MINISTRY OF SCIENCE AND HIGHER EDUCATION
OF THE RUSSIAN FEDERATION

Federal State Budgetary Educational Institution of Higher Education

PENZA STATE UNIVERSITY

Institute of Economics and Administration	Department of Sociology, Economic Theory and International Processes
Field of study	38.04.01 Economics
Master's degree programme	International Economics and Business

GRADUATION THESIS

on

Impact of Digital Economy on International Trade of the Belt and Road Countries

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Penza 2025

FSBEI HE Penza State University

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Master's degree programme International Economics and Business

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ASSIGNMENT
FOR THE GRADUATION THESIS OF

Master's degree student Li Danping, group 23ЭЭвам1, full-time mode of study

1 The topic of the graduation thesis: "Impact of Digital Economy on International Trade of the Belt and Road Countries"
was approved by the university order
dated «___»_____20__ no. _____
2 The deadline for the Master's degree student to complete the graduation thesis is 11.06.2025.
3 The input data for the graduation thesis is the regulatory and legal framework, scientific literature and reference books, and Internet data.
4 The list of issues to be studied includes: China and the "Belt and Road" countries along current status of digital economy development; impact of digital economy on international trade arrangements; digitalisation of international trade along "Belt and Road" route.
5 The list of visuals contains tables and figures.
6 The date of setting the assignment is 7.09.2023.

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The assignment was accepted by Master's degree student_____/ Li Danping /
(signature) (full name)

Schedule for completing the graduation thesis

№ п/п	Content of the thesis	Deadline for completion	Due date, signature of the academic adviser
First year of study			
1	Substantiating of the research topic and methodology, subject and object of research	1.09.2023 – 31.10.2023	
2	Framing the scientific concept of research	1.11.2023 – 18.12.2023	
3	Collection of scientific literature for the thesis	19.12.2023 – 15.01.2024	
4	Substantiating the relevance, concept, and novelty of the research	16.01.2024 – 19.02.2024	
5	Framing of a detailed plan and layout of the research	20.02.2024 – 12.03.2024	
6	Studying new literature sources within the topic of the thesis	13.03.2024 – 26.03.2024	
7	Conducting theoretical research within the first chapter of the thesis	27.03.2024 – 30.04.2024	
8	Preparing the first chapter of the thesis	1.05.2024 – 30.06.2024	
Second year of study			
9	Conducting analytical research within the second chapter of the thesis	1.09.2024 – 22.10.2024	
10	Preparing the second chapter of the thesis	23.10.2024 – 24.12.2024	
11	Conducting analytical research within the third chapter of the thesis	25.12.2024 – 25.02.2025	
12	Preparing the third chapter of the thesis	26.02.2025 – 21.04.2025	
13	Preparing the introduction and conclusion	22.04.2025 – 12.05.2025	
14	Completing the graduation thesis	13.05.2025 – 26.05.2025	
15	Handing in the thesis for compliance control and antiplagiat	27.05.2025 – 9.06.2025	
16	Getting acquainted with the feedback and review	10.06.2025	
17	Presenting the written thesis	11.06.2025	

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Summary

The graduation thesis comprises 63 pages, 3 chapters, 12 figures, 9 tables, 61 sources.

DIGITAL ECONOMY, ONE BELT ONE ROAD COUNTRIES, INTERNATIONAL TRADE, DIGITIZATION, E-COMMERCE.

The target of research is to study the development of the mechanism path and arrangements of digital economy affecting international trade including international trade cost, international trade product types, and trade facilitation

The goal of work is to explore the impact of the development of the digital economy on international trade in the context of the Belt and Road Initiative.

The methodological framework of the paper is formed by the complex of theoretical and practical methods such as literature analysis, empirical analysis and case summary.

The results of research include: the digital economy development level of countries along the Belt and Road can increase the scale of my country's international trade by reducing trade costs and increasing the variety of trade products.

On the one hand, it can enrich my country's theoretical research related to the digital economy, and on the other hand, it has certain reference significance for promoting the construction of the "Digital Silk Road".

The recommendations on disseminating and applying the results are as follows: strengthen cooperation with countries participating in the Belt and Road Initiative in areas such as digital infrastructure and digital standards; deepen talent training cooperation with countries participating in the Belt and Road Initiative; actively promote the digital transformation of industries; strengthen cooperation with countries participating in the Belt and Road Initiative in data security, technology.

The theoretical relevance of the thesis is established by the following: the impact of the digital economy on international trade entities is analyzed; the restrictive conditions of traditional international trade are sorted out; the factors that affect international trade through the digital economy are explained.

The target of research can be further explored through case analysis of the impact of digital economic development in different groups of countries.

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Introduction

The digital economy has become the core engine of global economic growth, and countries are accelerating the layout of key areas such as digital infrastructure, data factor markets, and artificial intelligence. The digital economy has become an emerging issue that has attracted the attention of all parties around the world. Given the widespread application of digital technology internationally, existing research generally recognizes that the development of the digital economy can effectively promote the development of international trade, but the specific mechanism path needs to be further investigated, sorted out and improved. The digital economy is an increasingly important driver of economic growth and plays a significant role in enhancing productivity of industries, cultivating new markets and industries, and achieving inclusive and sustainable growth.

Since the Belt and Road Initiative was formally proposed, the cooperation between China and countries along the routes has been steadily advanced, and the regions along the routes have become an important growth point for China's economy. However, with the continuous expansion of the scale of production in the countries along the Belt and Road, the continuous extension of the industries involved and the increasingly diversified geographical distribution, the international investment environment faced by Chinese enterprises is increasingly complex, and the impact of the institutional environment of the host country is particularly prominent. The specific performance is that the political, economic, legal, cultural and other institutional environments of countries along the route have obvious characteristics of richness, diversity and complexity, and the institutional environment differs greatly. The convergence of multiple institutional environments, on the one hand, brings mutual integration, symbiosis and prosperity, and promotes the economic and trade development of the two countries; on the other hand, it further intensifies the risk of "clash of civilizations", and brings potential threats to the investment and economic relations between China and countries along the route. Digital economy can intensify advantages and disadvantages of cooperation between Belt and Road Countries. This explains the high relevance of the study of this topic.

The goal of this study is to explore the impact of digital economy on international trade of the Belt and Road countries.

This goal is realized by solving the following objectives:

- analysis of the current status of digital economy development in "Belt and Road" countries;
- research of the mechanism path and arrangements of digital economy affecting international trade including international trade cost, international trade product types, and trade facilitation;
- studying of digitisation of international trade along "Belt and Road" Route including scale, forms, directions and instruments of international trade.

The object of this study is One Belt and One Road Initiative uniting a set of interconnecting countries along the route.

The subject of this study is impact of the digital economy on international trade in the Belt and Road countries.

Research techniques: literature analysis, empirical analysis and case summary.

1. Literature research. Literature research is the basis of economics, and it is also an important content of economic papers. By reading, collecting and sorting out a large number of domestic and foreign economic periodicals and books, we can understand the development trends and frontier issues of the discipline; Master the research methods, theoretical viewpoints and the focus of academic debate in this field; Familiar with the core concepts, important conclusions and development status of this field.

2. Empirical research. Empirical research refers to the scientific process of collecting and processing data by using various statistical software to obtain relevant data to verify a certain theory and hypothesis. The purpose of empirical research is to test hypotheses or put forward new hypotheses (i.e. falsification), so as to draw scientific conclusions. The empirical methods commonly used in economic research include econometric analysis (such as regression analysis), normative analysis and case investigation. (Note: Econometric analysis method belongs to the research field of microeconomics).

3. Case study. Case analysis is a way to analyze a specific problem under specific conditions, which can explain complex phenomena with simple models and draw conclusions. (The common method of case analysis is to use mathematical tools to establish a corresponding model to analyze a specific problem.) The common methods of case analysis mainly include factor analysis, principal component analysis (PCA) and discriminant analysis (Diagrams).

