ISSN 2616-5902 Vol. 6, Issue 1: 10-16, DOI: 10.25236/AJBM.2024.060102

Research on the Impact of Digital Economy Development Level of Host Countries on China's Trade: An Empirical Research Based on RCEP Countries

Qianqing Wei[1,a], Min Liu[1,b,*]

[1]*School of Economics, China-ASEAN Institute of Financial Cooperation, Guangxi University, Nanning, Guangxi, 530004, China*
[a]*kikikoko@126.com,* [b]*liuminsharon@163.com*
[*]*Corresponding author*

Abstract: *Digital economy is becoming a key factor in the reorganization of global important factor resources, the reshaping of economic structure and the change of global competition pattern. With the advent of the era of digital economy, the digital economic cooperation of RCEP countries is getting closer and closer, and the trade cooperation with China is getting closer and closer. Using the data from 2007 to 2021, this study uses panel data model to study the impact of digital economy of other RCEPs on China's trade. The empirical results show that the development level of digital economy in other RCEP countries can promote the development of China's trade with them, which has a significant role in promoting China's total trade, export and import. After multiple robustness tests, this conclusion is still significant. Finally, the heterogeneity test shows that the digital economy development level of middle and high incoming countries has a stronger impact on China's trade activities. Therefore, this paper proposes that in order to promote digital economy cooperation and trade among RCEP countries, each member country needs to strengthen the efficiency of digital infrastructure, and at the same time, strengthen the integration of digital economy and real economy. In addition, the member states should promote the coordinated development of innovation and enhance the degree of trade facilitation and cooperation.*

Keywords: *Digital economy development level, International trade, RCEP*

1. Introduction

With the rise of the new round of scientific and technological industrial revolution, the deep integration of emerging information technology and the real economy has brought about important changes in the economic and social form. The digital economy has gained strong momentum, becoming the third economic and social form after the agricultural economy and the industrial economy, and increasingly becoming an important driving force of global economic growth. As a regional agreement with the largest population, the most diversified membership structure, the largest economic and trade scale and the greatest development potential in the world. The RCEP agreement well conforms to this development trend and attaches great importance to the field of digital economic cooperation. Digital economy has become the key area of cooperation among RCEPs. A series of rules and provisions have been formulated in terms of digital economic cooperation and development, such as tariff concessions, service trade and investment. Aiming to strengthen the digital economy growth and trade cooperation among the REP member states. RCEPs have strong complementarity in digital economy and great potential for digital cooperation.

The digital economy affects all aspects of social life and has a huge impact on international trade. RCEPs such as Australia, New Zealand and ASEAN are increasingly becoming important trading partners of China. They are increasingly interdependent with China and play an important role in promoting China's economic and trade development and international competitiveness. Within the RCEP region, Southeast Asia has become the most important export market for China's labor-intensive, resource-intensive and simple technology-intensive manufactured goods. In 2021, the trade volume between China and RCEPs was US $1.87 trillion, including US $873.4 billion of exports and US $994.5 billion of imports, with an average annual growth rate of 12.9 percent. Against the backdrop of COVID-

ISSN 2616-5902 Vol. 6, Issue 1: 10-16, DOI: 10.25236/AJBM.2024.060102

19, other RCEPs have quickly overtaken the EU and the US to become one of China's most dynamic overseas markets. Therefore, studying the positive impact of the development of digital economy in RCEP countries on China's import and export trade and the realization of its transmission mechanism will not only help clarify the internal relationship between the development of digital economy and international trade, but also provide a theoretical basis for China to deepen the process of trade and digital cooperation with other RCEP countries.

