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Analysis on the Path of Optimizing the Export Structure of China's Service Trade Driven by Digital Economy in RCEP Member Countries

Yuting Dai [1], Renxiang Lu [2]
[1, 2] Department of School of Business, Shanghai Dianji University, Shanghai, China

* Corresponding Author: **Yuting Dai**

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Abstract
The coordinated development of the digital economy among members of the Regional Comprehensive Economic Partnership (RCEP) has provided new impetus for optimizing China's service trade export structure. Based on panel data from RCEP11 member countries between 2010 and 2020, this paper constructs a two-way fixed effects model to systematically examine the impact mechanism of member countries' digital economic development on China's service trade export structure. The study finds that an increase in the level of digital economic development significantly boosts the expansion of China's knowledge-intensive and digitally-driven service trade exports. This effect is realized through improved labor productivity, enhanced factor structure, and reduced trade costs. Further heterogeneity analysis reveals differences in this effect across different income countries. This research expands the theoretical framework for upgrading service trade structures from a regional digital cooperation perspective, providing policy insights for deepening the integration of digital elements and optimizing China's service export structure under RCEP.

Keywords: Export Structure, China's Service, Regional Comprehensive Economic Partnership

1. Introduction

In the context of the restructuring of global value chains and the deep integration of digital technologies, the digital economy has become the core driving force for the transformation of service trade structure. The Regional Comprehensive Economic Partnership (RCEP), as the world's largest free trade agreement, includes ten ASEAN countries and five countries from China, Japan, South Korea, Australia, and New Zealand. The region is seeing improved connectivity in digital infrastructure and more refined rules for cross-border data flows, providing new pathways for optimizing China's service trade export structure. Currently, China's service trade faces the bottleneck of an excessively high proportion of labor-intensive services and insufficient international competitiveness of knowledge-intensive services, necessitating regional digital collaboration to break down development barriers. Meanwhile, existing research often focuses on individual countries or bilateral relations, lacking systematic exploration of the linkage mechanisms between regional digital cooperation and service trade structure upgrading under the RCEP framework. This paper aims to reveal the impact pathways and boundary conditions of RCEP member countries' digital economic development on the optimization of China's service trade export structure from a regional digital collaboration perspective, offering a new viewpoint for understanding regional economic integration and trade structure transformation in the digital age.

This study carries both theoretical and practical significance. Theoretically, by constructing an analytical framework of "digital element integration−trade cost reduction−service trade export structure upgrade," it breaks through the isolated discussions on technology spillovers and institutional constraints in traditional trade theory. It elucidates the synergistic mechanism of regional digital cooperation in upgrading the service trade structure and expands the theoretical boundaries of interdisciplinary research on the digital economy and service trade. Practically, based on a two-way fixed effects model, it empirically tests its impact mechanisms, providing decision-making support for China to accurately align with RCEP digital rules and optimize the path of digital technology empowerment in service exports, thereby facilitating the transformation of service trade from "scale

service trade based on the theory of comparative advantage. Sampson & Snape (1985) argued that the intangibility of services and their simultaneity in production and consumption challenge traditional analytical frameworks. Francois (1990) introduced economies of scale and imperfect competition into new trade theory to explain intra-industry trade phenomena in knowledge-intensive services. Melitz (2003) further explored the impact of firm heterogeneity on service export decisions using new new trade theory, showing that high-productivity firms are more likely to overcome barriers to service trade.

Empirical research focuses on the driving factors and barriers of service trade. Hoekman & Mattoo (2008) found that service trade liberalization significantly promotes trade growth by enhancing market competition efficiency, but regulatory differences remain a major obstacle. Recent studies emphasize the dual role of digital technology: on one hand, Baldwin & Forslid (2020) argue that digital platforms reduce transaction costs and expand the tradable scope of services; on the other hand, Ferracane etal (2018) points out that new barriers such as data localization exacerbate trade frictions. Moreover, the interaction between service trade and global value chains has become a hot topic. Jones etal (2005) noted that production services (such as logistics and finance) embedded in manufacturing value chains drive higher-level integration of trade.

