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The Integration of digital payments within the Asia-Pacific region in the age of artificial intelligence

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Abstract. The widespread use of the internet and AI-powered mobile phones has contributed to the new integration trend of development of digital payments in the Asia-Pacific region. Despite the importance of digital payments in accelerating regional integration, a lack of research analysis of regional integration in the age of Artificial Intelligence (AI) could be hindered by national security concerns. The study begins by outlining the theory of economic integration and AI Executive Order in the U.S.A, followed by analysis of the limitations in the bilateral or multi-agreements for improving the connectivity of cross-border digital payments in the region. The findings indicate that the regional integration of digital payments still faces major bottlenecks, although AI is regarded as a transformative force in facilitating cross-border digital payments. The originality of this study lies in interdisciplinary approach, combining digital payments innovation with economic integration theory and policy analysis to support valuable insights for policymakers in the field of management, particularly in enhancing regulatory harmonization and governance of digital payments in the context of the AI era.

Keywords. Digital Payment; Artificial Intelligence; Economic Integration; Cross-Border Payments; Interoperability; Regulatory Harmonization; Digital Gap; Asia-Pacific

1. Introduction

1.1. Background

The World Economic Forum (WEF) put forward the vision in the research and analysis report "The Future of Financial Services" (2015): The trend of technological innovation will affect the six core functions of the financial services industry, led by payment, financial innovation at the payment level will create a cashless society and emerging payment channels. WEF further emphasized that digital payment will be the core of the digital transformation of the global economy in the next few years, and it implicates a new opportunity for small and medium enterprises in various countries to connect with global business (WEF, 2020).

AI models applied in digital payments have had an enormous impact on the way the business world pays suppliers, and they catalyzed continuous efforts for business to the improvement of technical security and trust for payment structures and key business processes due to the spread of the COVID-19. The Covid-19 pandemic has also speeded up the decline in

transactional cash usage. A survey clearly indicated half of the respondents had reduced cash usage while 40 per cent had cut back on the checks (Endava software service,2022-2023).

Another investigation implied many brick-and-mortar stores reopened in 2021 as Covid-19 gradually slowed down, but use of cash only increased by a small 1%, with most transactions being paid for using digital payment methods. The digital payment, including electronic and mobile payments, has thus become a significant payment method (McKinsey Report,2022).In 2023, the Asia–Pacific region demonstrated a 25 per cent increase in growth compared to the previous year, despite a 3 per cent decline in payment revenues in China, which is the main driving force behind the region’s growth, accounting for 88 per cent of the total increase growth in 2023 (McKinsey Report, 2023). Research indicated that Asia Pacific has emerged its leadership in digital payments, commanding over 55% of the global market share in 2025. In Asia- Pacific, the volume of real-time payments is expected to grow from 49.2 billion in 2022 to over 300 billion in 2027- an increase of almost sevenfold. (Online Payment Methods in Emerging Asia-Pacific Markets, 2023)

Additionally, an investigation of McKinsey Report (2023) implicated that more than a third of respondents would consider using generative AI for financial advice, an unusually high figure for an innovative technology little known to the people before one year.

1.2. Literature Reviews

It is an integrated world in which economics interact with economics and technology, and vice versa. Of course, technology has massive economic and even social and political implications.

Studies in economic integration theory (Erik Brynjolfsson, Andrew McAfee, & Nouriel,2014) indicated that the advances in AI and digital technologies are transforming industries, labor markets, and global economic dynamics, and these technological developments are reshaping patterns of trade, investment, and production, leading to greater economic integration.

The potential of AI and digital technologies is to streamline cross-border transactions and payments, thereby reducing transaction costs and enhancing efficiency in international trade. Furthermore, AI can analyze massive amounts of data to optimize currency conversions, mitigate currency risk, and ensure compliance with regulatory requirements. The role of AI-powered fraud detection and cybersecurity measures is bolstering trust and confidence in cross-border digital payments. By leveraging AI to detect and prevent fraudulent activities in real-time, businesses and consumers can transact more securely across borders (Pedro Bizarro,2020).