2. Literature Review

At present, the development of digital economy is a focus of close attention in academia, and its impact on international economy and trade is also an important aspect of research in this field. Countries with a high level of development in digital economy can provide enterprises with more convenient access to information and communication technology. As a result, the digital industries of developed countries are more capable of increasing productivity and thus gaining comparative advantages in ICT in international trade. As statistics related to the digital economy are not easy to measure, most studies on the development of the digital economy so far have taken the Internet and other information and communication technologies and the digital transformation of enterprises as the main measurement indicators. In an earlier study, Freund and Weinhold [1] (2000) used cross-sectional data from 1995 to 1999 to study the impact of the Internet on bilateral trade among 54 countries. The results of empirical tests show that the Internet has a positive impact on trade and confirm the positive role of digital economy. In a subsequent related study, Freund and Weinhold [2] (2002) used the data of 14 service industries in the United States from 1995 to 1999 to analyze the impact of the Internet on service trade. They further confirmed that the development of the Internet has a significant role in promoting the export of services. According to the research results of Melitz et al. [3] (2003), international trade is closely related to efficiency, so the cost of getting involved in foreign markets is very high, and only a few companies can engage in such trade activities. This also confirms the special role of information and communication technology (ICT) in reducing trade costs, especially in terms of communication costs. Then, in a study by Marquez and Martinez Zarzoso [4], they used the Technology Innovation Index to measure ICT and found that ICT has a positive and nonlinear role in trade based on trade data between 13 exporting and 167 importing countries. Taking into account the heterogeneity of the effects of ICT on trade across countries.

In recent studies on digital economy and international trade. According to the research of Shuzhong M et al. [5] (2019), the emergence of the Internet can alleviate the problem of information distortion caused by geographical distance, thus promoting the export trade of cross-border e-commerce. Research by Haiyang L et al. [6] (2020) showed that digital economy can reduce a series of trade costs such as information search cost, copy cost and transportation cost in economic activities, thus promoting technological progress and trade growth. From the perspective of international trade efficiency, Xin F et al. [7] (2020) used the heterogeneous stochastic frontier gravity model to study the data of China's export to 115 countries and regions from 2007 to 2015, and empirically tested the significant improvement of China's export efficiency by the development level of digital economy in importing countries. Feng J et al. [8] (2021) conducted an empirical test on the relationship between the digital economy level of partner countries and China's service trade, and found that the digital economy development of partner countries can promote China's service export trade and reduce costs. However, there is a single threshold effect of cultural distance in this process, that is, when a country's digital economy development reaches a certain threshold value, the promotion effect on China's service export trade will be significantly weakened. Rodriguez et al. [9] (2021) used panel data from 1996 to 2014 in their study, and found that the promotion degree of the Internet on bilateral exports was related to the income level of the country, especially among high-income countries, the use of the Internet had the most significant effect on promoting bilateral trade. Meng H & Feng J [10] (2022) used dynamic factor analysis to measure the development level of digital economy in EU countries, and empirically tested the promotion effect of the development level of digital economy in EU on China's export trade.

3. Theory and Research Hypotheses

Based on the data from 1990 to 2006, Choi (2009) [11] concluded that the Internet had played a role in promoting the export and import of services between the US and 31 other countries, and the service trade increased by 4% year on year. The digital economy is characterized by time saving, high efficiency and no geographical restrictions, which can spread more information between different countries and people,

ISSN 2616-5902 Vol. 6, Issue 1: 10-16, DOI: 10.25236/AJBM.2024.060102

thus stimulating demand growth and reducing transaction costs. In addition, scholars at home and abroad have conducted a large number of empirical studies to verify the impact of the digital economy on international trade.

Due to the rapid development of digital economy, logistics enterprises can make better use of Internet big data and digital technology, so as to carry out intelligent order processing, goods sorting and storage regulation, so as to improve the efficiency of logistics and transportation, reduce the cost of transportation and other aspects. In addition, the transportation cost of online games and software digital products in the digital economy is approaching zero, which further weakens the impact of geographical distance on international trade and speeds up the development of intermediate goods trade (Bingzhan S, 2016) [12]. The advantages of information technology and Internet platform unique to digital economy enable enterprises to quickly and accurately match supply and demand in international trade, reduce intermediate links, and improve the frequency and efficiency of international trade exchanges. This further expands the boundaries of enterprises, making them a key force to coordinate resource allocation and realize value creation and convergence (Hagiu,2012) [13]. Therefore, the development of digital economy in host countries effectively reduces transaction costs in international economic activities, improves production connection and cooperation efficiency among enterprises, and becomes an important driving force for China's foreign trade.