2.Related studies on the impact of digital economy on the export structure of service trade

The optimization of trade structure in service industry is the core issue under the background of deep integration of globalization and digital technology. Existing studies mainly focus on three perspectives: technology-driven, factor restructuring and institutional coordination:

First, the impact of technological change on the structure of service trade. Melitz (2003) proposed a heterogeneous firm model indicating that digital technology reduces information asymmetry, facilitating high-value-added service firms to enter international markets. Freund & Weinhold (2004) further confirmed that the widespread adoption of the internet significantly boosts knowledge-intensive service exports, with a higher elasticity coefficient compared to traditional services. Goldfarb & Tucker (2019) pointed out that the digital economy, through the cross-border flow of data elements, has given rise to new forms of digital service trade, reshaping the global service division of labor.

Second, the transmission mechanism of factor structure upgrading. Hummels & Lennon (2014) found that the optimization of service trade structure is highly correlated with human capital accumulation and R&D intensity. Lanz & Maurer (2018) argued that digital technology accelerates the specialization of knowledge-intensive services by enhancing total factor productivity. Pei Changhong (2018), based on Chinese practice, proposed that digital platforms integrate fragmented service demands, driving the transformation of traditional labor-intensive services towards digital-driven models.

Third, the regulatory role of regional institutional coordination. Kawai & Wignaraja (2011) focused on the RCEP framework, arguing that regional trade agreements promote the integration of digital service markets among member countries by reducing digital barriers. Jiang Xiaojuan (2020) emphasized that the "digital trade rules" of RCEP provide institutional guarantees for upgrading the structure of service trade through standardized arrangements such as digital property rights and cross-border payments. However, existing research often focuses on individual countries or bilateral agreements, with insufficient quantitative analysis of the synergistic effects of the RCEP region's digital economy, and lacks systematic examination of intermediary mechanisms such as labor productivity and trade costs.

3. Analysis of the mechanism by which digital economy in RCEP member countries affects China's service trade export structure

3.1 Economies of scale: The marginal cost of digital technology-driven service exports decreases

The coordinated development of the digital economy among RCEP member countries significantly optimizes China's service trade export structure through economies of scale. Digital technology breaks the constraints that traditional services cannot be stored or traded, making the marginal cost of knowledge-intensive services approach zero. Within the RCEP region, Chinese companies can integrate market demands from member countries through digital platforms, forming a scale advantage in service supply. For example, Chinese cloud service providers offer elastic computing power to Southeast Asian countries via regional data center networks, reducing unit service costs while expanding their market share. Additionally, cross-border e-commerce platforms leverage big data analysis to precisely match consumer preferences in the RCEP region, achieving large-scale supply of long-tail service demands and boosting the proportion of digital consumption service exports. This scale economy effect not only strengthens the international competitiveness of Chinese digital service enterprises but also attracts capital and talent within the region through technology spillovers, accelerating the upgrade of export structures towards higher value-added sectors.

3.2 Factor endowment effect: data elements reshape the comparative advantage pattern

In the era of digital economy, traditional factor endowment theory has been redefined by data elements and digital technology endowments. Under the RCEP framework, China leverages its advantages in digital infrastructure to form complementary division of labor with member countries: China exports digital technology solutions, while ASEAN countries provide rich application scenarios and data resources. For example, in the "Digital Silk Road" project jointly built by China and Singapore, Chinese technical teams optimize cross-border supply chain management through blockchain technology, while the Singaporean side provides port logistics data support. Both sides work together to enhance the value-added of digital service trade. At the same time, digital technology empowers the cross-border flow of human capital; platforms such as telemedicine and online education transform China's high-skilled workforce into tradable services, driving an increase in the share of technology-intensive service exports. This factor restructuring effect breaks traditional resource constraints, enabling China to form a dynamic comparative advantage in digital service trade characterized by dual-wheel drive of "technology−data."

3.3 Trade cost effect: digital rules reduce institutional transaction costs

The RCEP digital trade rules optimize the service export structure through two pathways: reducing fixed costs and variable costs. Firstly, digital platforms lower fixed costs such as information search and contract negotiation, enabling small and medium-sized enterprises to enter the RCEP market with a lower threshold. According to statistics, in 2021, the number of Chinese small and medium-sized service enterprises exporting via cross-border B2B digital platforms increased by 37%. Secondly, technologies like electronic payments and smart contracts reduce variable costs associated with service delivery. For example, AntChain's cross-border settlement system has reduced international payment costs for small and medium-sized enterprises within the RCEP region by 25%, significantly enhancing the efficiency of digital financial services exports. Additionally, the "cross-border free flow of data" clause in the RCEP agreement reduces compliance costs by harmonizing member countries' data localization policies, creating a systemic cost advantage for Chinese digital service enterprises. This cost reduction effect not only expands the scale of service exports but also drives the export structure towards higher-end development through a positive "cost-quality" cycle.

