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THE IMPACT OF THE DIGITAL ECONOMY ON DEVELOPMENT THE ASIA-PACIFIC REGION: MEASUREMENT ON GLOBAL VALUE CHAIN

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Abstract. The *purpose* of the paper is to summarise and present the evaluation impact of the digital economy development of countries in the Asia-Pacific region on Global Value Chain (GVC) through GVC Restructuring, the Division of Labor System and the Coordination Mechanism of GVC. *Methodology.* This paper collects a large volume of literatures, materials and data related to the digital economy and Global Value Chain (GVC). Firstly, the literature review method is adopted to sort out the relevant theoretical mechanisms and the latest research findings on the impact of economic development in the Asia-Pacific region on GVC under the background of the digital economy. Secondly, a combination of qualitative and quantitative analysis methods is employed to construct an empirical model of the indicator system for measuring the digital economy development level of regional countries. Based on 3 primary indicators of the digital economy (digital infrastructure, digital innovation environment, and digital industrialization) and 13 secondary indicators, the digital economy development level of Regional Comprehensive Economic Partnership (RCEP) member states is measured, and the comprehensive scores of the digital economy development level of 15 RCEP member states are obtained. Finally, the comparative analysis method is used to analyse the GVC participation degree and GVC activity of RCEP member states. *Results*. Digital technology in the Asia-Pacific region has become the core engine of global economic growth. With artificial intelligence (AI) and computing power, digital infrastructure, industrial integration, digital trade, and inclusive finance as the five main threads, it has promoted the global regional economy to shift from "scale expansion" to "quality improvement". *Practical implications*. The development of the digital economy in the Asia-Pacific region provides a steady stream of momentum for the extension of GVC to higher-end links, and at the same time plays a positive role in reshaping the division of labour system and upgrading path of GVC, as well as promoting the regional coordination of GVC. *Value / originality*. Analytical data on 3 primary indicators of the digital economy (digital infrastructure, digital innovation environment, and digital industrialization) and 13 secondary indicators provide a closely relationship between the digital economy development level and GVC participation degree, the higher GVC participation degree, indicating that the country occupies an important position in the global industrial structure, location advantages, and division of labour roles.

Keywords: digital economy, digital infrastructure, digital innovation environment, and digital industrialization, labor system, regional comprehensive economic partnership.

JEL Classification: O18, R10, F29

1. Introduction

In November 2024, with the successful convening of the 31st APEC Economic Leaders' Informal Meeting and the 19th G20 Leaders' Summit, economic governance in the Asia-Pacific region and even global economic governance ushered in a new milestone. In March 2025, the Boao Forum for Asia (BFA) released two flagship reports, namely Asian Economic Outlook and Integration Progress Annual Report 2025 and Sustainable Development in Asia and the World Annual Report 2025 (Asian Development Bank, 2025). The reports point out that despite the increasing uncertainty in global economic growth; Asia will remain the main engine of the world economy and the core of Global

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Value Chain (GVC). Asian economies, especially China and the Association of Southeast Asian Nations (ASEAN), continue to demonstrate strong resilience, leading the world in economic growth, trade, regional economic integration and other aspects, and serving as an important force and cornerstone for stabilizing and supporting the world economy.

According to the forecast of the International Monetary Fund (IMF), the global economy is expected to grow by 3.3% in 2026. The expected economic growth rates of developed economies such as the United States and the European Union in 2026 will all be below 2.5%, at 2.4% and 1.4% respectively. In the same period, the economic growth of developing countries in Asia is expected to stabilize at 5.0%, among which China, Indonesia, and Malaysia are expected to grow by 5.0%, 4.5%, and 4.8% respectively (ASEAN Digital Economy Outlook Report, 2022), becoming an important force driving economic growth under the economic recovery. The Asia-Pacific region has become a strong force in the development of global emerging markets. Meanwhile, relying on its huge market scale, improved industrial system, and rapidly popularized digital infrastructure, the Asia-Pacific region has become the core engine of global economic growth and GVC restructuring.

The formal implementation of the Regional Comprehensive Economic Partnership (RCEP) on January 1, 2022, marks that regional economic integration in the Asia-Pacific region has entered a new stage. As the world's largest free trade area in terms of population and economic and trade scale, RCEP covers approximately 30% of the world's GDP, population, and total trade volume. It provides deeper market opening than the World Trade Organization (WTO) for the Asia-Pacific region and creates a stable and predictable regional large market. RCEP occupies a core pillar position in the economic development of the Asia-Pacific region and plays a positive role in reshaping the Asian regional economic pattern, formulating global trade strategies, and boosting global economic recovery.