The novelty of work lies in the following. On the one hand, it can enrich theoretical research related to the digital economy, and on the other hand, it has certain reference significance for promoting the construction of the "Digital Silk Road".

Taking the development level of digital economy in countries along the Belt and Road as the starting point, this paper explores the impact of the development of digital economy in countries along the Belt and Road on my country's international trade and the specific mechanism path. Based on a new research perspective, it is different from the international trade research conducted by previous scholars based on the Internet development level of various provinces and cities in China. Based on the above conclusions, this paper proposes the following policy recommendations: First, strengthen cooperation with the countries along the Belt and Road in digital infrastructure and digital standards; second, deepen cooperation in talent training with the countries along the Belt and Road; third, actively promote the digital transformation of my country's industries; fourth, strengthen cooperation with the countries along the Belt and Road in data security; fifth, increase the depth and breadth of digital technology cooperation with the countries along the Belt and Road. The possible innovation of this paper lies in the research perspective.

Chapter 1 China and the "Belt and Road" countries along the current status of digital economy development and the significance of the study

First of all, it is necessary to understand the concept of digital economy. Tapscott (1996) was the first to put forward the concept of digital economy, he was keenly aware of the Internet will bring innovative changes to the whole economic mode of operation, and made a bold prediction, known as the "pioneers of the digital economy" [46, P.1]. Negroponte pointed out that the digital economy comes from the nature of the network, and analyzed in detail the applications and impacts of the digital economy. Negroponte pointed out that the digital economy comes from the nature of the network, and analyzed the application and impact of the digital economy in detail. After that, some scholars define the scope of digital economy, Mesenbourg defines digital economy from the perspective of products, which are digital hardware and software facilities, business networks and organizations, and products in the process of e-commerce transactions, and Moulon (2010) proposes that the digital economy can be classified into the ICT industry, information technology industry, and ICT-based commodities industry according to the industry. ICT-based industries such as retailing of goods and e-commerce [54, P.1]. The Organization for Economic Cooperation and Development (OECD) defines the digital economy as a dynamic process, where the development of digitization and networking of traditional industries is seen as part of the digital economy [8, P.102-104], and states that the key pillars in the development of the digital economy are digitization and interconnectivity [48, P.79]. The 2016 G20 Summit adopted a cooperation initiative related to the digital economy, which defines the digital economy as ICT-related economic activities, emphasizing the cross-sectoral digital technology characteristics of convergence, thus further weakening the scope boundaries of the digital economy. Qiao, Xiaonan, Chen, Yun and Xi, Yanping (2020) divide the digital economy into manufacturing and service industries, in which the service industry contains a narrow and a broad division; the service industry of the digital economy in the narrow caliber is centered on the digital business, and the broad caliber contains the industrial sector that can make the business carried out out out of the physical place with the help of ICT, which is in line with the

trend of the digital industrialization and the digitalization of the industry. Chen Fuzhong (2020) summarizes the relevant discussions of various scholars on the development of the digital economy, pointing out that the digital economy not only covers the digitalization and networking process of economic and social development, but also reflects the mutual integration of the information technology industry and the traditional industry in the process of economic and social development; on the one hand, it is reflected in the rapid development of the information technology industry itself and the growth of the scale of enterprises, and on the other hand, it is reflected in the deep integration and development of the information technology industry with On the one hand, it is reflected in the rapid development of the information technology industry itself and the growth of enterprise scale, and on the other hand, it is reflected in the in-depth integration and development of the information technology industry with other industries.

Currently, the development of the digital economy has become a topic of widespread concern across countries, and the existing literature generally recognizes that ICT diffusion can increase the scale of international trade.

The existing literature generally believes that the popularization of information and communication technology can increase the scale of international trade [17, P.78]. In terms of economic theory, some scholars have analyzed the economic effect of digital technology development from the perspective of global value chain, pointing out that the development of digital technology has narrowed the huge gap in global labor cost and promoted the formation of regional value chain. At the same time, digital technology can promote the transformation and upgrading of traditional manufacturing industries by reshaping the profitability, production, organization and service modes of traditional industries. Digital trade can promote international trade by reducing transaction costs and expanding tradable varieties, or enhance market efficiency by reducing trade barriers and the degree of information asymmetry, thus increasing the welfare of consumers and producers, and contributing to the rapid development of global trade in services. In summary, the digital economy reflects the process of digital industrialization and industrial digitization in the process of economic development, reflecting the integration of ICT-related industries in the process of economic development. At present, there is no uniform

international standard for the measurement of the level of development of the digital economy, and we can refer to the ICT Development Index (IDI) of the International Telecommunication Union and the Network Readiness Index (NRI) issued by the World Economic Forum to construct an evaluation system of the digital economy through multiple dimensions. Existing research generally recognizes that the application of ICT can enhance the scale of international trade, and most scholars study the impact of the level of domestic digital economy development on the country's foreign trade from the perspective of their own country, while there are fewer studies from the perspective of trading partner countries. Therefore, this paper draws on relevant literature to take the countries along the "Belt and Road" as the research object, analyze the impact of the level of development of the digital economy of trading partner countries on China's international trade, and explore its role in the mechanism, which can supplement and enrich the existing research.

With the rise of the fourth industrial revolution, the new generation of information and communication technology has a significant impact on research and development, design, production and up to the rapid development of digital industrialisation and digitization of industry as all aspects of final consumption begin to penetrate, renew and reconfigure. The ensuing digital economy has become an emerging topic of focus for all parties globally. Given the importance of digital technology in international. The wide range of applications within the scope of existing research generally recognises that the development of the digital economy can effectively contribute to the international trade. However, the specific mechanism and path need to be further sorted out and improved. In the era of the "Belt and Road" Initiative it is important to explore the impact of the development of the digital economy in the countries along the route on the development of China's international trade and its specific role in the context of the development of the digital economy in the countries along the route. The mechanism can enrich China's theoretical research related to the digital economy on the one hand, and promote the "digital economy" on the other. The construction of the "Silk Road" has certain reference significance.

1.1 Current status of the development of China's digital economy

In terms of the overall level of development, the total development of China's digital economy in 2020 will be about 39 trillion yuan, accounting for GDP [1, P.76]. With a share of nearly 40 per cent, its growth rate of 9.7 per cent was more than twice the nominal growth rate of GDP over the same period, indicating that the number of the world economy has gradually become a key driver of our economic growth. Looking at the internal structure of the digital economy, The scale of industrial digitalisation in the country reached 31.7 trillion yuan, accounting for 80.9% of the entire digital economy scale, compared with only 7.5 trillion yuan of digital industrialisation, accounting for 19.1% of the digital economy scale, industrial digitalisation has become a powerful engine to promote the development of China's digital economy.

In recent years, the number of Chinese netizens has continued to grow, and the Internet penetration rate has increased year by year. In 2020, China's Internet penetration rate reached 70.4%. In 2021, China's Internet penetration rate reached 73%, an increase of 33% over ten years ago, achieving a leapfrog growth. In 2022, China's Internet penetration rate reached 75.6%. In 2023, it reached 77.5%. In 2024, China's Internet penetration rate reached 78.6%.

