critical drivers of innovation.

## *2/ Theoretical Framework for Digital Transformation and Economic Development:*

### *2.1. Digital Transformation Definition*

Researchers have given a number of meanings of "digital transformation" The most important ones are shown in the table below:

***Table 1. Digital Transformation Definition***

| Source | Definition |
|---|---|
| **Européen Commission** | "Digital transformation is characterized by a fusion of advanced technologies and the integration of physical and digital systems, the predominance of innovative business models and new processes. |
| **OECD** | "Digitalization is the use of digital technologies and data as well as their interconnection which results in new or changes to existing activities." |
| **Schweitzer** | "The application of technology to build new business models, processes, software and systems that result in more profitable revenue, greater competitive advantage, and higher efficiency." |
| **Deloitte** | "Digital transformation is the use of technology to radically improve the performance or reach of an organization, In a digitally transformed business, digital technologies |

**Source:** (Natalja & Jelena, 2019, p. 721)

Digital transformation is a long-term plan to change businesses by using digital technologies to make them more effective and meet customers' changing needs. It is built on turning data and information into something of value, which helps businesses be more competitive, come up with new ideas, and change to the needs of the modern market**.**

The orientation of countries toward digital transformation strategies since the dawn of the new millennium was not a mere coincidence. Rather, it emerged from the convergence of various new factors that contributed to the rise of governmental digital transformation strategies. (Roulami, 2022, p. 81)

### *2.2. Components of Digital Transformation:*

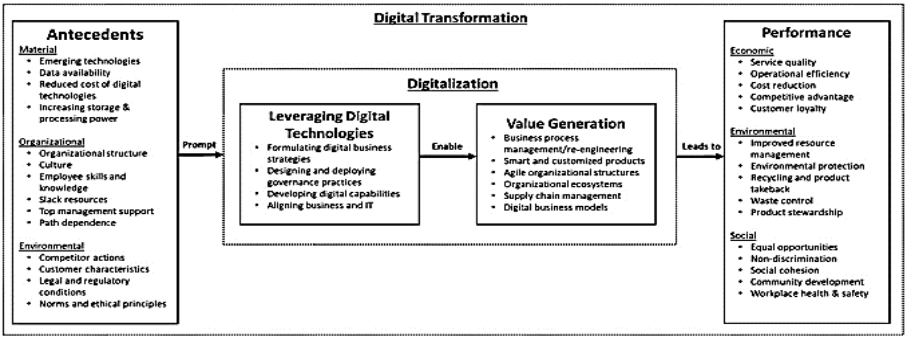
- **Technological Integration:** Digital Transformation involves adopting and integrating digital technologies across all operational and strategic areas of an organization. (Stoumpos, Fotis, & Michael , 2023, p. 27)
- **Organizational Change:** Overcoming organizational inertia is crucial. Firms must address psychological, sociotechnical, political, and economic barriers to successfully implement digital Transformation. (Housawi & Miltiadis , 2023, p. 178)
- **Strategic Frameworks:** Effective digital Transformation strategies often include business process reengineering, technology-driven

value propositions, and quality assurance through KPIs and benchmarks. (Xiaodong, 2023, p. 151)

- **Human Capital:** Empowering employees at all levels is essential. (Jamil, 2024, p. 7)

**Security Considerations**. (Stewart, 2023, p. 1007)

***Fig.1. Conceptual framework of digital transformation***




**Source:** (Mikalefand & Elena, 2022, p. 04)

### *2.3. Definitions of Economic Development:*

- Economic development is "a multidimensional process that involves making fundamental changes in social" (Salama, 2013, pp. 109-110).
- Economic development can be described in terms of goals or as a process that influences growth to enhance the economic well-being of a community/society. (Tomaa, Ana-Maria , & Paul , 2013, p. 148)

### *2.4. The Importance of Economic Development:*

The importance of economic development lies in elevating the standard of living for the population and providing them with a dignified life. For people in underdeveloped areas, development is not seen as an end in itself but as a means to achieve other goals. This role as a means to serve broader objectives underscores its significance. (Imad, 2015, pp. 73-74)

### *2.5. Measures of Economic Development:*

- The economic development measures vary according to the different economic development concepts: (Zitouni, 2019, pp. 13-15)