In recent years, countries in the Asia-Pacific region have continuously promoted the construction of digital infrastructure, digital industrial innovation, and coordination of regional digital governance, driving the regional economy towards digitalization, intellectualization, and green transformation. This process has not only reshaped the structure of value chains within the Asia-Pacific region but also exerted a profound impact on the participation models, spatial distribution, and governance systems of Global Value Chain (GVC).

2. Literature Review

Early research on Global Value Chain (GVC) centred on the concept of "vertical specialization", which gradually entered the academic perspective with the rise of multinational corporations in the field of international production in the 1960s and 1970s. This concept was first proposed by Balassa (Balassa, 1967), and usually involves aspects such as "production fragmentation", "international production dispersion", "international outsourcing", and "value chain slicing". Gereffi et al. proposed five modes of GVC governance: market, modular, relational, captive, and hierarchical (Gereffi, Humphrey, Sturgeon, 2005). Regarding GVC upgrading, Humphrey and Schmitz put forward four paths of industrial upgrading in GVC (Humphrey, Schmitz, 2002). Enterprises in developing countries can follow the industrial upgrading paths of "process upgrading, product upgrading, functional upgrading, and chain upgrading" to embed themselves in GVC, thereby acquiring advanced technologies and market competitiveness and improving their disadvantageous position at the low end of GVC (Humphrey, Schmitz, 2002).

With the rapid development of the digital economy and global integration, the participation of various countries and regions in global division of labour, production, trade, delivery, governance and other links has become inseparable. Meanwhile, as the core driving force for the transformation of the global economic structure, the reshaping mechanism, impact effects, and future trends of the digital economy on GVC have become core research topics in the field of economics.

On the one hand, Fernandes et al. pointed out that digital platforms, Internet communication, and intelligent collaboration technologies have significantly reduced the costs of information search, contract performance, and inter-entity coordination in cross-border production, promoting the transformation of GVC from traditional vertical integration division of labour to a networked, flat, and modular direction, and breaking the constraints of geographical distance and scale thresholds on enterprises' participation in the international division of labour (Fernandes, Mattoo, Wang, 2019).

On the other hand, some scholars have confirmed that the development of the digital economy can significantly enhance the depth of GVC participation of economies and enterprises and promote their climb to the middle and high-end links of the value chain. Huiying et al. found that digital input has significantly improved enterprises' domestic value-added rate and position in the value chain division of labour through technological innovation effects and production efficiency improvement effects (Huiying, Yang, Hongju, Yang, 2024); Qi and Ren further verified that the promoting effect of the digital economy on GVC upgrading has industry heterogeneity, and the enabling effect on technology-intensive industries is more significant (Junyan, Qi, Yida, Ren, 2021). Xue pointed out in their research that the digital economy effectively reduces the embedding threshold of labour-intensive

industries, providing possibilities for developing countries to achieve leapfrog upgrading of the value chain (Lan, Xue, 2023). Li et al. empirically found that deep embedding in GVC can reversely promote enterprises' digital transformation through technology spillover, resource optimization allocation, and market competition forcing effects, and the promoting effect on enterprises locked in the low end of the value chain is more prominent (Junrong, Zhang, Li, Li, Jian, Wang, 2024).

Meanwhile, the research team of Shanghai University of Finance and Economics found that the digital economy promotes the expansion of GVC embedding length by reducing external transaction costs and optimizing the allocation of production links, and at the same time promotes the improvement and inward integration of domestic value chain links (Research Centre for Global Value Chains, Shanghai University of Finance and Economics, 2023), realizing the coordinated linkage of international and domestic value chains. Zhang et al. showed that digital technology has improved the transparency and emergency response capacity of GVC, weakened the dependence on geographical agglomeration, promoted GVC to present the characteristics of short-chain, regionalization, and diversification, and significantly enhanced the stability and risk resistance capacity of supply chains (Si, Chen, Wei, Zhang, 2023).

Through sorting out the research of relevant scholars, it is found that the digital economy empowers GVC division of labour, upgrading, spatial restructuring, and governance reform, forming a multi-level achievement system from theoretical framework construction to empirical testing, and from the macro level to micro subjects, which provides important theoretical support and empirical basis for the global division of labour in the digital era. However, there is still room for expansion in the research on the integration and innovation of the digital economy and GVC.

3. Research Methodology

This paper takes the 15 member states of the Regional Comprehensive Economic Partnership (RCEP) as the research objects of the Asia-Pacific region, aiming to examine the impact of economic development in the Asia-Pacific region on their Global Value Chain (GVC).