Table 1.1 - Internet penetration rate in China from 2020 to 2024 [7]

years	2020	2021	2022	2023	2024
Internet penetration rate in China	70.40%	73%	75.60%	77.50%	78.60%

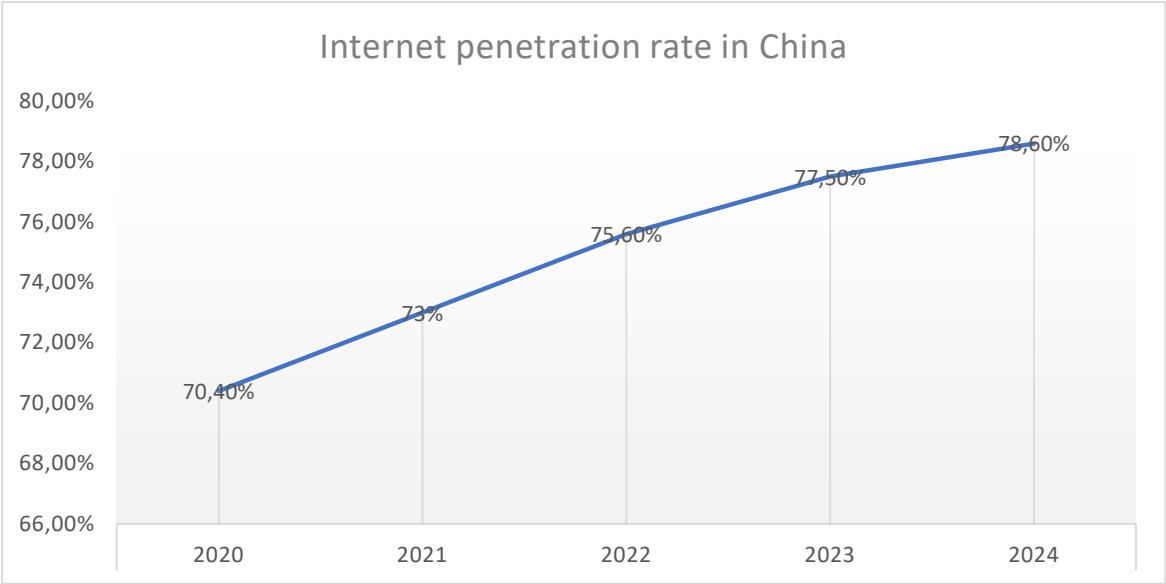

Figure 1.1 - Internet penetration rate in China from 2020 to 2024

According to Figure 1.1, it can be seen that my country's Internet penetration rate shows a significant upward trend from 2020 to 2024, which provides basic support for the application of digital technology and reduces the cost for enterprises and individuals to participate in the digital economy.

In the field of mobile devices, the proportion of Chinese Internet users using mobile phones to access the Internet is now as high as 99.6 per cent, thanks to the improvement of infrastructure, people can achieve convenient peer-to-peer transactions without leaving their homes, which greatly promotes the development of the digital economy. According to CNNIC statistics, in 2021, the number of IPv4 addresses in China will be 393.19 million; the number of IPv6 addresses will be 62,023/32.

The total number of mobile phone base stations reached 3.397 million in 2014, 4.668 million in 2015, 5.59 million in 2016, 6.19 million in 2017, 6.48 million in 2018, 8.41 million in 2019, 9.31 million in 2020, 9.48 million in 2021, 10.83 million in 2022, 11.62 million in 2023, and 12.65 million in 2024. These data can be seen from Table 1.2.

Table1.2 - Statistics of the total number of mobile phone base stations in China from 2014 to 2024 [40]

years	Total number of base stations (Ten thousand)	Departments that publish data
2014	339.7	Ministry of Industry and Information Technology
2015	466.8	Ministry of Industry and Information Technology
2016	559	National Bureau of Statistics
2017	619	Ministry of Industry and Information Technology
2018	648	Ministry of Industry and Information Technology
2019	841	Ministry of Industry and Information Technology
2020	931	Ministry of Industry and Information Technology
2021	948	National Internet Association
2022	1083	Ministry of Industry and Information Technology
2023	1162	National Bureau of Statistics
2024	1265	National Bureau of Statistics

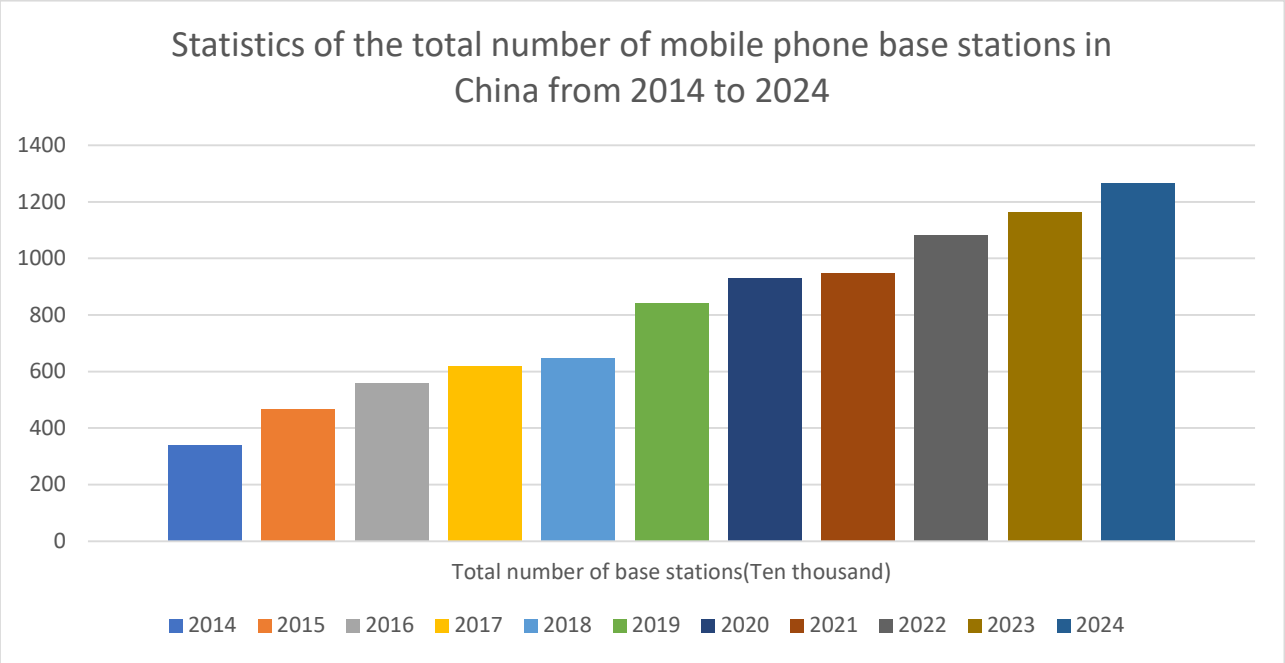

Figure 1.2 - Statistics of the total number of mobile phone base stations in China from 2014 to 2024

From Figure 1.2, we can see that the growth rate of base stations has significantly accelerated since 2019. In 2022, the total number of base stations will exceed 10 million. Judging from the data, China has vigorously developed the strategy of "Network Power" in recent years. In recent years, China has vigorously developed the strategy of "Network Power" and actively promoted the construction of digital infrastructure, which has achieved rapid improvement in the number of base stations, ports and Internet penetration rate, providing a good environment for the development of China's digital economy.

At the 2022 China International Digital Economy Expo, China Electronic Information Industry Development Research Institute released the 2022 China Digital Economy Development Research Report. The report points out that China's network infrastructure from running to leading, 5G network scale global leader, industry special network to accelerate the landing; IPv6 "highway" is fully completed, into the traffic enhancement stage; industrial Internet marking resolution system continues to improve, empowering thousands of lines of industry digital wisdom upgrade. The arithmetic infrastructure has changed from dispersed to integrated, the national integrated big data centre system has been initially established, and the "East Counts, West Counts" project has been comprehensively launched. At present, China's arithmetic scale accounts for about 27% of the global arithmetic scale, ranking second in the world, and is expected to achieve the first place in the global arithmetic scale by the end of the 14th Five-Year Plan [9, P.74]. The Digital China Development Report (2022) also shows that China's digital economy will reach 50.2 trillion yuan in 2022, a nominal increase of 10.3 per cent year-on-year, and will account for 41.5 per cent of gross domestic product (GDP), making it the world's second largest.