4. Model design and variable selection

4.1 Model design

In order to test the impact of digital economy development level on China's manufacturing export competitiveness, this paper sets the econometric model as a two-way fixed panel model. In order to test the mechanism of RCEP member countries' digital economy on China's service trade export structure, model 4.1 is established:

$$STSC_{it} = \alpha_0 + \alpha_1 DE_{it} + \alpha_2 LnOPEN_{it} + \alpha_3 LnSL_{it} + \alpha_4 LnFDI_{it} + \alpha_5 LnGEX_{it} + \alpha_6 GDP_{it} + \delta + \varepsilon + u_{it} \quad (4.1)$$

In equation (4.1), the subscripts i and t represent the sample countries and years of RCEP member states, respectively; STSCit represents the relative index of China's service trade export structure to RCEP member state i in year t, with a higher value indicating a more optimized service trade export structure; DEit represents the level of digital economy development in RCEP member state i in year t; LnOPENit represents the degree of service trade openness in RCEP member state i in year t; LnSLit represents the industrial structure of services in RCEP member state i in year t; LnFDIit represents foreign direct investment in RCEP member state i in year t; Ln GEXit represents goods trade exports in RCEP member state i in year t; δ and ε represent time effects and country effects, respectively, and uit is the random error term.

4.2 Indicator construction

4.2.1 Variable selection

(1) Dependent variable: Service Trade Export Structure (STSC)

The dependent variable in this paper is China's service trade export structure (STSC). The service trade export structure is a crucial indicator for measuring a country's participation in the international division of labor and its competitive advantage in the global market. It is calculated as the ratio of modern service trade exports to traditional service trade exports. A higher ratio indicates a greater proportion of modern service trade, suggesting an optimized service trade export structure and enhanced overall competitiveness. This provides important reference for the high-quality development of a country's service trade. The calculation results of this index are shown in Table 4-1.

Table 4.1: Relative Index of China's Service Trade Export Structure to RCEP Member Countries from 2010 to 2020

Year	Modern Service Trade Volume (USD million)	Traditional Service Trade Volume (USD million)	Service Trade Structure Export Relative Index
2010	1,669.59	19,728.26	0.0846
2011	2,085.47	16,519.55	0.1262
2012	2,425.69	17,649.89	0.1374
2013	2,811.37	19,099.54	0.1472
2014	4,339.50	19,443.04	0.2232
2015	4,478.13	19,303.54	0.2320
2016	5,027.45	20,054.97	0.2507
2017	5,482.15	21,238.97	0.2581
2018	6,830.01	23,242.49	0.2939
2019	8,090.69	23,078.44	0.3506
2020	9,090.22	17,734.28	0.5126

(2) Core explanatory variables: digital economy development level (DE)

The core explanatory variable of this paper is the level of digital economic development (DE) of RCEP member countries. Based on the entropy value method, the comprehensive score of digital economic development level of RCEP member countries is measured based on the relevant data of digital economy in RCEP member countries from 2010 to 2020. In this paper, it is believed that the higher the level of digital economic development, the more conducive to optimizing the export structure of service trade.

Table 4.2: Comprehensive Scores of Digital Economy Development Level in RCEP Member Countries

Country	2010	2012	2014	2016	2018	2020	Mean	Rank
Japan	0.322	0.340	0.354	0.362	0.406	0.422	0.366	1
China	0.226	0.255	0.311	0.404	0.476	0.538	0.362	2
Singapore	0.196	0.196	0.210	0.259	0.361	0.440	0.276	3
South Korea	0.233	0.237	0.254	0.267	0.282	0.298	0.262	4
Australia	0.163	0.168	0.168	0.178	0.215	0.227	0.185	5
New Zealand	0.148	0.157	0.157	0.166	0.173	0.184	0.164	6
Malaysia	0.128	0.133	0.136	0.144	0.162	0.190	0.147	7
Philippines	0.098	0.109	0.120	0.141	0.130	0.163	0.125	8
Vietnam	0.069	0.086	0.094	0.108	0.126	0.147	0.104	9
Thailand	0.090	0.092	0.094	0.100	0.114	0.125	0.102	10
Indonesia	0.053	0.052	0.051	0.055	0.067	0.088	0.060	11
Cambodia	0.011	0.014	0.016	0.025	0.022	0.036	0.020	12