Therefore, this study puts forward the following hypotheses:

H1: The development level of digital economy in host countries is conducive to the growth of total bilateral trade between China and other RCEPs.

H2: The development level of the digital economy of the host country is conducive to the growth of the export value of China and other RCEPs.

H3: The development level of digital economy in host countries is conducive to the growth of import volume between China and other RCEPs.

4. Research Design

4.1. Model Construction and Data Sources

In order to test the above hypotheses, the following basic panel data model is firstly constructed for the transmission mechanism:

$$lnTrade_{it} = \alpha_0 + \alpha_1 Digital_{it} + \alpha_2 \ln X + \mu_t + \delta_i + \varepsilon_{it} \quad (1)$$

$$lnEX_{it} = \beta_0 + \beta_1 Digitalit + \beta_2 \ln X + \mu_t + \delta_i + \varepsilon_{it} \quad (2)$$

$$lnIM_{it} = \gamma_0 + \gamma_1 Digital_{it} + \gamma_2 \ln X + \mu_t + \delta_i + \varepsilon_{it} \quad (3)$$

Where $InTtrde_{it}$, $lnEX_{it}$ and $lnIM_{it}$ are the total trade volume, export volume and import volume of China to country i in period t, $Digital_{it}$ is the digital economy level of country i in period t, lnX is a series of control variables, μ_t and δ_i are country fixed effects and time fixed effects, respectively. ε_{it} is the random disturbance term, α_0, β_0 and γ_0 is the constant term, α_1, α_2, β_1, β_2 and γ_1, γ_2 represent the estimated coefficients of each variable respectively.

4.2. Variable Measurement and Description

4.2.1. Explained Variable

In this paper, the total trade volume, import volume and export volume of other RCEP countries to China with them are used as the proxy variables of bilateral trade. The data are from the World Development Indicators Database (WDI).

4.2.2. Explanatory Variables

The core explanatory variable in this paper is the digital economy development level of each country ($Digital_{it}$). Given the limitations of the available data, this paper uses the logarithm of the Internet penetration rate to assess the development of the digital economy. Internet penetration is the share of individuals in the total population who have used the Internet in the past three months, including the use of devices such as computers, mobile phones, game consoles and digital TVS. The data come from the World Development Indicators Database (WDI).

ISSN 2616-5902 Vol. 6, Issue 1: 10-16, DOI: 10.25236/AJBM.2024.060102

4.2.3. Control Variables

Consumer demand. The economic development level of the importing country reflects its market size and consumption power, and the import demand of country i in period t is measured by the gross domestic product (GDP_{it}) of RCEP countries in the World Bank's Development indicators database.

The level of wages. The higher a country's wage level, the less it exports. This paper uses China's average income to represent China's wage level in period t ($Wage_t$).

Trade openness. The foreign trade dependence of an importing country is an indicator to reflect a country's degree of openness to the outside world. The higher the foreign trade dependence of a country is, the higher its level of openness to the outside world is, so the more it participates in international trade. This paper uses the ratio of imports and exports of goods and services to GDP of importing countries (DT_{it}) to measure foreign trade dependence. The data are from the World Bank.

Production capacity. The level of a country's productive capacity can be reflected by its labor productivity. The lower the labor productivity of the importing country, the more able the exporting country is to export, and vice versa. This paper uses the labor productivity of RECP member countries (LP_{it}) to measure their productive capacity.

Geographic distance. Generally speaking, the greater the geographical distance between two countries, the higher the transportation costs and the higher the export trade costs. It is denoted by DIS_{ij} and the data come from CEPII database.

5. Empirical Study

5.1. Descriptive Analysis

By analyzing the data of each variable from 2007 to 2021, the descriptive statistics table is obtained, as shown in Table 1.

Table 1: Descriptive statistics of variables.