AI is regarded as a transformative force in facilitating cross-border digital payments. As a result, it can contribute to greater economic integration and efficiency within the global economy. To ensure fair and equitable economic outcomes, however, governments need to play a crucial role in addressing the potential negative consequences of digitalization on labor markets and social cohesion, such as to build social safety nets and regulation of financial markets. (Joseph Stiglitz & Nouriel Roubini, 2019)

Based on economic integration theory, the goal of economic integration can be achieved through a comprehensive approach, such as regional trade agreements, institutional frameworks, and policy measures designed to promote closer economic cooperation and collaboration among nations or entities (Duc Bao Nguyen & Robert Zoellick,2019).The regulatory cooperation is another good way to maximize the benefits of economic integration and promote sustainable development because robust regulatory frameworks can be used to

safeguard against potential risks such as cybersecurity threats, data privacy concerns, and market volatility (Robert Zoellick,2019).

1.3. Research Method and Research Focus

The overall development of electronic payments in the Asia Pacific region, nevertheless, is different in terms of steps and speeds due to the economic transformation or the gap between urban and rural areas in each economy of the region.

Although digital payments with AI technology are growing rapidly, there is a research gap in understanding the role of digital technologies in economic integration within the Asia-Pacific region facing AI era, including digital infrastructure, data flows and regulations. Addressing these research gaps can contribute to a deeper understanding of the dynamics, challenges, and opportunities associated with economic integration in the Asia Pacific region.

The paper aims to identify the published positions of governments and international organizations, using a narrative approach based on economic integration theory. Its general applications include exploring existing debates, evaluating documents on AI cooperation and identifying digital gaps in the Asia-Pacific region.

This research begins with an overview of the strategic goals underlying economic integration in the Asia-Pacific region, specifically focusing on the United States' approach. It also explores the implications of the AI Executive Order and highlights the importance of international collaboration on artificial intelligence with America's global partners. Additionally, the development of digital payment systems in the Asia-Pacific region is examined in Section 2. Section 3 provides a comprehensive assessment of the current state of digital payments integration in the Asia-Pacific, organized through the lens of key building blocks. In Section 4, the paper addresses the primary challenges hindering the seamless connectivity of digital payments within the region. It emphasizes that achieving greater cross-border connectivity will require sustained and synergistic efforts, especially security management with enforceable agreements to realize the goals of integrated payment systems.

The paper concludes by offering recommendations to enhance the highly workable connectivity of cross-border digital payments in the Asia-Pacific region.

2. The development of digital payments in the Asia-Pacific region

The main strategic goal of economic integration in the Asia-Pacific region for the United States is aiming at promoting American interests, counterbalancing China's influence, enhance regional stability with partners and expanding market access.

2.1. AI Executive Order and International Engagement

Former American President Barack Obama administration began to focus on the development of AI and released two AI reports focusing on the impact of AI (2016), given that AI moves from the research laboratory to commercialization, it is no longer possible for a tech company to regulate it.

Recognizing the strategic importance of AI to America future economy and security, the Trump administration (February 2019) signed the "Maintaining American Leadership in Artificial Intelligence (AI)" executive order 13859 to strengthen US leadership in AI and lay out a strategy including five pillars: increasing AI research investment, data sharing, standards and regulation, personnel training and international engagement. Most of important, Trump Administration believes that guidance, for developing AI governance framework, must be updated to promote innovation while building public trust in AI. (White House,2019).

The second Trump Administration released a new Executive Order titled "Removing Barriers to American Leadership in Artificial Intelligence", which revoked Biden's EO

hindered AI innovation and imposed cumbersome government control that inhibit private sector innovation and threaten American technological leadership. This radical shift in the US AI policy reflects a broader trend in reducing government oversight over AI development, which can have long-term ramifications for civil rights.