(1) Literature Review Method. By extensively reading domestic and foreign literature and materials related to economic development in the Asia-Pacific region, the digital economy, and GVC, this paper sorts out the relevant theoretical mechanisms and the latest research findings on the impact of economic development in the Asia-Pacific region on GVC under the background of the digital economy, which serves as an important theoretical basis for this study.

(2) Combined Method of Qualitative and Quantitative Analysis. The scope of qualitative analysis refers to the summary and collation of relevant data and literature data, concluding that the development of the digital economy in the Asia-Pacific region is a key driving force for GVC restructuring, and at the same time plays a positive role in reshaping the division of labour system and upgrading path of GVC as well as promoting the regional coordination of GVC. Quantitative analysis refers to measuring the digital economy development level of RCEP member states by constructing an empirical model of the indicator system for the digital economy development level of RCEP countries. The combination of the two integrates theory and demonstration, making the research content logically coherent and more persuasive.

(3) Comparative Analysis Method. This paper compares the data on the digital economy development level of different RCEP member states, observes and analyses the GVC participation degree and GVC activity of RCEP member states, the dynamic changes in digital economy trade data of each RCEP member state in previous years, as well as the proportion and ranking of FDI Inflow and FDI Outflow in global investment. From this, it explores the internal connection and impact between the digital economy development level in the Asia-Pacific region and GVC.

4. Results

(1) Construction of the Digital Economy Development Level Indicator System for RCEP Countries

Against the backdrop of accelerating digital transformation of the global economy, the digital economy has become the core driving force for reorganizing global factor resources and reshaping the pattern of international trade. The development level of a country's digital economy needs to comprehensively consider multiple aspects, including national digital infrastructure, digital technology, digital innovation capacity, and digital trade. Based on relevant data from the World Economic Forum (WEF), World Bank, UN E-Government Survey, International Telecommunication Union (ITU), United Nations Conference on Trade and Development (UNCTAD), and other institutions, this paper constructs a digital economy development level indicator system for RCEP member states. Three primary indicators are selected, namely digital infrastructure, digital innovation environment, and digital industrialization. There are 5 secondary indicators for measuring digital infrastructure, 5 indicators for measuring the digital innovation environment, and 3 indicators for measuring digital industrialization, totaling 13 secondary indicators. The specific indicator names and data sources are shown in Table 1:

Table 1
RCEP Countries' Digital Economy Development Level Indicators

Primary Indicator	Secondary Indicator	Sources of Date	Indicator Attribute
Digital Infrastructure	Internet user base	WDI	+
	Communication infrastructure coverage	UN E-Government Survey	+
	Mobile network coverage(4G/5G)	WDI	+
	Fixed broadband coverage	WDI	+
	Secure network server coverage	WDI	+
Digital Innovation Environment	Digital talent rate	WDI	+
	Digital patents and journal publication rate	WEF	+
	R&D investment intensity in digital technology	WEF	+
	Strength of intellectual property protection	WEF	+
	E-government development index	UN E-Government Survey	+
Digital Industrialization	GDP added value of core industries	UNCTAD stat.	+
	ICT industry revenue rate	UNCTAD stat.	+
	Digital trade index	UNCTAD stat.	+

Source: Authors' own elaboration

The construction of the digital economy development level indicator system can provide a quantifiable, monitorable, and assessable practical basis for the economic strategies of RCEP member states and guide the direction for the high-quality development of the digital economy. Firstly, digital infrastructure is the underlying hardware foundation of the digital economy, and the premise of all digital activities is to ensure the smooth flow of "electricity, networks, computing power, and security"; secondly, the digital innovation environment is the source of motivation for the digital economy, and providing innovative technologies, high-quality talents, policy and financial support is the engine for the sustained growth of the digital economy; finally, digital industrialization is the core industrial entity and growth driver of the digital economy, and a complete industrial system and industrial chain provide a steady stream of vitality and development resilience for a country's economic GDP, tax revenue, employment, and other aspects. These three dimensions cover most of the connotation of the digital economy, and the digital economy development level indicator system constructed thereby can better reflect a country's digital economy level and has strong explanatory power for the digital economy.

(2) Measurement of the Digital Economy Development Level of RCEP Member States

Based on the 13 secondary indicators in Table 1, panel data processing was conducted, and the conventional Principal Component Analysis (PCA) was adopted to more comprehensively and accurately analyse the current development status of the digital economy in RCEP countries, so as to calculate the comprehensive index of the digital economy development level of RCEP countries.

As shown in Table 2, after extracting principal components from the 13 secondary indicators, the eigenvalues of the first three factors are ≥ 1. (In accordance with the criteria of Principal Component Analysis, only principal components with eigenvalues ≥ 1 are retained.) The cumulative variance contribution rate is 78.3%, which is significantly higher than the statistical threshold of 70%. This indicates that the first three principal components can effectively capture the key information of most indicators.