(3) Control variables:

① Economic development level (LnGDP)

This paper uses the per capita GDP of a country to represent its level of economic development. It is an important indicator for measuring a country's economic development and residents' income, reflecting the overall scale of economic development and purchasing power of a country. Generally speaking, the higher the per capita GDP of a country, the faster its economic development and stronger its purchasing power, which is more conducive to exports. The data for this variable comes from the World Bank Database (WDI) and has been processed with logarithmic transformation to reduce data volatility and heteroskedasticity.

② Trade dependence (LnTDR)

Trade dependence is a crucial indicator of a country's reliance on foreign trade. This paper uses the ratio of total imports of goods and services to gross national product as a measure. Countries with high trade dependence tend to have more open economies and are more susceptible to global economic markets and the economies of certain major powers. The data for this variable comes from the World Bank Database (WDI) and has been log-transformed to reduce data volatility and heteroskedasticity.

③ Degree of openness to trade in services (LnOPEN)

The degree of openness in service trade is a crucial indicator for measuring the openness and internationalization level of a country's service trade. This paper uses the proportion of a country's total outward service trade in its gross national product to represent this. The higher the openness of service trade, the lower the trade barriers and costs for the country's market, indicating closer international service trade relations and greater openness. This not only effectively reduces trade costs but also promotes service trade between countries, reflecting the impact of sample countries' open service markets on China's service exports. The data for this variable comes from the World Bank Database (WDI) and has been log-transformed to reduce potential effects of data volatility and heteroskedasticity on analytical results.

④ Whether the export of goods (Ln GEX) has a common language (COMLANG)

The export of goods can reflect the overall scale of trade in goods for the sample country, and this paper represents it using the total export value of goods from member countries. Existing research generally holds that there is a clear complementary relationship between trade in goods and services; an increase in trade in goods often stimulates demand for related service sectors such as logistics, finance, and insurance. As the volume of goods exports increases, it may boost the export of services, thereby improving the structure of service exports. Therefore, this paper includes this variable as a control variable. The data for this variable comes from the World Bank Database (WDI) and has been processed with logarithmic transformation to reduce potential impacts of data volatility and heteroskedasticity on analytical results.

⑤ Market Development Potential (MDP)

The market development potential can reflect a country's economic demand forecast and economic vitality in the future. This paper uses the growth rate of per capita gross national product to represent it. The greater a country's market development potential, the better its economic growth prospects, and the stronger its future demand and consumption capacity may be, which is beneficial for China's service trade exports to that country. In this study, by controlling the market development potential, we can more accurately analyze the impact of digital economy development levels on the structure of service trade exports, while also capturing the role of market potential in service trade exports.

5. Empirical design

5.1 Benchmark regression and test

5.1.1 Benchmark regression analysis

Table 5.1: Basic Regression Results of Fixed Effects

Variables	(1) STSC	(2) STSC	(3) STSC	(4) STSC	(5) STSC	(6) STSC
DE	1.203***	1.005***	0.930***	0.616**	0.659**	0.568**
	-0.307	-0.24	-0.22	-0.253	-0.284	-0.278
LnGDP		-0.371***	-0.394***	-0.312***	-0.376*	-0.343*
		-0.101	-0.0986	-0.0931	-0.199	-0.177
LnTDR			0.196**	0.153	0.0922	0.131
			-0.0852	-0.0937	-0.152	-0.14
LnOPEN				0.183	0.196**	0.211**
				-0.116	-0.0986	-0.0938
LnGEX					0.0579	0.0435
					-0.145	-0.129
MDP						-0.00908
						-0.129
Observations	121	121	121	121	121	121
R-squared	0.834	0.875	0.885	0.893	0.893	0.897
Country	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes

Table 5-1 presents the regression analysis results of the fixed effects benchmark model. This paper first conducts a separate regression analysis using the independent variable, level of digital economy development, and the dependent variable, service trade export structure. Subsequently, five control variables−level of economic development, trade dependence, openness to service trade, goods export status, and market potential−are sequentially added to the model for regression analysis. As the number of control variables increases, the model fit improves from 0.834 to 0.897, indicating that the regression results become increasingly robust. Moreover, the regression coefficients corresponding to each variable are all positively significant, suggesting that the level of digital economy development in RCEP member countries has a significant positive effect on China's service trade export structure.