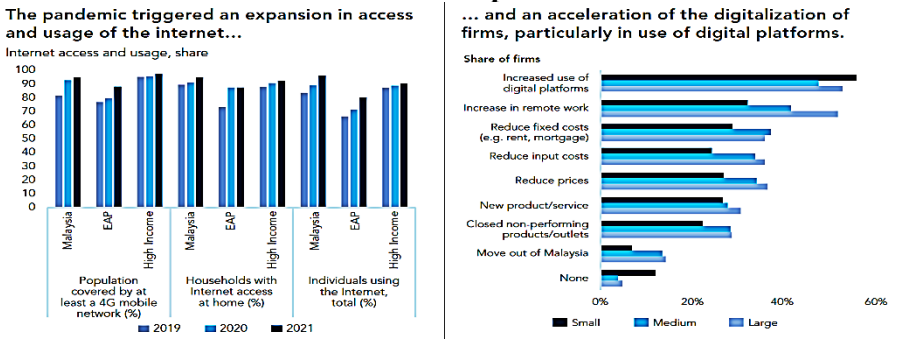
- Income Measures; Social Indicators; Human Development Index (HDI); Structural Indicators.

## *3/ Malaysia's Strategy for Embracing Digital Transformation:*

### *3.1. The reality of digital transformation and economic development in Malaysia before government policies:*

We review and analyses some data that shows Malaysia's adoption and orientation towards adopting digital transformation to improve development and economic conditions:

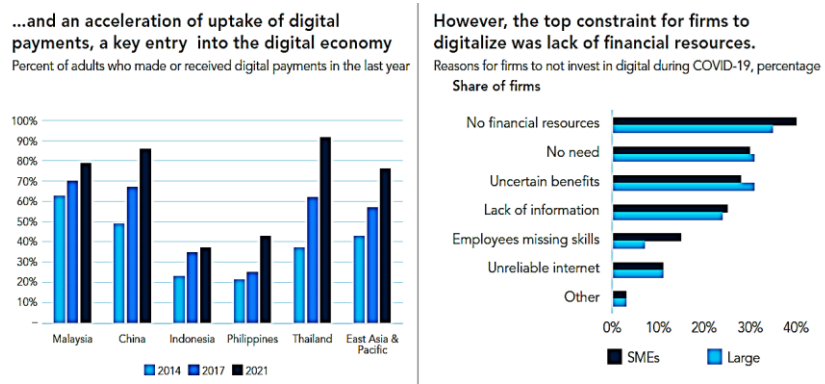
***Fig.2. key aspects of digital transformation in Malaysia influenced by the COVID-19 pandemic***




**Source**: (Directors, 2023, p. 22)

The left chart illustrates a significant rise in internet access and usage across multiple demographics in Malaysia, particularly from 2019 to 2021, aligning with trends observed in East Asia and Pacific regions and high-income countries. Fuelled by the pandemic, this increase reflects expanded digital connectivity, with a notable rise in 4G network coverage, internet-accessible households, and individual internet users. The correct chart shows that, in response to the pandemic, firms of varying sizes (small, medium, and large) have broadly adopted digital platforms, with larger firms demonstrating broader adaptation strategies, including remote work and cost reductions. However, small firms face barriers, limiting their adaptations primarily to digital platform use.

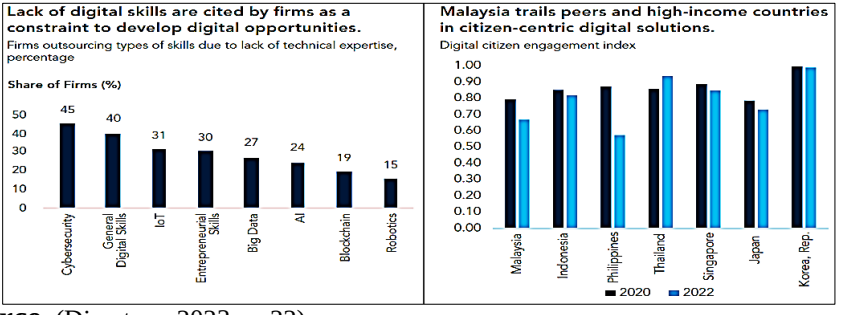
***Fig.3. The figure provides insights into the adoption of digital payments and the barriers to digitalization faced by firm***




**Source**: (Directors, 2023, p. 22)

The chart on the left reveals a consistent increase in digital payment adoption across East Asia and Pacific countries. Malaysia reached nearly 80% of adults using digital payments by 2021, reflecting its progress towards a digital economy. China leads in adoption rates, exceeding 90%, while other countries like Indonesia, the Philippines, and Thailand show a slower, yet rising, trajectory. The correct chart identifies significant obstacles to digital investment for firms during the COVID-19 pandemic, with lack of financial resources as the most cited constraint, particularly for SMEs. Additional barriers include limited perceived necessity, unclear benefits, and informational gaps, alongside issues like inadequate digital skills and unstable internet, which further hinder digital transformation efforts in Malaysia.