Namely, the AI and digital policies introduced during the Trump administration have engendered a more conducive environment for innovation within the digital payments ecosystem. It is evident that these policies are indicative of a pivot towards deregulation, the empowerment of the private sector, and the promotion of decentralized financial technologies. It is worth noting that the United States Congress has taken a proactive stance in formalizing the AI principles, particularly in areas concerning cross-border digital payments, national security, and law enforcement. A notable instance is the Emerging Innovative Border Technologies Act, enacted in 2024. This Act mandates the Department of Homeland Security to incorporate artificial intelligence, machine learning, and sensor technologies into U.S. border operations. This legislative momentum underscores a bipartisan recognition of the strategic importance of emerging technologies in both economic and security domains.

Given current geopolitical tensions and the complex trade relationship between America and China, any potential agreement would be significantly affected by political considerations. Key issues such as the status of financial technology companies, national security concerns and wider trade negotiations would undoubtedly influence the feasibility of such an agreement.

2.2. The development of Digital payments in Asia Pacific Region

The Australia APEC Study Center has conducted an investigation on the payment situation of Asia-Pacific economies and found that the establishment of an overall payment ecosystem in the Asia-Pacific region is closely related to the level of economic development and economic transformation of each economy (2016). The overall ranking of the electronic payment readiness is also affected by the GDP per capita of each economy: for example, the United States, Singapore, Canada, Australia, New Zealand, South Korea, Hong Kong and Japan rank in the first group; but there are exceptions, Brunei Darussalam's GDP per capita is among the top few in the International Monetary Fund (IMF), even higher than that of Singapore. However, it lags significantly behind its peers in a similar income bracket.

The vigorous development of digital payments in the Asia-Pacific region is due to the uncertainty and instability brought about by the COVID-19 epidemic, prompting governments to actively promote electronic financial services and accelerate the digitization of various fields, whether it is financial services and information, financial education with suggestions etc.

When the Thai Finance Minister served as the chairman of the APEC Finance Ministers and Central Bank Heads Meeting in 2022, he emphasized that the Asia-Pacific region is the largest contributor to global payment revenue and should seize the opportunity at the right time to achieve financial inclusion and respond to the challenges faced in cross-border transactions. "This will allow both the people of the region and MSMEs to benefit from the transparency, openness and interconnectedness of the entire region," he concluded.

The overall development of electronic payments in the Asia Pacific region, however, is different in terms of steps and speeds due to the economic transformation or the gap between urban and rural areas in each economy of the region. The Electronic Payment Alliance (Better Than Cash Alliance, 2017) believes that in poor rural areas, even in remote areas, the expansion of digital payment and the establishment of a reasonable digital payment system has been developing very slowly. If cross-border connections are made in the field of digital payments even with AI, considerable difficulties and challenges must be overcome.

To overcome those difficulties and challenges, member economies in this region have gradually signed bilateral agreements through building blocks to promote cross-border connections, along with the regionalization and localization have become the mainstream trend due to increasing automation (Richard Baldin,2021).

3. Integration of digital payments of key members in the Asia-Pacific region

Digital payments in the Asia-Pacific region have become popular. According to the estimation of OECD (2022), digital wallet payments will account for three-quarters of e-commerce payment methods and more than half of POS payments in the Asia-Pacific region by 2025. Most of Asian consumers have used digital payments to send money for their family and friends. The use of mobile payments in mainland China solved the pain of local people who cannot use credit cards to pay. After the Covid-19 epidemic, the regulations of digital payments in the Asia-Pacific region

are not only increasingly sound but also providing innovative services.

The ASEAN e-Payments Coalition, which was set up in March 2019, is a good model as it dedicated to supporting the development of an integrated and harmonized digital payment framework across ASEAN with the goal of supporting the growth of cross-border e-commerce.