The coefficient of each component indicator in the linear combination is obtained by dividing the component matrix value in Table 3 by the square root of the eigenvalue corresponding to that component indicator. The calculation results are as follows:

$$F1 = 0.124a + 0.126b + 0.083c + 0.123d + 0.064e + \\ + 0.136f + 0.029g + 0.132h + 0.131i + 0.125j + \\ +0.063k + 0.045l + 0.050m \quad (1)$$

$$F2 = -0.103a - 0.130b + 0.051c - 0.104d + \\ +0.143e - 0.134f + 0.086g - 0.133h + 0.011i - \\ -0.051j + 0.403k - 0.162l + 0.267m \quad (2)$$

$$F3 = 0.035a + 0.037b + 0.319c - 0.250d - \\ - 0.149e - 0.165f + 0.662g - 0.127h + 0.005i - \\ - 0.100j + 0.108k + 0.476l + 0.096m \quad (3)$$

After obtaining the expressions of the above factors, the variance contribution rates of the three extracted principal components are taken as weights, and the weighted average of the coefficients of each secondary indicator in the linear combination is calculated to obtain the coefficients of each secondary indicator in the comprehensive indicator. The specific calculation formula is as follows:

$$F = (0.552/0.783)*F1 + (0.138/0.783)*F2 + \\ + (0.093/0.783)*F3 \quad (4)$$

By substituting the processed values of each secondary indicator in Table 3 into the formula for calculation, the 13 variable values of a-m can be obtained as follows: 0.074, 0.072, 0.123, 0.042, 0.046, 0.047, 0.110, 0.052, 0.095, 0.064, 0.160, 0.090, and 0.088. All variable scores are positive, indicating that the three factors have

Table 2
Variance Contribution Table

principal component	characteristic value	variance contribution rate	cumulative variance contribution rate
Factor1	7.176	0.552	0.533
Factor2	1.794	0.138	0.648
Factor3	1.209	0.093	0.783
Factor4	0.884	0.068	0.823
Factor5	0.676	0.052	0.861
Factor6	0.533	0.041	0.952
Factor7	0.351	0.027	0.960
Factor8	0.260	0.020	0.975
Factor9	0.195	0.015	0.983
Factor10	0.117	0.009	0.991
Factor11	0.091	0.007	0.995
Factor12	0.065	0.005	0.997
Factor13	0.039	0.003	1.000

Source: Authors' own elaboration

Table 3
Principal Component Score Coefficient Matrix

variable		Factor 1	Factor 2	Factor 3
a	Internet user base	0.124	-0.103	0.035
b	Communication infrastructure coverage	0.126	-0.130	0.037
c	Mobile network coverage(4G/5G)	0.083	0.051	0.319
d	Fixed broadband coverage	0.123	-0.104	-0.250
e	Secure network server coverage	0.064	0.143	-0.149
f	Digital talent rate	0.136	-0.134	-0.165
g	Digital patents and journal publication rate	0.029	0.086	0.662
h	R&D investment intensity in digital technology	0.132	-0.133	-0.127
i	Strength of intellectual property protection	0.131	0.011	0.005
j	E-government development index	0.125	-0.051	-0.100
k	GDP added value of core industries	0.063	0.403	0.108
l	ICT industry revenue rate	0.045	-0.162	0.476
m	Digital trade index	0.050	0.267	0.096

Source: Authors' own elaboration

a positive impact on the digital economy development level.

Based on Table 1 and the calculation formula, and adjusted in combination with the actual development of the digital economy of RCEP member states, this paper comprehensively measures the digital economy development level of RCEP countries in 2025 from three dimensions: Digital Infrastructure, Digital Innovation Environment, and Digital Industrialization. The detailed indicator scores are shown in Table 4.

To analyse the overall development trend of the digital economy in 15 RCEP countries more objectively and comprehensively, this paper calculates the latest five-year dynamic situation of the digital economy development of RCEP countries with reference to data from the ITU, UNCTAD, WEF, official digital economy reports of various countries, and regional cooperation data, as shown in Figure 1.

Based on the average index data of RCEP countries from 2021 to 2025 in three dimensions – Digital Infrastructure, Digital Innovation Environment, and Digital Industrialization – this paper analyzes the digital economy development level index scores (Table 4) and trends (Figure 1) of the 15 countries.