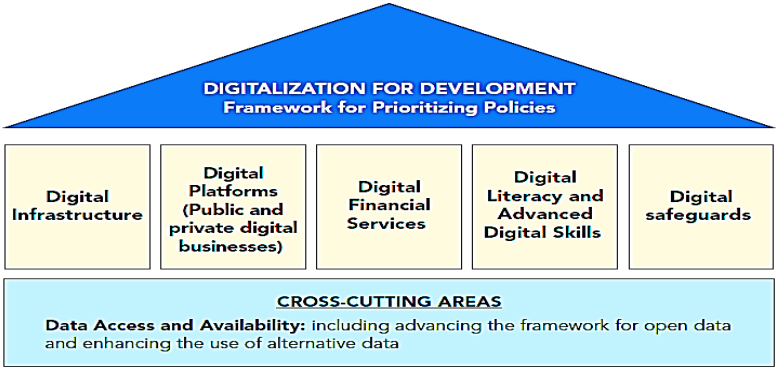
***Fig.4. Cchallenges in Malaysia's digital transformation efforts***




**Source**: (Directors, 2023, p. 22)

The chart below highlights that firms frequently outsource digital skills due to insufficient internal expertise, with cybersecurity and general digital skills topping the list at 45% and 40%, respectively. Other outsourced skills include IoT, entrepreneurial skills, big data, and AI, reflecting a significant skills gap in critical digital areas, which could hinder firms' digital transformation and innovation capabilities. The correct chart indicates that Malaysia lags behind several East Asian and high-income countries, such as Singapore, Japan, and South Korea, in the Digital Citizen Engagement Index, despite a slight improvement from 2020 to 2022.

***Fig.5. Areas and dimensions of digital transformation that Malaysia has focused on***




**Source:** (Directors, 2023, p. 20)

### *3.2. Impact of digital transformation on economic development in Malaysia*

**Fig.6.** Malaysia's economy is expected to expand at a faster pace in 2024

| Real GDP Growth, y/y, Percentage | | | | | Contribution to Real GDP Growth, y/y, Percentage point | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2021 | 2022 | 2023 | 2024f | | 2021 | 2022 | 2023 | 2024f |
| GDP | 3.3 | 8.9 | 3.6 | 4.9 | | | | | |
| Domestic Demand (including stocks) | 3.8 | 9.5 | 4.7 | 5.4 | Domestic Demand (including stocks) | 3.6 | 9.0 | 4.4 | 5.1 |
| Private Consumption | 1.8 | 11.3 | 4.7 | 5.5 | Private Consumption | 1.1 | 6.6 | 2.8 | 3.3 |
| Public Consumption | 5.8 | 5.1 | 3.3 | 3.9 | Public Consumption | 0.8 | 0.7 | 0.4 | 0.5 |
| Gross Fixed Capital Formation | -0.7 | 6.8 | 5.5 | 7.4 | Gross Fixed Capital Formation | -0.1 | 1.4 | 1.1 | 1.5 |
| External Demand | | | | | External Demand | | | | |
| Exports of Goods & Services | 18.5 | 14.5 | -8.1 | 5.9 | Exports of Goods & Services | 11.4 | 10.3 | -6.0 | 3.9 |
| Imports of Goods & Services | 21.2 | 16.0 | -7.4 | 6.7 | Imports of Goods & Services | 11.7 | 10.4 | -5.1 | 4.1 |

**Source:** (Directors, 2024, p. 61)

The table illustrates Malaysia's GDP growth trends from 2021 to a forecast for 2024, revealing a peak in growth at 8.9% in 2022, which is anticipated to moderate to 4.9% by 2024. Domestic Demand has been a major contributor, driven by the adoption of digital services and e-commerce, which boosts both private and public consumption. Gross fixed capital formation is positively impacted by digital transformation, as investments in digital infrastructure enhance productivity and drive capital growth. External Demand shows how digitalization improves export competitiveness while reducing import dependency via local technological innovations. Overall, digital transformation plays a crucial role in Malaysia's sustainable economic development, fostering growth through increased productivity, cost efficiency, market expansion, and job creation in the digital sector.