In 2023, along with the in-depth implementation of the strategy of Digital China and Network Power, China's digital economy will be in full force and develop rapidly. According to the data of China Information and Communications Technology Institute (ICTI), it is expected that the scale of China's digital economy will reach 56.1 trillion yuan in 2023, with a year-on-year growth of about 11.75 per cent, and the proportion of the digital economy in the GDP will be close to that of the secondary industry, and account for more than 40 per cent of the national economy [26, P.1]. According to the data released by the State Administration of Taxation, the sales revenue of China's core digital industry

will grow by 8.7% year-on-year in 2023, an increase of 2.1 percentage points compared with 2022, and account for 12.1% of all sales revenue. In this context, China's digital economy this year is moving towards a new stage, the digital economy geographic "integration", the digital economy of the larger regions is giving full play to the role of the leader, effectively driving, linking the development of the digital economy in other regions. This will promote the geographical integration of the digital economy.

From the point of view of the application of China's digital economy in the field of trade. Digital trade is the most direct embodiment of the development process of the digital economy, which mainly refers to domestic commercial activities and international trade activities established on the basis of the Internet and the Internet.

Table1.3 - Summary table of relevant data on the scale of China's cross-border e-commerce transactions from 2014 to 2024（trillion yuan） [41]

years	Total transaction size	Export transaction volume	Export share	Import transaction volume	Import share	Year-on-year growth
2014	4.20	3.59	85.40%	0.61	14.60%	33.30%
2015	5.40	4.49	83.20%	0.91	16.80%	28.60%
2016	6.70	5.50	82.08%	1.20	17.92%	24.00%
2017	8.06	6.30	78.20%	1.76	21.80%	20.30%
2018	9.00	7.10	78.90%	1.90	21.10%	11.60%
2019	10.50	8.03	76.50%	2.47	23.50%	16.66%
2020	12.50	9.70	77.60%	2.80	22.40%	19.00%
2021	14.20	11.10	78.20%	3.10	21.80%	13.60%
2022	15.70	12.20	77.70%	3.50	22.30%	7.50%
2023	16.85	13.10	77.60%	3.75	22.40%	7.30%
2024	17.66	13.70	77.60%	3.96	22.40%	4.80%

According to Table 1.3, we can see the total transaction volume, import and export volume, proportion, and year-on-year growth rate of China's cross-border e-commerce transactions from 2014 to 2014. In 2019, the total transaction volume exceeded 10 trillion yuan for the first time. In 2020, the transaction volume of China's cross-border e-commerce reached 12.5 trillion yuan, a year-on-year increase of 19.04%, a significant increase compared with previous years; from the import and export structure, exports accounted for 77.6%. According to the "2020 China Cross-border E-commerce Market Data Report", China's cross-border e-commerce transactions accounted for 38.86% of the total value of goods imports and exports. From this, it can be seen that the digital development trend of my country's trade has been significantly strengthened.

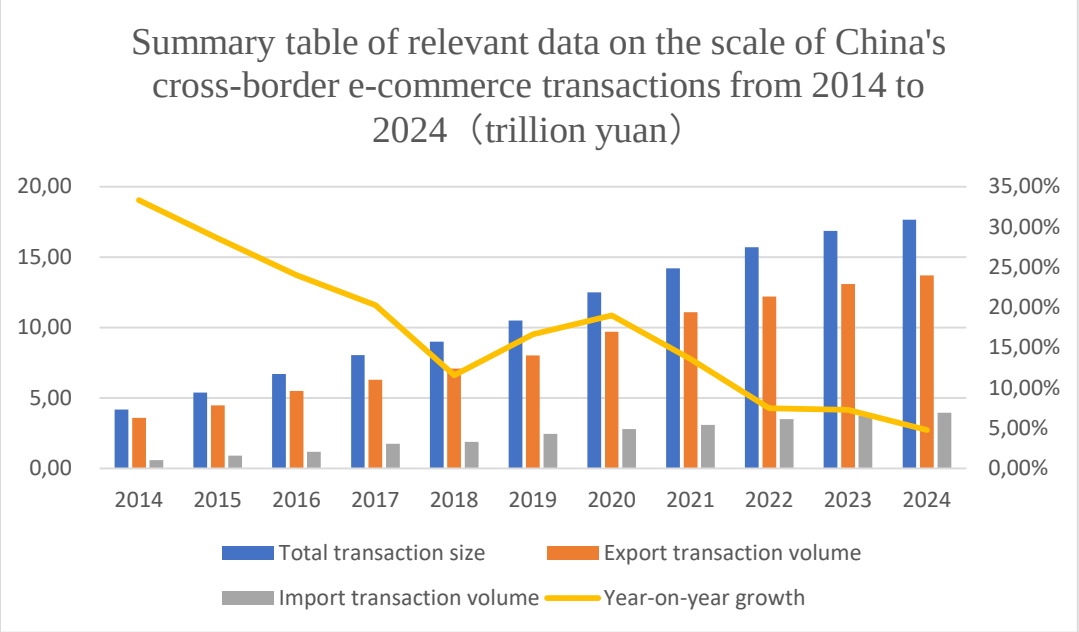

Figure 1.3 - Summary table of relevant data on the scale of China's cross-border e-commerce transactions from 2014 to 2024

According to Figure 1.3, we can more intuitively see that the total volume of China's cross-border e-commerce transactions and import and export volume have shown a steady growth trend from 2014 to 2024. Although the year-on-year growth rate fluctuates, it is all positive, indicating that the scale of China's cross-border e-commerce transactions is getting bigger and bigger from 2014 to 2024. At present, my country is in a critical period of transformation from a trading power to a trading power. Digital trade has become one

of the three pillars supporting my country's construction of a trading power, along with trade in goods and trade in services.

1.2 Current status of digital economy development in “Belt and Road” countries

The level of development of the digital economy in the countries along the Belt and Road. Based on the availability of the NRI (Network Readiness Index), a measure of the digital economy, this paper takes the "One Belt, One Plan" as the basis. A sample of 47 countries along the "road" was studied, covering six major regions.

In the time and geographical dimensions, there are significant differences in the degree of development of the digital economy in the countries along the "Belt and Road". First, analysed from the perspective of time, the overall digital economy development level of countries along the "Belt and Road" has shown a year-on-year upward trend, from 3.61 in 2008 to 4.24 in 2016, with an average annual growth rate of 2.03%. Sub-regionally, the level of development of the digital economy in each region from 2008-2016, in descending order, was West Asia, East Asia, Central and Eastern Europe, the CIS, Central Asia, South Asia, and there are differences in the average annual growth rate, the CIS, Central Asia, the growth rate is higher, respectively, 2.56 per cent and 1.78 per cent; West Asia, East Asia, Central and Eastern Europe, the growth of the region is more stable, about 1.39 per cent; the growth level of the South Asian region is slower The South Asian region has a slower level of growth, with an average annual growth rate of about 0.99 per cent, and it has great potential for growth [42, P.65-67].

Secondly, analysed from a regional perspective, the level of development of the digital economy in the countries along the Belt and Road is relatively low. In 2016, Singapore's digital economy development level was 6, ranking 1st, while Nepal's digital economy development level was only 3.2, ranking 47th; the top three countries belonged to East Asia, West Asia and Central and Eastern Europe [33, P.16], while two of the bottom three countries came from the South Asian region, which shows that the "One Belt, One Road This shows that the level of digital economy development in countries along the

"Belt and Road" is characterised by obvious regional imbalance. At the same time, there are still significant differences in the level of digital economy development of different countries in the same region, for example, in East Asia, Singapore's digital economy development level ranked first in 2016, while Cambodia, which belongs to the same region, ranked in the bottom five.