In terms of development levels: First, Singapore is a global leader in the digital economy. Its average index reached 96.2 in 2025, ranking first for five consecutive years. Its Digital Infrastructure (96.1), Digital Innovation Environment (97.2), and Digital Industrialization level (95.3) are all regional benchmarks, reflecting a full-chain leading digital economic ecosystem. Second, Korea, Japan, China, Australia, and New Zealand, with an average index of ≥85 in 2025, belong to the regional core development layer. Among which, China, Korea, and Japan maintain stable index growth relying on mature digital technology R&D and industrial layout; Australia and New Zealand maintain a high level of development through digital governance and digital

Table 4
RCEP Countries Digital Economy Development Level Index Scores, 2025

Country	Digital Infrastructure	Digital Innovation Environment	Digital Industrialization	Average Score
Singapore	96.1	97.2	95.3	96.2
Korea	94.8	92.9	93.7	93.8
Japan	93.5	91.8	92.1	92.5
China	91.2	88.7	90.5	90.1
Australia	89.3	88.9	87.6	88.6
New Zealand	88.1	87.5	86.2	87.3
Malaysia	81.5	80.7	79.8	80.7
Thailand	78.9	76.8	77.3	77.7
Brunei	76.2	75.8	74.5	75.5
Indonesia	73.4	72.3	71.6	72.4
Vietnam	70.6	69.7	68.9	69.7
Philippine	69.2	68.3	67.5	68.3
Cambodia	56.7	55.1	54.2	55.3
Laos	53.4	52.5	51.1	52.3
Burma	49.8	48.5	47.3	48.5

(Note: This index adopts 0-100 point system, with each of the three dimensions accounting for a weight of 1/3.)

Source: Authors' own elaboration

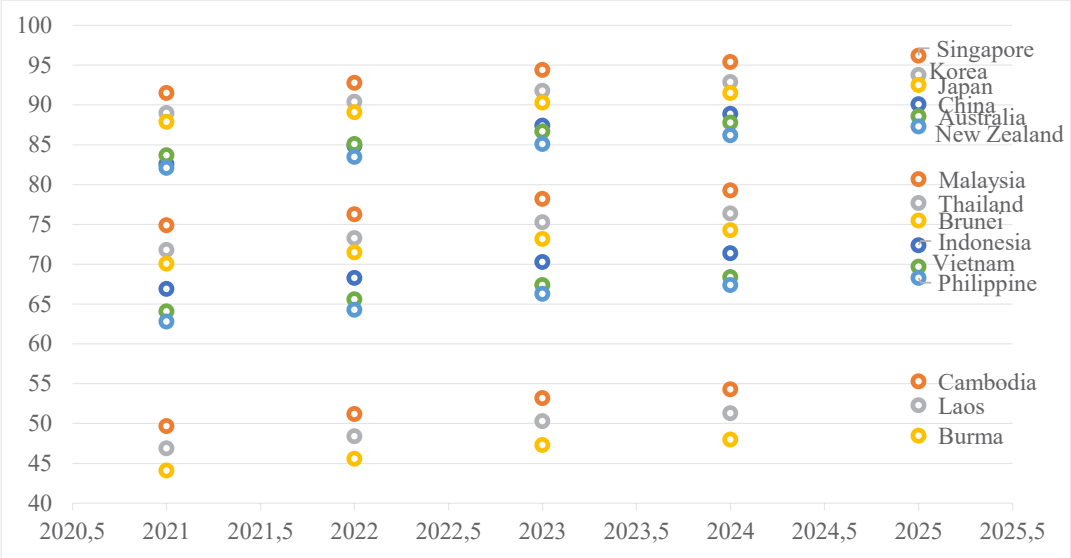

Figure 1. Dynamic Trend of Digital Economy Development of RCEP Countries

Source: Authors' own elaboration

transformation of resource industries. Third, Malaysia, Thailand, and Brunei, with an average index between 75 and 81 in 2025, are core ASEAN economies. The digital economy development of these three countries relies on infrastructure construction and initial agglomeration of digital industries, and the innovation environment has become a key shortcoming restricting their breakthrough. Finally, Indonesia, Vietnam, the Philippine, Cambodia, Laos, and Burma all had an average index below 70 in 2025, among which Burma was only 48.5, belonging to the initial stage of digital economy development. All three-dimensional indicators have significant shortcomings, and the regional digital development divide still exists.

In terms of development trends: The average digital economy index of all RCEP countries showed a continuous upward trend from 2021 to 2025, confirming the positive effects of regional digital cooperation in RCEP. Developed countries such as Singapore and Korea maintained an average annual growth rate of 1-2 percentage points, with steady improvement in development quality; ASEAN countries showed stronger growth momentum, for example, Vietnam's index increased from 64.1 to 69.7, and Cambodia's from 49.7 to 55.3, reflecting the catch-up effect of late-developing countries. At the same time, the gap in regional digital economy development showed a converging trend. The advancement of

digital infrastructure connectivity and cross-border collaboration in digital industries has effectively helped less developed countries improve their digital capabilities.