5.1.2, Robustness test

(1) Add control variables

To verify the robustness of the research model, this paper adopted the method of adding control variables for robustness testing. As shown in Table 5-2, on the basis of the original two-way fixed model, domestic service industry development level (LnSERV) was added as a new control variable. This variable is measured by the proportion of domestic service sector employment in total employment, effectively reflecting a country's industrial foundation in services. The regression results show that the core explanatory variable, the digital economy index, still exhibits a positive significant effect at the 5% level, with regression coefficients highly consistent with those in the benchmark model. Although the regression coefficients of other control variables show some fluctuations, their sign directions and significance levels are basically consistent with those in the benchmark regression model. This indicates that after introducing the domestic service industry development level as a variable, the estimation results of the model remain stable, further validating the good robustness of the regression model used in this paper.

Table 5-2: Regression Results After Adding Control Variables

Variable	STSC (Service Trade Structure Index)
DE	0.647**
	(2.25)
LnGDP	-0.366**
	(-2.08)
LnTDR	0.150
	(1.11)
LnOPEN	0.190**
	(2.03)
LnGEX	-0.004
	(-0.04)
MDP	-0.007
	(-1.24)
LnSERV	0.358
	(1.49)
Observations	121
R-squared	0.898
Adjusted R^2	0.869
F-statistic	26.97
Country FE	YES
Year FE	YES

(2) Replace the control variables

To verify the robustness of the research model, this paper adopted the method of substituting control variables for robustness testing, using Gross National Product (LnCGDP) instead of per capita GDP to measure a country's economic development level. As shown in Table 6-8, after substituting the control variables, the sign and significance level of the coefficient for digital economy development remained stable, further confirming that the digital economy development level of RCEP member countries has a positive promoting effect on the structure of service trade exports. Based on these research findings, the regression results after substituting the control variables are consistent with the benchmark model, thus verifying the robustness of the model presented in this paper.

Table 5-3: Regression Results After Replacing Control Variables

Variable	STSC (Service Trade Structure Index)
DE	0.680***
	(2.75)
LnCGDP	-0.616***
	(-3.49)
LnTDR	-0.089
	(-0.63)
LnOPEN	0.222**
	(2.51)
LnGEX	0.254*
	(1.93)
MDP	-0.008
	(-1.38)
Observations	121
R-squared	0.909
Adjusted R^2	0.884
F-statistic	34.98
Country FE	YES
Year FE	YES

(3) Replace the core explanatory variables

This paper replaces the digital economic development level of each country with a 0-1 variable based on whether it is higher than the average of all RCEP countries in the same year. If a country's digital economic development level is higher than the average of RCEP countries in the same year, DE1 = 1; otherwise, DE1 = 0. By substituting this dummy variable for the core explanatory variable in the original model, a bidirectional fixed effects regression analysis is conducted to explore the impact of the relative level of digital economic development on the structure of service trade exports. As shown in Tables 5-4, there is a positive correlation at the 1% significance level, further confirming that the digital economic development level of RCEP member countries has a positive promoting effect on the structure of service trade exports. Based on these research findings, the regression results after replacing the core explanatory variable remain consistent with the benchmark model, thus verifying the robustness of the model in this paper.