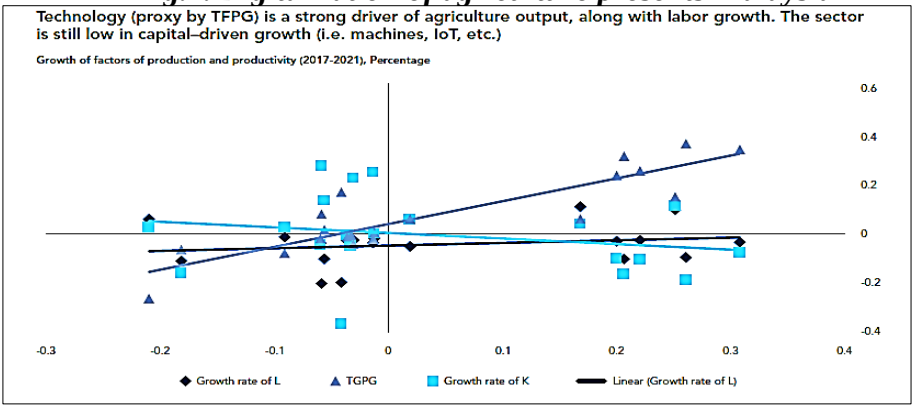
## *4/ Developing digital agriculture in Malaysia to achieve economic development:*

### *4.1. Agriculture in Malaysia and Its Challenges Before New Digital Policies:*

Malaysia's agriculture sector faces critical challenges that hinder its growth potential, impacting supply and demand transitions. Low productivity growth remains a significant issue, with agricultural labour productivity at less than 50% of high-income country averages and lagging behind other sectors, growing only by 0.7% in 2022 compared to the national average of 5.4%. This low productivity results from inefficient production, high costs, limited diversification, and risks from natural threats and unsustainable practices. Wage stagnation is also a concern, as stagnant productivity hinders wage growth, potentially exacerbating income inequality, particularly in rural areas where agriculture is the primary employment source. Lastly, digital adoption in agriculture is notably behind other sectors, with only 72% of agricultural establishments using the Internet compared to 93% in manufacturing. Challenges like poor rural connectivity and low digital literacy among

farmers slow digital transformation in agriculture despite Malaysia's strong overall digital. (Directors, MALAYSIA ECONOMIC MONITOR Farming the Future: Harvesting Malaysia's Agricultural Resilience through Digital Technologies, 2024, pp. 68-69)

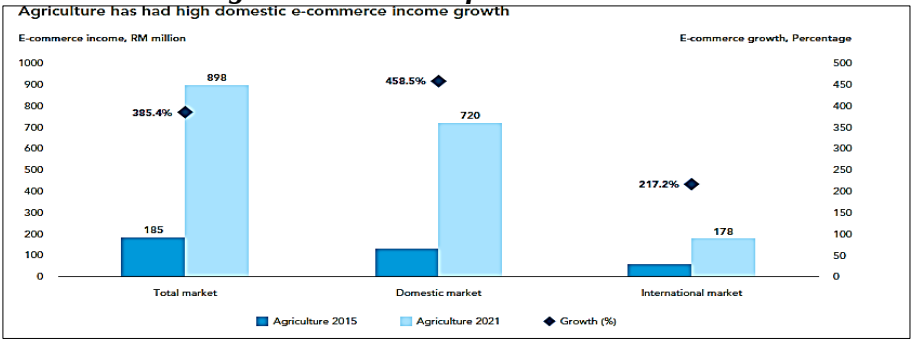
***Fig.7. Digitalization of agriculture presents Malaysia***




**Source**: (Directors, 2024, p. 75)

The scatter plot illustrates Malaysia's agricultural sector's productivity and production factors growth from 2017 to 2021, focusing on technology (TFPG), labor, and capital. Technology-driven growth (TFPG), represented by grey triangles, shows a positive trend, indicating that technological advancements significantly enhance productivity, outpacing labor and capital growth rates. However, labor and capital growth remain stagnant or negative, with labor (dark blue diamonds) showing minimal upward movement and capital (light blue squares) exhibiting low growth rates, signaling underinvestment in machinery and IoT. These trends imply that while technology boosts productivity, the sector's full potential may only be limited with increased capital investment in advanced tools and infrastructure, which would complement TFPG and sustain long-term growth in Malaysia's agriculture sector.