Variable	N	Mean	p50	SD	Min	Max
$lnTrade_{it}$	210	23.94	24.69	2.007	19.15	26.64
$lnEX_{it}$	210	23.25	24.04	1.893	18.54	25.83
$lnIM_{it}$	210	23.07	23.82	2.339	17.42	26.09
$lnDigital_{it}$	210	3.589	4.080	1.288	-1.527	4.586
$lnBand_{it}$	210	1.554	2.124	2.007	-4.316	3.790
$lnGDP_{it}$	210	26.07	26.40	1.806	22.16	29.47
$lnWage_t$	210	9.846	9.912	0.436	9.058	10.47
$lnDT_{it}$	210	4.390	4.380	0.679	2.473	6.081
$lnLP_{it}$	210	2.780	2.833	1.083	0.565	4.306
$lnDIS_i$	210	8.725	8.818	0.360	7.782	9.107

5.2. Benchmark Regression

Due to the different national conditions of RCEP countries, there may be omitted variables that do not change with time. To ensure the validity of the model, the Hausman test is conducted first, and the results show that the sample data are suitable for the fixed model. The basic regression uses Least Dummy Dependent Variable (LSDV) method. The regression results are shown in Table 2.

According to columns (1)-(3) of Table 2, the regression coefficients of $lnDigital_{it}$ are significantly positive at the level of 5%, indicating that the digital economic development level of RCEP countries has a significant promotion effect on China's total Trade volume, export volume and import volume, and Hypotheses 1-3 are verified.

At the same time, according to the regression coefficient results of control variables, it can be seen that the coefficients of $lnGDP_{it}$, $lnWage_t$ and $lnDT_{it}$ are significantly positive. This shows that the market size of the trading partner countries, China's wage level and the trade dependence degree of the importing countries have a significant promotion effect on China's total trade, import and export. In addition, the regression coefficients of $lnLP_{it}$ on total trade and exports are significantly negative at the 10% level. The reason is that the greater the labor productivity of the importing country is, the stronger its production

ISSN 2616-5902 Vol. 6, Issue 1: 10-16, DOI: 10.25236/AJBM.2024.060102

capacity is, so the demand for imported goods is less, which is in line with the actual situation. The regression coefficient of the logarithm of $lnDIS_i$ on China's trade is not significant. The possible reason is that the distance gap between China and other RCEP countries is not large, and China's trade with China is greatly affected by policies or other variables, so the distance has no obvious impact on it.

Table 2: Reference regression model.

Various	LSDV			PPML		
	(1)	(2)	(3)	(4)	(5)	(6)
	$lnTrade_{it}$	$lnEX_{it}$	$lnIM_{it}$	$lnTrade_{it}$	$lnEX_{it}$	$lnIM_{it}$
$lnDigital_{it}$	0.105**	0.099**	0.272***	0.007***	0.007***	0.017***
	(0.034)	(0.031)	(0.068)	(0.001)	(0.001)	(0.003)
$lnGDP_{it}$	1.452***	1.133***	1.912***	0.065***	0.052***	0.089***
	(0.141)	(0.153)	(0.263)	(0.006)	(0.006)	(0.011)
$lnWage_t$	0.580***	0.606***	0.473*	0.022***	0.024***	0.018*
	(0.110)	(0.143)	(0.191)	(0.005)	(0.006)	(0.008)
$lnDT_{it}$	0.450***	0.241**	0.701***	0.021***	0.012**	0.034***
	(0.099)	(0.088)	(0.186)	(0.005)	(0.004)	(0.009)
$lnLP_{it}$	-1.257***	-0.847*	-2.021***	-0.060***	-0.043**	-0.102***
	(0.265)	(0.366)	(0.544)	(0.012)	(0.016)	(0.025)
$lnDIS_i$	-0.106	0.107	-0.532	0.343	-0.018	0.931**
	(0.203)	(0.211)	(0.357)	(0.181)	(0.231)	(0.330)
_cons	-16.796***	-12.142***	-23.596***	-1.775	1.759	-7.702*
	(1.970)	(2.229)	(3.684)	(1.654)	(2.117)	(3.073)
Year control	yes	yes	yes	yes	yes	yes
Country control	yes	yes	yes	yes	yes	yes
R2	0.9915	0.9873	0.9780	0.0326	0.0300	0.0454
N	210	210	210	210	210	210