Table 5-4: Regression Results After Replacing Core Explanatory Variable

Variable	STSC (Service Trade Structure Index)
DE1	0.097***
	(3.45)
LnGDP	-0.331*
	(-1.83)
LnTDR	0.136
	(0.99)
LnOPEN	0.252***
	(2.99)
LnGEX	0.024
	(0.19)
MDP	-0.009
	(-1.39)
Observations	121
R-squared	0.898
Adjusted R^2	0.869
F-statistic	30.07
Country FE	YES
Year FE	YES

5.3 Mechanism test

In order to further analyze the influence mechanism of the digital economy development level of RCEP member countries on the export structure of service trade, this paper refers to Jiang's research and uses a two-step method to construct the mediation effect model based on the benchmark model as follows:

$$LnLAB_{it} = \beta_0 + \beta_1 LnDE_{it} + \beta_2 LnGDP_{it} + \beta_3 LnTDR_{it} + \beta_4 LnOPEN_{it} + \beta_5 LnGEX_{it} + \beta_6 LnMDP_{it} + \delta + \varepsilon + u_{it}$$

$$LnTC_{it} = \beta_0 + \beta_1 LnDE_{it} + \beta_2 LnGDP_{it} + \beta_3 LnTDR_{it} + \beta_4 LnOPEN_{it} + \beta_5 LnGEX_{it} + \beta_6 LnMDP_{it} + \delta + \varepsilon + u_{it}$$

$$LnDSB_{it} = \beta_0 + \beta_1 LnDE_{it} + \beta_2 LnGDP_{it} + \beta_3 LnTDR_{it} + \beta_4 LnOPEN_{it} + \beta_5 LnGEX_{it} + \beta_6 LnMDP_{it} + \delta + \varepsilon + u_{it}$$

In this model, the variable subscripts i and t represent the RCEP sample countries and years, respectively. LnLABit represents the labor productivity level of country i in year t, LnCSit represents the capital stock of country i in year t, LnTCit represents the service trade cost between country i and China in year t, δ and ε represent time effects and country effects, respectively, and uit is the random error term.

Table 5-5: Mechanism Test Results

Variable	STSC	LnLAB	LnCS	LnTC
DE	0.568**	0.216*	0.677***	-1.257***
	(2.04)	(1.76)	(3.27)	(-3.11)
LnGDP	-0.343*	-0.340***	-0.054	0.783***
	(-1.94)	(-4.78)	(-0.26)	(3.42)
LnTDR	0.131	-0.387***	-0.210	-0.449**
	(0.93)	(-6.08)	(-0.63)	(-2.41)
LnOPEN	0.211**	0.002	0.058	0.304***
	(2.25)	(0.06)	(0.35)	(3.10)
LnGEX	0.044	0.318***	-0.181	0.432**
	(0.34)	(5.76)	(-0.71)	(2.44)
MDP	-0.009	0.002	0.005	0.008
	(-1.48)	(0.74)	(0.47)	(1.00)
Observations	121	121	121	121
R-squared	0.897	1.000	0.941	0.998
Adjusted R^2	0.868	1.000	0.925	0.997
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

According to the results of mechanism testing in Table 5-5, it can be seen that the impact correlation coefficient of digital economic development level on labor productivity and the proportion of capital factors is significantly positive, while the impact correlation coefficient on service trade costs is significantly negative. This indicates that the digital economic development of RCEP member countries can optimize the export structure of service trade by improving labor productivity, increasing the proportion of capital factors, and reducing service trade costs.

5.4 Heterogeneity analysis

Table 5-6: Analysis Results of Heterogeneity Among Countries with Different Income Levels

Variable	High-Income Countries	Upper-Middle Income Countries	Lower-Middle Income Countries
DE	2.858***	0.213	0.737**
	(0.591)	(0.778)	(0.296)
LnGDP	0.142	0.0178	-0.115
	(0.154)	(0.0717)	(0.107)
LnTDR	-0.236	-0.409***	-0.0163
	(0.172)	(0.0932)	(0.0665)
LnOPEN	0.321*	0.0668	0.0620
	(0.165)	(0.0921)	(0.0997)
LnGEX	-0.0404	0.213**	0.0932
	(0.0405)	(0.0832)	(0.0829)
MDP	-0.0465***	-0.00594	-0.0299***
	(0.0123)	(0.00343)	(0.00483)
Observations	55	22	44
R-squared	0.821	0.821	0.821
Adjusted R^2	0.792	0.792	0.792
Country FE	YES	YES	YES
Year FE	YES	YES	YES