The above analyses show that the overall digital economy development in the countries along the Belt and Road since 2008 is still in progress. The level has been increasing year by year, but the development is not coordinated among regions, and there are unbalanced features in the development of different countries within the same region. Among them, West Asia, East Asia and Central and Eastern Europe have the highest level of development of the digital economy, with growth rates of The CIS and Central Asia regions are at an intermediate level of development and are growing rapidly; the South Asian region is at a low level of development and is growing rapidly. The slowest growth rate has a strong potential for development.

In 2021, Zhang Ming's team published the report in the 6th issue of Financial Review in 2021, and measured the digital economic development level of 106 economies in the world from 2013 to 2023 through an indicator system (technology, infrastructure, market, governance). The TIMG index ranking of countries along the Belt and Road from 2021 to 2023 is shown in Table 1.4.

According to Table 1.4, the digital economy in East Asia and ASEAN (Singapore, Malaysia) will develop relatively fast from 2021 to 2023. Central and Eastern Europe (Estonia) and the Gulf countries (UAE, Saudi Arabia) take digital governance and smart cities as their main development paths, with a moderate development speed. The digital economy in South Asia and Africa is relatively backward, but has great development potential.

Challenges faced by countries along the Belt and Road in the development of the digital economy. The existence of the digital divide has led to significant regional disparities between the levels of development of the digital economy, which are manifested in the following three points:

Table 1.4 - The TIMG index ranking of countries along the Belt and Road from 2021 to 2023 [60]

country	2021 TIMG Rankings	2023 TIMG Rankings	Core Competitive Advantages
Singapore	2	2	Digital tech, e-governance, infrastructure
China	5	5	Digital market (2nd globally), 5G/6G
UAE	12	12	Smart cities (Dubai), blockchain
Malaysia	18	18	E-commerce, digital payments
Estonia	12	12	e-Government (e-Residency), cybersecurity
Vietnam	28	28	Manufacturing digitization, e-commerce
Russia	25	25	localization, domestic platforms
India	28	28	public infrastructure
Saudi Arabia	35	35	Smart cities (NEOM), oil digitization
Kenya	55	55	Mobile money (M-Pesa), digital ID

First, in terms of digital infrastructure, the development of the digital economy needs to be based on sound infrastructure conditions. However, due to the varying levels of infrastructure development in the countries along the route, countries within the same region have There are also large gaps in the number of secure web servers, leading to high and low rates of digital economy development.

Secondly, with regard to the level of use, the widespread use of information and communication technologies is an important factor in promoting the development of the digital economy. momentum, and the level of GDP per capita provides a sound economic basis for widespread use of the digital economy. Sub-region – to put this in perspective, the

highest GDP per capita in 2018 was in West Asia and the lowest was in South Asia, with the corresponding West Asia has the highest level of digital economy development, while South Asia has the lowest.

Thirdly, in terms of skill levels, the literacy of workers affects the digital economy as labour as the literacy level of motorists increases, so does their ability to process information with the help of digital technology. In the countries along the route The CEE region has the highest average number of years of schooling at 11.89 years, while South Asia has the highest average number of years of schooling at only 6.93 years, limiting the development of the local digital economy to some extent.

It can be seen from the previous analysis that the level of digital economy development in countries along the "Belt and Road" has been increasing year by year. The improvement of digital infrastructure and application level provides new opportunities for countries to carry out foreign trade, and this section will further explore the application of the development of digital economy in international trade in the context of "Belt and Road".

Digital Silk Road. General Secretary Xi Jinping pointed out at the World Internet Conference in December 2015 that it is necessary to accelerate the construction of global networks and promote connectivity. One of the sub-forums of the conference was themed "Digital Silk Road - Win-Win Cooperation", which discussed the construction of the Digital Silk Road and the realization of win-win sharing, and the concept of "Digital Silk Road" was born. At the opening ceremony of the "Belt and Road" Summit Forum in May 2017, General Secretary Xi Jinping formally put forward the concept of the "Digital Silk Road", pointing out that "we need to adhere to innovation-driven development, strengthen the 'Belt and Road', and enhance the development of the "Digital Silk Road". In 2020, Chinese e-commerce enterprises and Mexican partner Andrés jointly launched the Mexican "digital village project". China's e-trade experience has been promoted to more regions in Mexico, providing talents and technical support for Mexican enterprises to realize digital transformation. On the one hand, by increasing investment in digital infrastructure construction and taking digital technology as the driving force of economic and social innovation, we can effectively promote the rational allocation and open sharing

of digital resources, thus further narrowing the digital divide among countries along the Belt and Road and improving trade facilitation in countries along the route; on the other hand, we can promote the deep integration of the information industry and traditional industries, and provide technical support for the digital transformation of Mexican enterprises [57, P.21-23]. On the other hand, it promotes the deep integration of the information industry and traditional industries, promotes the digital transformation of traditional industries, enables the incubation of new industrial forms and business models, creates an open and transparent international business environment for the international trade market between China and its trading partners along the routes, and further points out the direction of the digital construction along the "Belt and Road" [59, P.1].

Since 2016, when the Ministry of Commerce and the Ministry of Foreign Affairs of Chile signed the first Memorandum of Understanding (MoU) on cross-border e-commerce cooperation, by the end of 2019, China has established e-commerce collaboration mechanisms with 22 countries. In the face of the impact of the epidemic, cross-border e-commerce, in coordination with the normalized operation of the China-European Union (CEU) liner, has facilitated economic and trade exchanges between countries along the Silk Road e-commerce, which is conducive to maintaining the stability of the global supply chain and promoting the transformation and upgrading of China's foreign trade industry. At present, China has signed memorandums of understanding on cooperation on the Digital Silk Road with 17 countries and established bilateral cooperation mechanisms on Silk Road e-commerce with 23 countries.

Looking ahead, industry experts believe that the construction of the "Digital Silk Road" will usher in three major development opportunities [5, P.289]: first, it will inject more new impetus into the global economic recovery and create more new growth points for the economic development of all countries; second, it will become an important engine for the development of cross-border e-commerce, providing new opportunities for China's e-commerce platforms and digital platforms to "go global"; third, it will help small and medium-sized enterprises to realize win-win cooperation. Secondly, it will become an important engine for the development of cross-border e-commerce, providing new opportunities for Chinese e-commerce platforms and digital platform enterprises to "go

out"; thirdly, it will help small and medium-sized enterprises in their digital transformation and realize win-win cooperation.

Economic effects of digital construction. From the consumer perspective the rapid development and popularization of information and communication technologies have greatly improved consumer welfare. On the one hand, it is reflected in the increase of trade categories [37, P.1]. On the other hand, it is reflected in the decline of transaction costs. Firstly, the extensive application of digital technology has made products that were previously unable to participate in trade due to various cost factors become tradable goods, and increased the choices of consumers. Secondly, technological innovation has intensified market innovation, allowing more enterprises to invest in research and development of new products, while technological innovation has intensified market competition, further reducing the price of traded goods and providing consumers with more goods of good quality at low prices.

From a producer perspective. On the one hand, the popularization of ICT can reduce the cost of organization and coordination in the existing value chain; on the other hand, the emergence of new digital products and services can give rise to a new global value chain, and the borderless and decentralized characteristics of digital products themselves provide a possibility for more countries to participate in the international division of labor. "Most of the countries along the Belt and Road are developing and emerging countries, and the reshaping of the organization, production and operation modes of the global value chain in the era of the digital economy provides these countries with an opportunity to overtake them.