(3) GVC Participation of RCEP Countries

GVC Participation degree is measured by the share of foreign value added in exports and indirect value added in gross exports (0–1). Data are estimated based on UNCTAD Eora-MRIO, ADB MRIO, and national statistics, GVC participation index of RCEP countries from 2021 to 2025 are presented in Table 5. Higher values represent deeper integration into global value chains (GVC).

Based on the GVC participation index of RCEP countries (Table 5), the Standard Deviation (SD) of each country's GVC participation degree was calculated to measure the annual volatility of GVC participation degree among the 15 countries. A larger value indicates weaker stability of GVC participation degree.

According to the information in Table 5 and Figure 2, Singapore ranked first with an average annual participation degree of 0.86, reaching a peak of 0.87 in 2025. The difference between its max value (0.87) and min value (0.84) was only 0.03. Combined with the low standard deviation of 0.011, it indicates that Singapore has formed a stable pattern of high-end embedding in the value chain, and continues to dominate the circulation of regional value chains relying on its advantages as a shipping hub and digital services. The average participation degrees of Korea, Malaysia,

Table 5

GVC Participation Index of RCEP Countries, 2021–2025

Country	2021	2022	2023	2024	2025	Average Value
Singapore	0.84	0.85	0.86	0.86	0.87	0.86
Korea	0.8	0.81	0.81	0.82	0.83	0.81
Malaysia	0.76	0.77	0.78	0.79	0.8	0.78
Thailand	0.73	0.74	0.75	0.76	0.77	0.75
Japan	0.73	0.74	0.74	0.75	0.76	0.74
China	0.7	0.71	0.72	0.73	0.74	0.72
Vietnam	0.68	0.69	0.7	0.71	0.73	0.70
Australia	0.67	0.68	0.68	0.69	0.7	0.68
New Zealand	0.65	0.66	0.66	0.67	0.68	0.66
Philippine	0.61	0.62	0.63	0.64	0.65	0.63
Indonesia	0.58	0.59	0.6	0.61	0.62	0.60
Brunei	0.56	0.57	0.57	0.58	0.59	0.57
Cambodia	0.49	0.5	0.51	0.52	0.54	0.51
Laos	0.45	0.46	0.47	0.48	0.49	0.47
Burma	0.4	0.41	0.41	0.42	0.43	0.41

Source: Authors' own elaboration

Figure 2. Standard Deviation of GVC Participation Degree of RCEP Countries

Source: Authors' own elaboration

Thailand, and Japan were between 0.74 and 0.81. In which, Korea had a standard deviation of 0.011, with its participation degree steadily rising from 0.80 to 0.83, showing prominent stability; Malaysia (0.78) and Thailand (0.75) achieved steady improvement relying on manufacturing agglomeration, with standard deviations of 0.014 and 0.016 respectively, reflecting moderate growth volatility. The average participation degrees of China and Vietnam were 0.72 and 0.70, respectively. Vietnam had a standard deviation of 0.019, the highest in the region, reflecting that as the manufacturing centre of ASEAN, its GVC participation degree showed significant fluctuation characteristics of rapid growth along with industrial transfer.

The trend of GVC participation degree of RCEP countries is similar to that of RCEP countries digital economy development level. On the whole, there is a positive relationship between the digital economy development level and GVC participation degree – that is, the more developed the digital economy of a country, the higher its GVC participation degree, indicating that the country occupies an important position in the global industrial structure, location advantages, and division of labour roles.

(4) GVC Activity of RCEP Countries

To expand the depth and breadth of this article, the latest core data on GVC of RCEP countries from 2021 to 2025 will be supplemented below, so as to improve the activity of RCEP countries in the development of GVC from two aspects: the scale of Global Trade and Foreign Direct Investment (FDI).

The trade scale of RCEP countries increased from 12.8 trillion US dollars in 2021 to 16.63 trillion US dollars in 2025, with a cumulative growth rate of 29.92% over five years, which was significantly higher than the global trade growth rate of 24.00%, showing a continuous expansion trend. Meanwhile, the proportion of RCEP countries' trade volume in global trade volume remained within the range of 27%–29.5%, reaching a peak of 29.10% in 2024 and slightly falling back to 28.50% in 2025, but still higher than the level in 2021–2022. Although the proportion of RCEP returned to the average level due to the renewed expansion of global trade in 2025, it indicates that the intra-RCEP trade has strong resilience and is synergistic with the global trade cycle.