Coalition members come from a broad range of constituencies, including banks, e-commerce companies, regulators and other pertinent entities. The group formulated a set of key recommendations and presented them to the ASEAN Working Committee on Payment and Settlement Systems (WC-PSS), shaping an ASEAN Payments Policy Framework through a series of working sessions. Accordingly, digital payment systems have gradually replaced cash transactions across ASEAN. For example, the number of digital platform users in Thailand, Malaysia and the Philippines has almost doubled; in high-income economies like Singapore, significant advancements in digital payment are driven by major technology firms and established traditional banks, such as Grab.

The table below exhibits integration progress of the digital payments in the main economies of Asia Pacific region, although they promote the domestic and cross-border integration of digital payments by different steps.

Table 1¹: Digital payment integration progress of selected economies in the Asia-Pacific region

Economy	Policies and measures related to digital payments
Taiwan	<ul style="list-style-type: none"> • While Taiwan is not a formal member of regional organizations like ASEAN, it has worked economically with neighboring economies to improve its payment systems' interoperability. This includes efforts to integrate with regional QR payment systems and blockchain-based cross-border payments. • LINE Pay and JKOPay, which have been integrated with international payment systems. helps make cross-border payments easier, especially in the ASEAN region and East Asia.

¹ Table 1 focuses on selected economies, not all economies on the Asia-Pacific region. The purpose is to make the analysis not too complex in the region. For example, ASEAN is regarded as a small bloc, each one of 10 members is not examined individually. ASEAN (2023), available at: <http://www.aseanbriefing.org>, accessed on 5 June 2025.

	<ul style="list-style-type: none"> In October 2023, the public sector launched the integration of nine APPs using a common payment code "TW QR Code" with a shopping function, through single "Electronic Payment Cross-Agency Platform." Additionally, Taiwan has collaborated with digital payment platforms like Alipay and WeChat Pay in China, to support payments for businesses and tourists.
USA	<ul style="list-style-type: none"> The financial services chapter of the United States-Mexico-Canada (USMCA) trade agreement came into force on July 1, 2020. It provides a clearer and more detailed data freedom movement framework and prohibits the localization of data as a model for digital commerce. The agreement's provisions on source code and proprietary algorithms also provide clearer protection for digital commerce compared to the CPTPP. Apply explicit national treatment to payments and market access. Including the transactions via credit card, cash card, traveler's check and bank draft.
China	<ul style="list-style-type: none"> The largest number of digital payment users and the highest penetration rate in the region. Its digital payment transaction volume exceeded US\$3 trillion in the past year. Ninety percent of the people have an important demand for mobile payment, such as Alipay and WeChat, as it can solve the pain points that consumers cannot get a credit card or traditional financial services. Taiwan tourists can use Alipay and WeChat with their phone number and credit card beginning from 2023. Emphasis on data restrictions and data localization.
Japan	<ul style="list-style-type: none"> Paypay – the first 'cashless' payment method and the most popular QR code payment service in Japan with the highest usage rate and recognition in the country. Rakuten Pay is also immensely popular. Japan will integrate QR code payments with ASEAN from 2025, aiming to facilitate spending between ASEAN and Japan without the need to exchange currency. The official start of this initiative is still scheduled for 2025, and details on how it will be rolled out are expected to be finalized closer to the launch. The government is also in discussions with governments and central banks of countries around the world in this regard.
ASEAN	<ul style="list-style-type: none"> The ASEAN Guide on AI Governance and Ethics was unveiled at the 4th ASEAN Digital Ministers' Meeting on 2 February 2024. Five ASEAN members-Singapore, Indonesia, Thailand, Malaysia and Philippines signed a memorandum of understanding on cross-border payments integration between the countries in 2022. On 24 August 2023, Vietnam joined to the ASEAN Regional Payment Connectivity (RPC) initiative, linking ASEAN countries with a unified payment.