According to the results of national heterogeneity analysis, the impact of RCEP member countries' digital economy development level on service trade exports varies across different income levels. The digital economy development level in high-income countries has the most significant effect on upgrading the structure of service trade exports, with a coefficient of 2.858, and is significant at the 1% level, indicating that for every one-unit increase in the digital economy development level in high-income countries, the scale of service trade exports increases by 2.858 units; the digital economy development level in middle-and low-income countries also has a significant positive impact on the structure of service trade exports, but its coefficient is 0.737, and is significant at the 5% level, showing a weaker influence compared to high-income countries; while the digital economy development level in upper-middle-income countries has a less significant impact on the structure of service trade exports. This result suggests that the role of digital economy development level in upgrading the structure of service trade exports is more pronounced and has greater marginal benefits in high-income countries, whereas in middle-and low-income countries, although there is a positive impact, the effect is relatively limited. This difference may stem from the advantages of high-income countries in digital infrastructure, technological innovation capabilities, and policy support, enabling them to more effectively transform digital economic development into a driving force for optimizing and upgrading the structure of service trade exports. In contrast, due to limitations in digital

infrastructure and technological capabilities, the promoting effect of digital economic development in middle-and low-income countries has not yet been fully realized. Therefore, policy formulation should fully consider the heterogeneity of countries at different income levels, further deepen digital technology cooperation for high-income countries, and help low-and middle-income countries to improve the level of digital economy development, so as to achieve comprehensive growth in service trade exports.

6. Conclusions and policy recommendations

6.1 Research Conclusions

This study systematically examines the impact mechanism of digital economic development in RCEP member countries on the optimization of China's service trade export structure based on panel data from 2010 to 2020. The findings are as follows: First, the digital economic development of RCEP member countries significantly boosts the proportion of knowledge-intensive and digitally-driven service exports in China through three major effects: economies of scale, factor endowment restructuring, and trade cost compression. The low marginal cost characteristic of digital technology and regional market integration capabilities enable high-value-added services such as cloud computing and cross-border e-commerce to achieve large-scale output; the cross-border flow of data elements and complementary division of labor with digital technology reshape China's dynamic comparative advantages within the region. Second, heterogeneity analysis shows that this effect is stronger for high-income member countries (such as Japan and South Korea), highlighting the importance of digital rule coordination and technological adaptation. Third, mechanism verification confirms that improvements in labor productivity, upgrading of factor structures, and reduction in trade costs are the core transmission pathways, with the compressive effect of digital technology on traditional service costs being particularly prominent. This study provides new theoretical explanations and empirical evidence for regional digital cooperation and the upgrading of service trade structure.

6.2 Policy Recommendations

In order to fully release the synergistic effect of RCEP digital economy and optimize the export structure of China's service trade, it is suggested to take measures from the following levels:

Firstly, deepen the alignment of regional digital rules to build institutional cost advantages. Promote the standardization of data cross-border flow and digital property rights protection under the RCEP framework. Collaborate with member countries to establish a regional data circulation whitelist mechanism, reducing compliance costs for enterprises. Draw on Singapore's "trusted data corridor" experience to pilot cross-border data security certification, prioritizing breakthroughs in e-commerce and digital finance sectors.

Secondly, strengthen the joint construction and sharing of digital infrastructure to solidify the foundation of economies of scale. Increase investment in new infrastructure such as 5G base stations and cloud computing centers in ASEAN countries, and achieve regional network connectivity through the "Digital Silk Road" project. Encourage companies like Alibaba Cloud and Huawei to collaborate with local partners in building data centers, forming a collaborative supply model of "Chinese technology + localized services," thereby expanding the reach of digital service exports.

Thirdly, optimize the allocation of digital elements and cultivate dynamic comparative advantages. Establish an RCEP Digital Technology Innovation Fund to support core technology research and development in areas such as artificial intelligence and blockchain; improve mechanisms for cross-border digital talent mobility, piloting "digital visas" to facilitate regional practice for high-tech professionals. At the same time, leverage free trade zones to pilot digital service exports, guiding traditional service enterprises to extend their value chains through digital transformation.

Fourth, establish a risk prevention system to ensure the sustainable development of digital service trade. Set up a joint mediation mechanism for RCEP digital trade disputes, and develop regional emergency response plans for risks such as data security and privacy breaches. Enhance policy coordination between China and member countries in areas like digital taxation and anti-monopoly measures to avoid rule frictions that could stifle the release of technological benefits.

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