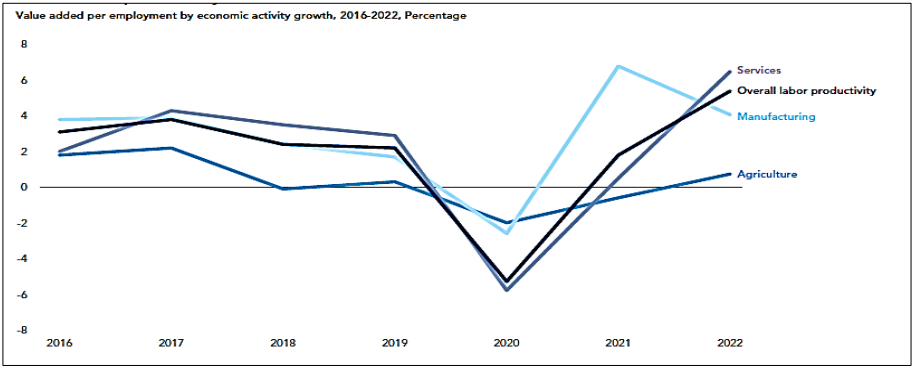
***Fig.8. The growth in e-commerce income within Malaysia's agricultural sector from 2015 to 2021***




**Source**: (Directors, 2024, p. 76)

The bar chart showcases the substantial growth in Malaysia's agricultural e-commerce income from 2015 to 2021, with breakdowns for total, domestic, and international markets. Total e-commerce income in agriculture surged from RM 185 million to RM 898 million, representing a 385.4% growth, illustrating the sector's pivot towards digital sales. The domestic market displayed the highest growth, reaching RM 720 million—a 458.5% increase, indicating robust local demand and a preference for online transactions in agriculture. In contrast, the international market saw a 217.2% increase, reaching RM 178 million, highlighting emerging interest in Malaysian agricultural products globally, though at a smaller scale.

***Fig.9. value added per employment by economic activity in Malaysia from 2016 to 2022***



**Source:** (Directors, 2024, p. 67)

The chart presents value-added growth per employment in Malaysia across agriculture, manufacturing, and services from 2016 to 2022, revealing productivity trends within each sector. Agriculture consistently shows the lowest growth rate, remaining stable yet modest, reflecting limited productivity improvements compared to the more dynamic manufacturing and services sectors. The 2020 pandemic caused a sharp drop in productivity across all sectors; however, agriculture was less impacted, indicating resilience but also limited capacity for recovery, as seen in its stagnant post-2020 performance. This lack of growth highlights structural issues, such as low technological investment and efficiency challenges, underscoring the need for targeted policies to enhance agricultural productivity and close the gap with other sectors.

***Key Findings:***

Digital transformation in Malaysia has become a cornerstone of its economic advancement, driving innovation, increasing productivity, and opening new market opportunities across sectors. In industries such as manufacturing, banking, healthcare, and education, digital technologies have streamlined supply chains, improved service delivery, and enabled broader access to global markets. The emergence of e-commerce platforms, digital payment systems, and smart city initiatives has further contributed to employment creation and GDP growth. Within this digital shift, the government has introduced focused policies such as the National Agrofood Policy 2.0 and the Malaysia Digital Economy Blueprint (My DIGITAL) to modernize agriculture through precision farming, the Internet of Things (IoT), drones, and intelligent irrigation systems. Farmers benefit from training and subsidies to support digital integration. These initiatives have led to measurable improvements in agricultural productivity and efficiency, with reduced labor costs and water use, and increased yields in pilot projects. However, the sector's contribution to GDP remains modest, highlighting the need for broader adoption of digital agriculture technologies (DATs). While Malaysia's

digital strategy is comprehensive, it lags behind East Asian frontrunners like South Korea and Singapore, whose ecosystems are more integrated and user-centered. Notable digital policy outcomes include the expansion of e-commerce and high adoption rates of digital payments, facilitating Malaysia's transition to a cashless economy. Yet, challenges persist: rural internet infrastructure gaps, limited digital literacy among smallholder farmers, and financial barriers for SMEs hinder widespread digitalization. Moreover, concerns over cybersecurity and data privacy necessitate stronger regulatory frameworks. To bridge the skills gap and enhance rural participation, targeted digital literacy programs especially for youth are essential. In the long term, sustained investments in advanced digital skills, inclusive infrastructure, and adaptive policy mechanisms will be crucial for making Malaysia's agricultural sector more productive, sustainable, and globally competitive.