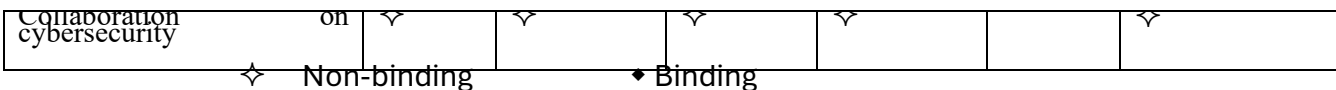
Singapore	<ul style="list-style-type: none"> • Singapore established its Model AI Governance Framework in 2019. The framework provides guidelines for the responsible and ethical use of AI, focusing on transparency, fairness, and accountability. • Singapore released an updated version of the framework specifically for Generative AI in 2023. To address the unique challenges and risks associated with technologies like large language models (LLMs) and generative AI systems, the updated framework places a stronger emphasis on addressing the ethical, legal, and operational issues related to generative AI applications. • The Government fosters interoperability of standards and systems through four digital economy agreements (DEAs) with major trading partners, including Digital Economy Partnership Agreement between Singapore, Chile and New Zealand(2021), Singapore-Australia DEA(2020), UK-Singapore DEA(2022), and Korea-Singapore Digital Partnership Agreement(2023) due to its good regulatory environment and advanced technology.
Indonesia	<ul style="list-style-type: none"> • Bank of Indonesia initiated the Indonesian QR code standard (QRIS) in 2019 to promote interoperability among different payment systems. • In December 2021, Bank of Indonesia established fast payment system (BI-FAST) to strengthen the infrastructure of the retail payment system and digital financial service. • In 2022, approximately 51% of all funds in Indonesia were transacted digitally, a significant increase from pre-COVID-19 levels. By 2024, this trend continued to grow, with digital payments projected to reach a total transaction value of \$371.61 billion due to regulatory measures for protecting consumers.
Thailand	<ul style="list-style-type: none"> • As of December 2023, Thailand has established cross-border linkages with seven countries: Japan, Cambodia, Vietnam, Malaysia, Indonesia, Singapore and Hong Kong to facilitate real-time digital payments. • The integration of common guidelines and standards like ISO 20022 and QR codes streamlines enhances transparency, security and shortens clearing and settlement cycles. By 2028, real-time digital payments are expected to exceed 50% of total payments.

Malaysia	<ul style="list-style-type: none"> In February 2021, the government launched the Digital Economy Blueprint (MyDIGITAL) to enable electronic payments by 2022. The Central Bank launched the Standard QR Code (QRIS) under the name DuitNow QR to ensure interoperability among platforms. This initiative is part of Malaysia's broader effort to drive digital payments and financial inclusion in ASEAN. The government has taken steps to enhance cross-border payment connectivity beyond ASEAN. In 2022, the "Cross-Border QR Payment Linkage" initiative enables cross-border payments between Malaysia and China using their respective QR code payment systems.
Philippines	<ul style="list-style-type: none"> The Central Bank (BSP) launched "The Paleng-QR Ph program" in June 2022, which provides a uniform approach to drive digital payment adoption through the QR Ph standardized system. The Philippines has joined efforts to connect its payment systems not only within ASEAN but also with China outside the region. In 2022, the Philippines and China signed an agreement to enhance cross-border payments between the two countries.

Table 2: Comparison² of Digital Trade Provisions in Leading Trade Agreements with Asia-Pacific Economies

Provision	CPTPP (2018)	USMCA (2020)	US-Japan DPA (2020)	Singapore-Australia DPA (2022)	DEPA (2021)	Korea-Singapore DPA (2023)
Free cross-border transfer of personal data	▼	▼	▼	▼	▼	▼
Ban on data localization	▼	▼	▼	▼	▼	▼
Protecting consumer's information	▼	▼	▼	▼	▼	▼
Measures against spam messages	▼	▼	▼	▼	▼	▼
Ban source code exchange for market access	▼	▼	▼	▼	▼	▼
Interoperable electronic invoicing				▼	▼	▼
Interoperable electronic payments system				▼	▼	▼
Interoperable digital identities				▼	▼	▼
Ethical governance of AI				▼	▼	▼