From the perspective of government regulation. The e-government platform established on the basis of information and communication technology can effectively deal with the problems encountered by trade subjects in the transaction process. Utilizing blockchain smart contract technology, it can effectively deal with all the procedures in the process of procedures in the customs clearance process, simplifying the process of customs clearance for enterprises, saving the approval timeframe, and improving trade efficiency. Currently now, the international community has not yet established a legal system on digital economy in a complete sense, and digital economy is the digital

economy is the development trend of international trade in the future, therefore, legislatures around the world also attach great importance to the development of the digital economy, and have introduced policies to strengthen the protection of the digital economy [37, P.1].Therefore, legislatures around the world also attach great importance to the development of digital economy and have introduced policies to strengthen the supervision and management of digital economy enterprises. Countries along the Belt and Road urgently need to establish a sound legal system related to the digital economy to provide a strong guarantee for the digital transformation of industries in the countries along the Belt and Road.

Chapter 2 Impact of the Digital Economy on International Trade Arrangements

2.1 Modifying International Trade in the Digital Economy

This section first analyzes the influence of digital economy on international trade subjects, then sorts out the restrictive conditions of traditional international trade, then explains the factors that digital economy affects international trade, and then discusses the effect of digital economy on improving international trade on the basis of the above analysis.

The first is the analysis of the influence of digital economy on international trade subjects. As shown in Figure 2.1, the analysis is conducted from the following three aspects.

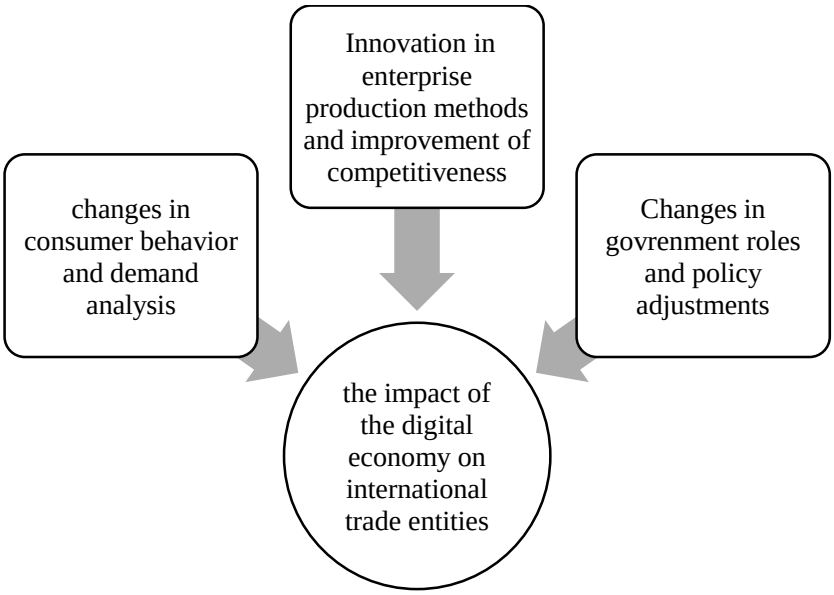

Figure 2.1 - Impact of the digital economy on international trade entities

Consumer behavior changes and demand analysis. Under the background of the rapid rise of digital economy, consumers' shopping behavior and consumption habits have undergone profound changes. This change has not only changed the traditional way of shopping, but also brought new market opportunities and challenges to enterprises. The digital trend of consumer behavior is obvious. With the continuous development and popularization of Internet technology, more and more consumers choose to do shopping, payment and entertainment online. This digital shopping method provides consumers with a more convenient, efficient and flexible shopping experience. Consumers can make more

rational and wise purchase decisions by looking at other consumers' comments and comparing the performance and price of different products. This change in information acquisition mode also requires enterprises to strengthen brand building, optimize product information display and marketing strategies to better attract and meet the needs of consumers. Enterprise production mode innovation and competitiveness improvement. With the increasingly fierce market competition, the innovation of enterprise production mode and the improvement of competitiveness have become an important guarantee for the sustainable development of enterprises. In terms of industry consolidation and optimization, enterprises need to strengthen cooperation and coordination with upstream and downstream enterprises to realize the integration and optimization of industrial chain. This can not only reduce the procurement cost and risk of enterprises, but also improve the production efficiency and product quality of enterprises. At the same time, through industry consolidation and optimization, enterprises can realize the optimal allocation and sharing of resources, thus improving the competitiveness of the whole industrial chain. Government Role Change and Policy Adjustment In terms of international cooperation and exchanges, the government should actively participate in the governance and rule-making of the global digital economy and strengthen cooperation and exchanges with other countries and regions. This can not only jointly promote the global development of the digital economy, but also provide more opportunities and platforms for China's digital economy and international trade.

Then sort out the restrictive conditions of traditional international trade. Traditional trade theory generally refers to all kinds of frictions in international trade as "iceberg cost", which includes "natural resistance" formed by geographical distance on the one hand; On the other hand, it includes "artificial resistance" brought by political system and information barriers [15, P.147]. Because enterprises can't know the local market information in detail, it is difficult to adjust production strategies and expand new services in time according to the different needs of the host country, which hinders the expansion of trade scale. Affected by trade costs and information asymmetry, international trade barriers are virtually built, which is not conducive to the expansion of the international trade market and the effective allocation of resources. Figure 2.2 provides a detailed

explanation from the perspectives of transaction costs and the degree of information asymmetry.

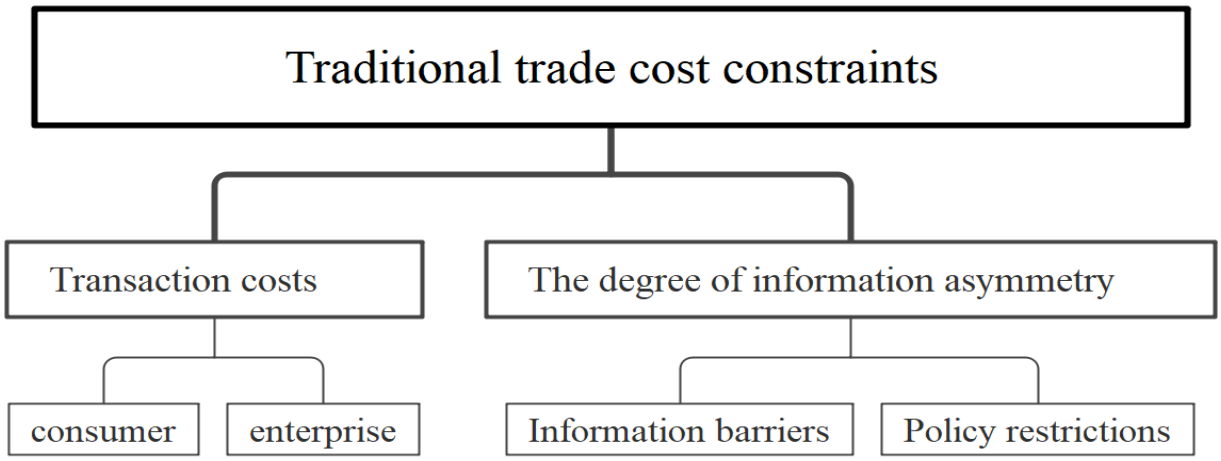

Figure 2.2 - Traditional trade cost constraints

The trade cost factor. In the process of transnational trade, enterprises will first measure the cost of exporting their products or services to the corresponding countries or regions according to the law of cost-benefit, and compare it with the expected income. Only when the expected income is met, enterprises will actively participate in global trade, so trade cost has become a key factor restricting the development of international trade. The transaction cost theory points out that the trade cost generally involves information collection, negotiation, performance, logistics and time cost, while the product price borne by consumers is affected by multiple factors such as transportation cost, regional trade barriers, producer price and geographical distance. From the perspective of trade object, the existence of geographical distance will increase the transportation cost, which will directly reduce the tradeability of some commodities. And geographical differences will further lead to economic and cultural differences between different countries, such as cultural differences and highly localized social networks, which greatly affect consumers' demand for goods [19, P.76-78]. For trade in services, the international transfer of some technologies and labor needs to face higher transportation costs and time costs, which hinders cross-regional cultural exchanges. From the analysis of trade subjects, enterprises' participation in international trade is mainly divided into two stages: contract

establishment and trade performance. The degree of information asymmetry. Human resistance in international trade mainly includes information barriers in different markets and trade policy restrictions in various countries, among which the degree of information asymmetry between the two parties greatly hinders the improvement of trade efficiency. All these have limited the number of enterprises participating in international trade to a certain extent, especially for small and medium-sized enterprises, the uncertainty risk in international trade is greater, which invisibly raises the threshold for participating in international trade.