## *5/ Conclusion*

This research highlights the transformative potential of digital transformation on Malaysia's economic development, with a particular emphasis on the agricultural sector. By exploring how digital policies shape productivity, market access, and efficiency, the study underscores Malaysia's proactive approach to becoming a digitally-driven economy. The agricultural sector, however, still faces considerable challenges, such as low digital literacy and limited technological investment, which impede the full realization of digitalization benefits. Nonetheless, the findings suggest that with targeted policy adjustments and greater investment in digital infrastructure, Malaysia can achieve significant productivity gains. Through comparisons with other East Asian countries, the study provides a nuanced understanding of where Malaysia stands in its digital journey and offers practical recommendations for overcoming obstacles in the agricultural sector. Ultimately, Malaysia's commitment to digital transformation is a promising avenue for sustainable economic development, with the potential to enhance economic resilience, equity, and competitiveness.

The findings of this study validate the research hypotheses, confirming that while digital transformation significantly drives Malaysia's economic growth, its impact on agriculture is tempered by persistent structural barriers. Specifically, the proven correlation between digital adoption and productivity (H1 & H2) contrasts with the identified obstacles of low literacy and infrastructure gaps (H3). Consequently, the proposed recommendations—ranging from enhancing rural digital skills to fostering public-private partnerships—serve as a strategic response to these results. By addressing the financial and technical constraints identified during hypothesis testing, these interventions aim to bridge the productivity gap and ensure sustainable economic resilience.

***Testing Hypotheses:***

The analysis conducted provides strong support for the hypotheses put forth, each of which highlights a key aspect of digital transformation and its impact on Malaysia's economic growth and agricultural sector.

- **Hypothesis 01** is supported, as the evidence suggests that digital transformation has had a tangible positive effect on Malaysia's economic growth. This is clearly reflected in the improvements in productivity and competitiveness across various sectors, where digital tools and technologies have played a pivotal role in driving performance and efficiency.
- **Hypothesis 02** is also supported, indicating that digital transformation in the agricultural sector has a direct and substantial impact on productivity and market access. However, this positive influence is somewhat hindered by challenges related to infrastructure and skill gaps, which limit the full realization of the potential benefits.
- **Hypothesis 03** is validated, with the main barriers to digital adoption in agriculture identified as financial constraints, insufficient digital literacy, and infrastructural deficiencies. These challenges continue to impede the broader uptake of digital technologies in the sector, preventing its transformation at the pace it requires.

***Recommendations:***

Building on the findings and the supporting evidence for the hypotheses, several recommendations emerge to overcome the challenges and enhance the positive impacts of digital transformation in Malaysia, particularly within the agricultural sector:

- **Digital Literacy and Skills Development**: It is essential to expand digital literacy and skills training programs, especially those aimed at rural farmers and young individuals. This effort will bridge the existing knowledge gap and enable a larger portion of the population to leverage digital tools effectively.
- **Investment in Digital Infrastructure**: To support agricultural digitization, there must be a strategic investment in expanding digital infrastructure, particularly in rural areas. Improving connectivity will ensure that farmers have the necessary access to digital resources and platforms.
- **Financial Support for SMEs**: Financial initiatives must be developed to assist small and medium enterprises (SMEs) in accessing digital tools and technologies. This would reduce the financial barrier to entry and allow businesses to integrate digital solutions into their operations.
- **Strengthening Cyber security and Data Privacy**: To build public trust in digital solutions, it is crucial to enforce robust cyber security measures and data privacy regulations. Ensuring the security of digital platforms will encourage wider acceptance and usage by both consumers and businesses.
- **User-Centered Digital Services**: The design of digital services should prioritize user accessibility and engagement. Creating platforms that cater to the needs of diverse user groups will enhance their adoption and usage, especially among rural populations.
- **Public-Private Partnerships**: Fostering collaborations between the public and private sectors is vital for driving innovation and investment in agricultural digital technologies. These partnerships

can pool resources and expertise to accelerate the development and deployment of digital solutions.

- **Research and Development in Precision Agriculture**: Increased focus on research and development in precision agriculture and data-driven farming is necessary. Advancing these areas will boost productivity, promote sustainable farming practices, and enhance the overall competitiveness of the agricultural sector.

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- **Citing a Journal Article**

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