² Source: Nexttrade (up to June 2024), available at: <https://www.nexttradegrouppllc.com/> and <https://www.mti.gov.sg/Trade/Digital-Economy-Agreements>



4. Challenges of digital payments linkage in the Asia Pacific region

The study clearly indicated that certain advanced economies in the Asia-Pacific region have overcome barriers to cross-border digital payments through bilateral or multilateral agreements in response to the AI era. The Digital Partnership Agreement (DEPA), which was signed by Chile, New Zealand, and Singapore—also members of the CPTPP, is a prominent example. DEPA represents a pioneering framework in digital trade, featuring a dedicated chapter on digital payments that highlights the adoption of international standards, improved interoperability, and the integration of cross-border payments infrastructures by enabling free data flows, ensuring deeper communication between systems, and promoting trustworthy digital ecosystems. Additionally, the integration of electronic payments in ASEAN has made impressive strides, with mobile payments and AI-driven financial services playing a significant role in improving accessibility and efficiency. In doing so, it helps participating economies adapt proactively to the economic and regulatory demands of the AI era.

China's focus on data restrictions and data localization, however, creates significant barriers to the integration of digital payments, such as making cross-border transactions more complex and hindering innovation in payment solutions. Furthermore, several critical factors have influenced the progress of digital payments integration, including infrastructure gaps, regulatory inconsistencies, and cybersecurity risks.

4.1. the infrastructure gaps between economies.

APEC Leader declarations have consistently emphasized the importance of narrowing the urban-rural infrastructure gap within member economies across the Asia-Pacific region, whereas our findings indicate that significant gaps persist in the digital payment infrastructure between rural and urban areas in multiple economies.

For example, Myanmar's financial infrastructure remains underdeveloped and fragmented, particularly in comparison with other ASEAN states, which significantly hinder its ability to participate in regional digital payments initiatives. Similarly, Indonesia's digital inequality persists, with Java enjoying superior internet access and infrastructure among geographically diversified islands. Rural areas face poor transport networks, hindering e-payment expansion and reinforcing regional disparities.

4.2. the lack of comprehensive consistency in regulations.

The regional and bilateral trade agreements provide an excellent opportunity for economies to further reduce market barriers and cross-border frictions for payment services. For instance, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) reinforces and goes beyond WTO provisions on financial services, but there are limitations in the scope of its commitments. CPTPP includes an annex outlining specific commitments on payment services, potentially limiting requirements for local data storage and processing. However, it does not guarantee non-discriminatory treatment, as member states may provide preferential treatment to local e-payment suppliers provided that foreign networks are also granted the right to operate.

In essence, significant bottlenecks remain in the integration of cross-border payment regulations. Although the regulatory framework for payment businesses in the Asia-Pacific region is well-defined, critical domains such as fraud prevention and consumer data protection, divergent regulatory authorities and enforcement practices across economies hinder innovation. Regulatory harmonization remains essential.

4.3. interoperability is hindered by security risk management.

Interoperability refers to the ability of disparate IT systems to function and communicate through open standards. ASEAN has made efforts to streamline cross-border payment integration and local currency usage via a unified QR code system under the Regional Payment Connectivity (RPC) initiative. Concurrently, ASEAN is advancing a common framework for trustworthy AI to boost consumer confidence in digital payments.

Cybersecurity management remains a significant challenge as criminal groups are operating scam centers in Myanmar, Cambodia, and Laos. (UN Report,2024) Moreover, half of the members in the region have limited cybersecurity resources compared to advanced economies like Singapore, Japan and the United States.

5. Policy Suggestions

To sustain progress, ASEAN and APEC economies must prioritize the development of robust digital infrastructure, the strengthening of regulatory frameworks, and the assurance of secure and accessible digital payment systems. Furthermore, enhancing interoperability across platforms and increasing efforts on the benefits and risks associated with digital payments will be pivotal.