The RCEP region has become a pivotal core sector in global trade, the trade scale growth rate has continuously outperformed the global average, with share stably maintaining at nearly 30%, and contribution to global trade growth has been continuously strengthened. In the future, with the full implementation of the RCEP agreement and the deepening of intra-regional industrial chain coordination, RCEP is expected to further consolidate its core position in global trade and continuously provide momentum for the recovery and growth of global trade.

Based on the data on the proportion of FDI Inflow and FDI Outflow of RCEP member states in the world from 2021 to 2025, the overall characteristics and national differences of regional foreign capital flows can be clearly seen. In terms of FDI Inflow, China and Singapore ranked first and second, with proportions reaching 11.8% and 5.2% respectively in 2021, and steadily increasing year by year, rising to 14.1% and 6.4% respectively in 2025, making the core destinations for global foreign capital inflows. The proportion of foreign capital attracted by Japan, Australia, Korea and other countries remained stable between 1.2% and 1.9%, maintaining a slight growth trend. In terms of FDI Outflow, China, Japan, Singapore, and Australia performed prominently. Those of proportions of outward investment in 2021 were 9.2%, 3.2%, 4.8%, and 3.1% respectively, accounting for more than 80% of the total outward investment of RCEP and dominating the regional outward investment pattern. In which, China had the most significant growth rate, with its proportion reaching 14.2% in 2025, becoming the core force of regional outward investment. For other small and medium-sized member states, whether in terms of attracting foreign capital or outward investment, these proportions were relatively low and fluctuated gently, with most countries accounting for less than 1%. Laos, Myanmar, and Cambodia had long maintained a low level of outward investment.

Overall, the foreign capital flows of RCEP member states showed a steady growth trend from 2021 to 2025. The leading role of top countries was prominent, the characteristics of uneven distribution of foreign capital within the region were significant, and the activity of intra-regional investment cycles is expected to continue to improve.

Table 6

Trade Data of RCEP Countries, 2021–2025 (in goods trade terms, unit: trillion USD)

Year	RCEP Trade Volume	Global Trade Volume	Trade Proportion RCEP/Global	Data Sources
2021	12.8	47.06	27.20%	WB, WTO
2022	14	49.12	28.50%	WB, WTO
2023	15.65	55.3	28.30%	WB, UNCTAD
2024	16.14	55.46	29.10%	ASEAN, UNCTAD
2025	16.63	58.35	28.50%	WTO, UNCTAD

Source: Authors' own elaboration

Table 7
Proportion of FDI Inflow of RCEP Countries in the World, 2021–2025 (unit:%)

Country	2021	2022	2023	2024	2025	Average Value	Ranking
China	11.8	12.3	12.9	13.5	14.1	12.92	1
Singapore	5.2	5.5	5.8	6.1	6.4	5.8	2
Japan	1.7	1.8	1.9	2	2.1	1.9	3
Korea	1.3	1.4	1.5	1.6	1.7	1.5	4
Australia	1.2	1.3	1.4	1.5	1.6	1.4	5
Vietnam	1.1	1.2	1.3	1.4	1.5	1.3	6
Indonesia	1	1.1	1.1	1.2	1.3	1.14	7
Malaysia	0.9	0.9	1	1.1	1.2	1.02	8
Thailand	0.8	0.8	0.9	0.9	1	0.88	9
Philippines	0.6	0.7	0.7	0.8	0.8	0.72	10
Cambodia	0.3	0.3	0.3	0.4	0.4	0.34	11
New Zealand	0.3	0.3	0.3	0.3	0.3	0.3	12
Brunei	0.1	0.1	0.1	0.1	0.1	0.1	13
Laos	0.1	0.1	0.1	0.1	0.1	0.1	14
Myanmar	0.1	0.1	0.1	0.1	0.1	0.1	15

Source: Authors' own elaboration

Table 8
Proportion of FDI Outflow of RCEP Countries in the World, 2021–2025 (unit:%)

Country	2021	2022	2023	2024	2025	Average Value	Ranking
China	9.2	10.1	11.5	12.8	14.2	11.56	1
Singapore	4.8	5.2	5.6	6	6.5	5.62	2
Japan	3.2	3.4	3.6	3.8	4	3.6	3
Australia	3.1	3.3	3.5	3.7	3.9	3.5	4
Korea	2.1	2.2	2.3	2.4	2.5	2.3	5
Malaysia	0.8	0.8	0.9	0.9	1	0.88	6
Thailand	0.6	0.6	0.7	0.7	0.8	0.68	7
New Zealand	0.5	0.5	0.5	0.6	0.6	0.54	8
Indonesia	0.4	0.4	0.5	0.5	0.6	0.48	9
Vietnam	0.3	0.3	0.4	0.4	0.5	0.38	10
Philippines	0.2	0.2	0.3	0.3	0.3	0.26	11
Brunei	0.1	0.1	0.1	0.1	0.1	0.1	12
Cambodia	0	0	0	0.1	0.1	0.04	13
Laos	0	0	0	0	0	0	14
Myanmar	0	0	0	0	0	0	15