Secondly, it explains the factors that digital economy affects international trade.

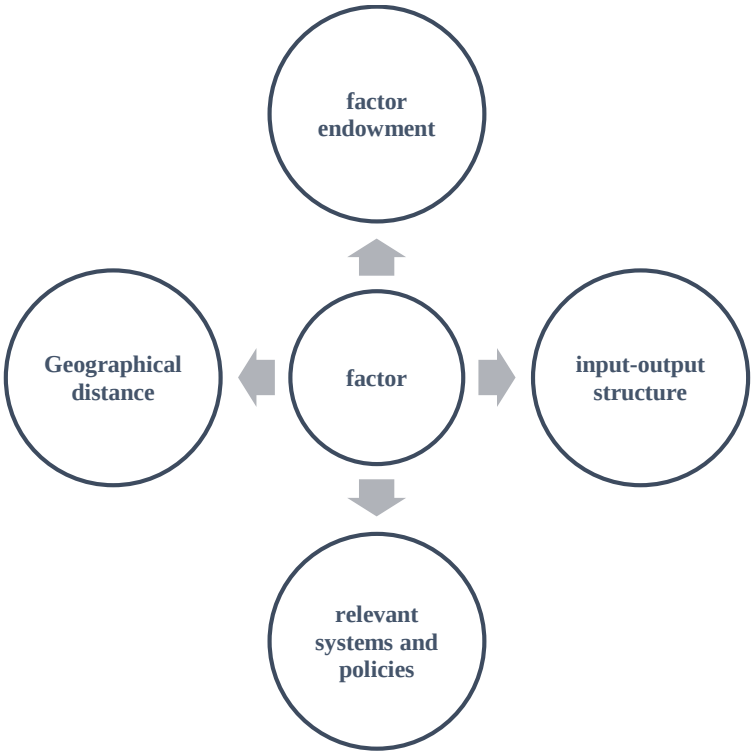

Figure 2.3 - Factors that digital economy affects international trade

As shown in Figure 2.3 drawing lessons from the governance framework of global value chain established by Gereffi and Fernandez-Stark, this section summarizes the factors that digital economy affects international trade into four aspects: factor endowment, input-output structure, geographical distance and related systems and policies.

Factor endowment. On the one hand, data, as a new factor of production, participates in the international division of labor, which intensifies the digitalization

process of traditional industries, promotes the iteration of technological renewal and intensifies industrial innovation, which is mainly reflected in the increase of international trade products and the decline of trade product prices [22, P.9,134]. On the other hand, the development of digital technology has improved the international spread structure and promoted the development of long-distance service trade. The development of digital technology has greatly reduced the face-to-face transaction cost, effectively promoted the development of service trade in various countries, and service trade will become an important development direction of international trade in the future.

Input-output structure. Digital technology promotes the realization of digital industrialization and industrial digitalization through the renewal and transformation of traditional industries. On the one hand, the digital economy creates a new source of value by transforming the supply side with digital technology. For example, the use of big data, Internet of Things and other technologies has improved the productivity of traditional industries from the supply side and effectively increased the added value of the value chain; Use the Internet of Things and big data analysis platform to integrate the hardware facilities, application software and digital technology of small and medium-sized enterprises, and open up all links in the supply chain, so that information can be transmitted efficiently; At the same time, actively track customer demand, use big data mining to realize accurate prediction of market trend, and lay the foundation for entering the international market. On the other hand, digital technology has improved the added value structure of international trade. First, with the wide application of blockchain and big data analysis, the importance of intangible assets is highlighted, and its added value moves to two segments of the global value chain; Second, the application of intelligent technology replaces the traditional low-skilled labor force, which increases the added value in the production and manufacturing stages; Thirdly, the application of automation and digitalization improves the productivity of enterprises, makes the whole value chain move upward and promotes the improvement of the overall international trade efficiency.

Geographical distance. Geographical distance is an important factor that restricts the development of international trade [30, P.136]. Under the background of global division of labor, countries conduct intra-product trade and engage in specialized production

according to their respective comparative advantages, and the trade of intermediate products involved needs to go through multiple cross-border transportation, which is easy to form industrial agglomeration effect due to geographical distance. However, in the era of digital economy, the obstacle of geographical distance to international trade is further weakened, which is embodied in the following aspects. For example, the popularization of electronic translation and Internet applications improves communication efficiency and reduces the negotiation cost caused by language barriers in international trade. Thirdly, the application of information and communication technology reduces the cost of face-to-face transactions and can effectively promote the development of cross-border service trade, including long-distance commuting, long-distance education and long-distance medical treatment.

Relevant systems and policies. Domestic institutions, trade and investment policies and regional trade agreements are important factors that restrict the development of international trade, especially in the context of digital economy. The main policy trend is to replace multilateral trade agreements with state intervention policies and regional agreements. The impact of the application of digital technology on the relevant trade system can be summarized as follows: On the one hand, blockchain technology enables the construction of e-government platform, strengthens the transparency of the import and export customs clearance process of enterprises, and improves the foreign trade efficiency of enterprises. On the other hand, since there are no uniform rules for the cross-border circulation of data in the world, policies such as data localization measures and data intellectual property protection have brought greater uncertainty to international trade.

Finally, the effect of digital economy on improving international trade. As shown in Figure 2.4, it will be explained from the following three aspects.

Figure 2.4 - The effect of digital economy on improving international trade

Increase tradeable varieties and improve consumer welfare. First of all, the wide application of digital technology enhances the information matching between the supply and demand sides of the market, enabling foreign trade enterprises to quickly understand the changing market demand, and the personalized demand of consumers can be transmitted to the supply side in time. At the same time, the automation and intelligence of production processes have improved the production speed of personalized products. Because enterprises can quickly grasp the market information, they put forward higher requirements for the heterogeneous production capacity of enterprises, thus promoting the diversification of trade products. The increase of trade varieties and the decrease of prices make consumers have more choices, which in turn can improve consumers' welfare.

Reduce the threshold of international trade and increase the participation of small and medium-sized enterprises. First, the application of digital technology has lowered the threshold for small and medium-sized enterprises to participate in international trade. Enterprises need to pay a series of costs such as cross-border consultation, negotiation and delivery to enter the international market, which virtually excludes some small and medium-sized enterprises with low production efficiency, weak financial strength and lack of professional and technical personnel from the international market. However, in the era of digital economy, the application of cross-border business platform reduces the cost of cross-border display of goods and obtaining cross-border sales orders. The adoption of intelligent technology makes communication, settlement and logistics more efficient; The popularization of e-government platform simplifies the customs clearance process of

enterprises and effectively weakens the traditional international trade barriers. Thus, effectively reducing the threshold for participation in international trade.

Improve the international trade mechanism and enhance the efficiency of international trade. First, the development of digital economy reduces the cost of market coordination, reduces the mismatch of resources caused by information asymmetry, and promotes the further refinement of division of labor. Second, realize the high-efficiency docking of "production" and "demand". Third, standardize international trade processes and improve trade efficiency. In the stage of trade performance, mainly due to the system differences in different countries and the existence of tariff and non-tariff barriers in international trade, enterprises need to pay too much compliance costs in the process of trade, which hinders the development of international trade to some extent. Using digital technology, strengthening cooperation among governments and establishing a transparent and open information exchange platform can effectively reduce the time for enterprises to go through compliance procedures and improve trade efficiency.