Standard errors in parentheses
$* p < 0.05$, $** p < 0.01$, $*** p < 0.001$

5.3. Robustness Test

5.3.1. Changing the Regression Method

Considering that the research sample is in the form of "big number of samples and small time", Poisson Pseudo Maximum Likelihood (PPML) method is used for robustness test to solve the heteroscedasticity problem. According to the regression results in columns (4)-(6) of Table 2, it can be seen that the regression coefficients of $lnDigital_{it}$ are significantly negative at 1%, indicating that the results are robust.

5.3.2. Replacement of Explanatory Variables

Considering that using only the single variable of Internet penetration rate to measure the level of digital economy development may lead to bias in the regression results, the logarithm of the number of fixed broadband users per 100 individuals is used instead as the indicator to measure the level of digital economy development. The regression results are shown in Table 3. The regression coefficients of lnbandit in RCEP countries on China's total trade and import and export trade are positive at the level of 5%, indicating that the results are robust.

Table 3: Reference regression model.

Various	(1)	(2)	(3)
	$lnTrade_{it}$	$lnEX_{it}$	$lnIM_{it}$
$lnDigital_{it}$	0.201***	0.181**	0.307**
	(0.058)	(0.068)	(0.104)
Country control	yes	yes	yes
Year control	yes	yes	yes
Country control	yes	yes	yes
R2	0.9920	0.9877	0.9769
N	210	210	210

Standard errors in parentheses
* p < 0.05, ** p < 0.01, *** p < 0.001

ISSN 2616-5902 Vol. 6, Issue 1: 10-16, DOI: 10.25236/AJBM.2024.060102

5.3.3. Heterogeneity Test

According to the income level of the sample countries, countries are divided into high-income countries and middle-income countries, and the regression results are shown in Table 4. It can be seen from the results that the digital economy of both high-income and middle-income countries has a significant impact on China's total trade. However, the impact on trade is larger in high-income countries, while it is relatively smaller in low-income countries, which may be related to the higher level of digital economy in high-income countries.

Table 4: Reference regression model.

Various	High income			Low income		
	(1)	(2)	(3)	(4)	(5)	(6)
	$lnTrade_{it}$	$lnEX_{it}$	$lnIM_{it}$	$lnTrade_i$	$lnEX_{it}$	$lnIM_{it}$
$lnDigital_{it}$	0.433**	0.714***	0.095	0.075*	-0.006	0.322***
	(0.129)	(0.174)	(0.220)	(0.034)	(0.026)	(0.072)
Control variable	yes	yes	yes	yes	yes	yes
Year control	yes	yes	yes	yes	yes	yes
Country control	yes	yes	yes	yes	yes	yes
R^2	0.9920	0.9833	0.9707	0.9931	0.9941	0.9689
N	120	120	120	90	90	90

Standard errors in parentheses
** p < 0.05, ** p < 0.01, *** p < 0.001*

6. Conclusions and Suggestions

6.1. Conclusion

This study uses the data of RCEP countries from 2007 to 2021, this paper empirically tests the impact of the digital economy development level of host countries on China's trade. The results show that the digital economy development level of other RCEP countries has a significantly positive impact on China's trade growth. The economic size and openness of RCEPs have a positive promotion effect on China's trade, while the labor productivity of RCEPs and China's wage level have an inhibitory effect on China's trade. However, it is undeniable that the level of digital economy is a key factor in the economic and trade cooperation between China and other RCEPs. After changing the regression method, explanatory variables and explained variables, the results are still robust. When the sample is divided into high and middle incoming countries and low and middle incoming countries, the digital economy development level of high-income countries has a positive role in promoting China's trade, but the economic development level of high and middle income countries has a greater role in promoting China's trade.