Source: Authors' own elaboration

5. Conclusions

The digital economy development level of RCEP member states is the core epitome of the economic development level in the Asia-Pacific region. The development trend fully reflects the overall picture of the transformation of the Asia-Pacific regional economy from traditional growth to digital-driven growth, and is also a concentrated embodiment of the economic vitality and development potential of the Asia-Pacific region. Among which, the 5G network coverage rate in Singapore and Korea exceeds 85%, and AI applications have deeply penetrated industrial scenarios, representing the highest development level of the digital economy in the Asia-Pacific region; relying on improved digital infrastructure and a huge application market, China has become the core engine for the growth of the digital economy in the Asia-Pacific region; countries such as Vietnam and Indonesia are accelerating 5G deployment and digital industrial layout, reflecting the strong momentum of digital transformation of emerging economies in the Asia-Pacific region, which is highly consistent with the rapid rise of emerging markets in the Asia-Pacific regional economy.

It is evident that the impact of the digital economy development of countries in the Asia-Pacific region on Global Value Chain (GVC) is mainly reflected in the following three aspects:

1. The Development of the Digital Economy in the Asia-Pacific Region is a Key Driving Force for GVC Restructuring

Professor Xue Lan from Tsinghua University pointed out that in the digital economy, data plays a role

similar to that of oil in the manufacturing industry in the past, and has become a key factor reshaping the competitiveness of the global digital industry *(Lan, Xue, 2023)*. From 2015 to 2025, the global scale of cross-border data flows maintained an average annual growth rate of more than 20%, generating enormous economic value. RCEP specifically encourages member states to strengthen infrastructure construction and intellectual property protection, providing important opportunities for the digital transformation of small and medium-sized enterprises (SMEs).

An empirical study based on data from RCEP countries found that there is a significant U-shaped relationship between digital trade and a country's climb in the GVC position. This means that the development of digital trade may reduce a country's GVC position in the initial stage, but after reaching a certain threshold, that will significantly improve the value chain position. It is not difficult to find that developed countries such as Singapore, Korea, and Japan are in the late-stage climb of digital trade, relying on high-tech and institutional advantages to maintain the high-level and stable development of the digital economy, and exerting a long-term positive driving effect on GVC; developing countries such as China, Malaysia, and Thailand are in the initial accumulation stage of digital trade, relying on emerging industrial upgrading and institutional opening-up to provide new momentum for the extension of GVC to higher-end links.

2. The Development of the Digital Economy in the Asia-Pacific Region Reshapes the Division of Labor System and Upgrading Path of GVC

The development of the digital economy in the Asia-Pacific region promotes the differentiated upgrading of the division of labour position in GVC. Leading digital economy countries in the Asia-Pacific region, such as Singapore, Korea, and China, rely on improved digital infrastructure, core technological advantages, and huge application markets to attract the agglomeration of foreign capital related to the global digital industry, promote the transfer of high-end GVC links to the region, and gradually transform from "value chain participants" to "value chain leaders". Countries with rapid digital economy catch-up, such as Vietnam and Indonesia, rely on digital empowerment to undertake mid-to-low-end manufacturing and service outsourcing links, accelerate their integration into the regional value chain division of labour system, and become important undertaking carriers for the gradient transfer of GVC.

3. The Development of the Digital Economy in the Asia-Pacific Region Promotes the Coordination Mechanism of GVC

The digital economy has weakened geographical space constraints, promoted the agglomeration of GVC to the Asia-Pacific region, and strengthened the region's core position in GVC. Digital technology empowers cross-border trade, foreign capital flows, and industrial chain coordination, reduces the transaction costs of GVC division of labour, promotes intra-regional member states to form a coordinated pattern of "digital + industrial chain", and improves the integrity and competitiveness of the regional value chain. In addition, the development of the digital economy has also intensified the imbalance in intra-regional GVC division of labour. Due to weak digital infrastructure, countries with backward digital economies such as Laos and Cambodia are difficult to participate in mid-to-high-end division of labour and have long been in the low-end links of GVC, which further highlights the importance of regional digital coordinated development for the balanced upgrading of the value chain.

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