Given the current findings, the public and private sectors must collaborate closely to address the disparities in digital payments and strengthen cybersecurity. Protecting cross-border digital payment systems from cyber threats is critical for ensuring security, fostering user confidence and facilitating seamless integration. We propose the following strategies to advance these objectives.

5.1. Strengthening physical infrastructure and practical financial inclusion.

To reduce the digital gap between urban and rural areas, public sector should encourage foreign capital entry or domestic private sectors to deploy mobile Internet access in remote areas and 5G network in urban areas comprehensively before establishing physical infrastructure of reliable payments in remote areas by strengthening the mobile payment facilities. In addition, while digital authentication helps the security of online payments through mobile phones, financial services should be provided in the remote area, such as physical base of deposit and withdrawal as well physical authentication. For example, the world's largest [archipelagic state](#) Indonesia is holding the momentum to bridge the digital gap through prioritizing connectivity infrastructure in remote areas while promoting adoption of digital infrastructure. Comprehensive infrastructure development is essential for meaningful engagement. Concentrated development in Java limits nationwide inclusion.

5.2. Promoting the harmonization of various regulations

The regulatory harmonization of digital systems in ASEAN is a significant step toward modernizing the region's financial infrastructure. Despite diverse payment norms and regulations across member economies, ASEAN and some APEC economies have taken a collaborative approach to prioritize digital market integration and improve cross-border payments by ameliorating the obstacles of digital payments connectivity.

However, it's essential to overcome challenges, including different regulatory environments, technological disparities and lingering concerns about cybersecurity. Without enforceable agreements and clear statements, it is difficult to ensure consistent oversight or effective governance of digital payment security.

5.3. Ensuring cybersecurity through enforceable statements and agreements

The arrival of the AI age has brought not only innovative technologies that improve payment systems but also has increased the risk of cyberattacks and fraud. Without strong governance, it becomes more difficult to implement effective cybersecurity protocols, which in

turn slow down the implementation of key digital security policies and regulatory framework works.

6. Conclusion

A central element of the paper is its innovative character. In the Asia-Pacific region, the integration of digital payments facing AI era associated with economic integration theory is rarely explored, and its solution has not been addressed comprehensively in this regard, though the APEC Leaders' Declaration(2021-2024) highlights the importance of digital security for economic integration while advancing the APEC Internet and Digital Economy Roadmap (AIDER), which aims to improve digital connectivity and secure data flows, privacy and digital trust across the region.

The current study reveals a significant trend toward the integration of digital payment platforms in the Asia-Pacific region since the onset of Covid-19. A key finding is that developed economies, such as Singapore and the United States, have been actively pursuing bilateral and multilateral agreements to reduce market barriers and enhance data interoperability with their primary economic partners. This progress reflects positively on their contributions to cross-border digital payments and aligns with the standards and expectations set forth by the World Economic Forum(WEF).

The key limitation of the non-binding nature of APEC Meeting and Leaders's Declaration (2017-2024) and initiatives could hinder deeper economic integration and the secure flow of digital commerce across the region. In selected bilateral or multilateral agreements (see Table2), such agreements can prove guidelines and set expectations, but successful cybersecurity relies on the ongoing implementation of technical safeguards, consistent monitoring, staff training and the ability to adapt to evolving threats. A combination of strong legal frameworks, governance and practical security measures is essential to ensure robust cybersecurity.

Advanced economies must engage Southeast Asia on AI risks by localizing safeguards, such as testing security features in regional languages, and building capacity through computational credit sharing and talent exchange. Civic tech initiatives can encourage public involvement in AI governance, ensuring the region's representation in the development of global standards. Significant investment and support are necessary in less developed economies needed to ensure protection for vulnerable populations.

For future research, proposed directions include comparative analyses of deeper regulatory harmonization and various technologies used in the payment ecosystem in the region by empirical evidence approach. Various economies can address the bottlenecks more effectively in the AI era when their collective interests are represented significantly by working together as a unified bloc.

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