6.2. Countermeasures and Suggestions

In order to better utilize the opportunities of RCEP digital transformation and expand China's international trade space, this paper puts forward the following suggestions:

Strengthening infrastructure for the digital economy. To help RCEPs strengthen digital economy infrastructure and provide technical support. Although RCEP countries have different levels of digital economy development, countries with lagging digital economies are more able to benefit from the spillover effect of digital economy. For countries with low levels of digital economy development, they should actively introduce advanced technologies from other RCEPs to narrow the gap in infrastructure construction between the two sides.

Actively promoting the integrated development of the digital economy and the real economy, and promote the coordinated development of technological innovation among RCEPs. China should actively promote and guide traditional industries to accelerate digital transformation, use advanced digital technology to comprehensively upgrade and transform traditional industries, rely on digital technology to comprehensively innovate export products, and constantly improve the international competitiveness of China's export products.

Further promoting digital economy and trade cooperation with RCEPs. RCEPs should conduct more exchanges and consultations on the development of the digital economy and clarify the direction of

ISSN 2616-5902 Vol. 6, Issue 1: 10-16, DOI: 10.25236/AJBM.2024.060102

digital economic and trade cooperation. Considering the differences in the digital economy development of RCEPs, China should adopt different docking strategies. For Australia, Japan, South Korea and other developed countries, in addition to the most basic cooperation, they should also strengthen exchanges and cooperation in the field of digital technology. For Cambodia, Myanmar, Vietnam and other countries, we need to strengthen key cooperation in digital infrastructure development and expand the depth and breadth of digital economy cooperation.

Acknowledgements

The authors are grateful for the support of the Humanities and Social Sciences Fund of the Ministry of Education. This paper is based on "Research on Mechanism, Effect and Path of China-Asean Digital Economic Cooperation under the Background of 'The Belt and Road'" (No.23YJAGJW004).

References

[1] Freund C L, Weinhold D. The effect of the Internet on international trade[J]. Journal of international economics, 2004, 62(1): 171-189.
[2] Freund C, Weinhold D. The Internet and international trade in services[J]. American Economic Review, 2002, 92(2): 236-240.
[3] Melitz M J. The impact of trade on intra-industry reallocations and aggregate industry productivity [J]. Econometrica, 2003, 71(6): 1695-1725.
[4] Markz-ramos L, Martiniz-Zarzoso I. The effect of technological innovation on international trade. Economics, 2010, 17 (4): 51-58. 4(1): 20100011.
[5] Shuzhong M; Chao F; Hongsheng Z. Whether cross-border e-commerce can break through the limitation of geographical distance [J]. Finance and Trade Economics, 2019, 40(08):116-131.
[6] Haiyang L; Lu G; Lingtao L. Internet, Enterprise Export mode reform and its impact [J]. China Economic Quarterly,2020,19(01):261-280.
[7] Xin F. Development of digital economy, international trade efficiency and trade Uncertainty [J]. Finance & Trade Economics, 2020, 41(08):145-160.
[8] Ke J; Huaichao C; Wenhui C. The impact of digital economy in trading partner countries on China's Service Export Trade [J]. Finance & Economics, 2021, (12):63-70.
[9] Rodriguez-Crespo E, Billon M, Marco R. Impacts of internet use on trade: new evidence for developed and developing countries[J]. Emerging Markets Finance and Trade, 2021, 57(10): 3017-3032.
[10] Meng H; Feng J. EU Digital Economy Development and China Export Trade Gains and its mechanism test [J]. China Journal of Circulation Economics, 2020, 36(09):102-115.
[11] Choi C, Yi M H. The effect of the Internet on economic growth: Evidence from cross-country panel data [J]. Economics letters, 2009, 105(1): 39-41
[12] Bingzhan S. Internet and international trade: an empirical analysis based on bilateral two-way URL link data [J]. Economic Research Journal, 2016, 51(05):172-187.
[13] Hagiu A. Oxford Handbook of the Digital Economy, Chapter Software Platforms [J]. Oxford University Press, 2012.