2.2 Impact of Digital Economy on International Trade of China and Belt and Road Countries

With the development and wide application of digital economy, countries have digitally transformed their local industries and carried out foreign trade on the basis of new comparative advantages. On the basis of the above, this paper intends to put forward the following assumptions: Hypothesis 1: The development of digital economy along the Belt and Road can promote the scale of China's international trade. Subsequently, this section will sort out the specific mechanism path of the digital economy affecting international trade, and mainly discuss the possible path of the development of digital economy affecting international trade from two angles: the cost of international trade and the types of international trade products.

Digital economy and the cost of international trade. Among them, information cost has become a key factor in international trade, and how to effectively improve the matching degree between supply and demand and reduce the cost of information search

and communication in the trade process has become a key concern in international trade practice [16, P.38]. In the era of digital economy, the rapid development of information and communication technology has brought opportunities to reduce various costs in the process of international trade, which are reflected in three aspects: information cost, transaction cost and system cost. First of all, information cost includes information search cost and information matching cost of both sides of trade. With the vigorous development of digital economy, the wide application of information and communication technology has greatly improved the transmission efficiency of market information. Government official websites and international statistical databases provide enterprises with relevant information about the market environment and trade risks of trading partner countries [36, P.93]; Cross-border e-commerce trading platform has accumulated a lot of trade data based on real scenes, which can provide foreign trade enterprises with market demand information of destination countries and credit information of potential trading partners, greatly reducing the information search and matching costs brought by information asymmetry of foreign trade enterprises [52, P.84]. With the continuous improvement of national infrastructure along the "Belt and Road" and the increase of Internet penetration rate [23, P.16], the dissemination of information is more convenient, timely and wider, reducing the information asymmetry when enterprises conduct trade [43, P.49]. Secondly, transaction cost refers to the cost that enterprises need to pay for cross-border transactions, including communication, signing, payment and delivery costs. Because the increase of data transmission rate reduces the communication cost of "face-to-face" negotiation, enterprises can display more goods at lower marginal cost with the help of e-commerce platform [20, P.13], and conduct timely business communication with the help of various office software, thus avoiding high-cost "face-to-face" transnational negotiation; The application of ICT technology based on blockchain and Internet of Things enhances the trust of both parties to the trade, and can effectively reduce the signing cost, payment cost and delivery cost during the performance of both parties to the trade. The digital "Belt and Road" reduces the distribution links in the trade process through the construction of the network platform [28, P.104], promotes the accurate matching between the production end and the consumption end, and reduces the transaction costs of both parties [27, P.109].

Third, institutional cost refers to the cost that enterprises need to pay to meet the rules and regulations of their own countries and trading partner countries when carrying out trade activities [14, P.68,135]. The construction of national digital customs clearance platforms along the "Belt and Road" can reduce the time limit for legal norms and procedures related to international trade, thus improving the efficiency of import and export customs clearance and reducing various compliance costs caused by institutional costs in international trade. Accordingly, the following assumptions are put forward: Hypothesis 2: The development of digital economy along the "Belt and Road" will enhance the scale of China's international trade by reducing the cost of international trade.

Digital economy and international trade products. The rapid development of a new generation of information and communication technologies, represented by big data, artificial intelligence and the Internet of Things, has promoted the construction process of the digital Belt and Road, and promoted the transformation of traditional trade methods and trade structures. First, the application of digital technology has overcome the constraints of traditional international trade and increased the number of tradable goods. Second, with the highly interconnected global economy and society, the content of international trade has begun to change, and the trade pattern is changing with each passing day. Benefiting from the application of information and communication technology, the mode of service trade is facing great changes. In the past, services that could only be produced and consumed locally, such as education, medical care, retail, tourism, etc., can realize long-distance or even transnational trade by relying on information and communication technology, which has given birth to a series of new service trade such as online education, online medical care, online social software and e-commerce platform [51, P.49]. Third, the rise of the digital economy has intensified the international market competition by increasing the matching between the supply side and the demand side and reducing the trade cost. On the one hand, digital products have the characteristics of sharing, copying and unlimited use, which reduces the fixed and variable costs passed on by enterprises to consumers to some extent and reduces the prices of bilateral trade goods [34, P.47]. On the other hand, the wide application of digital economy has lowered the threshold of international trade, which not only broadens the

trade intensive margin of the original exporting enterprises, but also allows more small and medium-sized enterprises to participate in the international trade market through the effect of reducing trade costs, thus increasing the breadth of enterprises' exports. Strengthen the construction of digital infrastructure in countries along the Belt and Road, so that enterprises can obtain international competition trends more conveniently and efficiently [28, P.104], and respond quickly to changes in consumer demand. Brand-new business opportunities and a wider consumer market will attract a large number of enterprises to participate in international trade competition across industries [27, P.121]. The wide application of information and communication technology reduces the constraints of traditional international trade, brings opportunities for more small and medium-sized enterprises to participate in the international trade market, intensifies the competition of similar products in the market, impacts the traditional cost pricing paradigm, and urges enterprises to innovate and upgrade their products. Accordingly, the following assumptions are put forward: Hypothesis 3: The development of digital economy along the "Belt and Road" will enhance the scale of China's international trade by increasing the variety of international trade products. Figure 2.5 is the impact of the digital economy on my country's international trade and path.

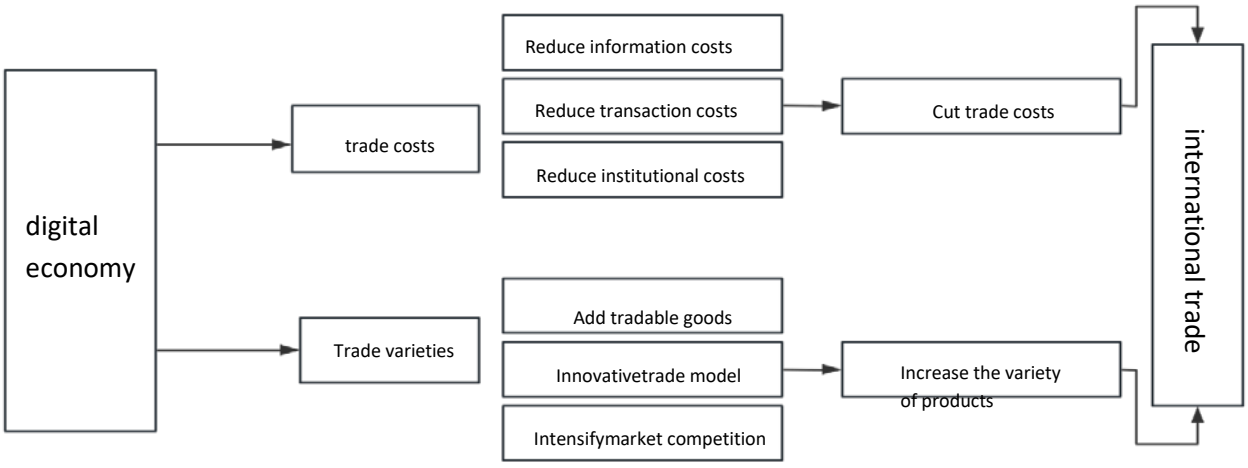

Figure 2.5 - Impact of the digital economy on China’s international trade and path

The national "Belt and Road Initiative" has not only brought new impetus to China's trade and economic growth, but also brought rare opportunities for the development of digital trade in various countries. This paper intends to put forward hypothesis 4: the development of digital economy can promote the development of international trade in "Belt and Road" countries. Subsequently, this section will sort out the specific mechanism path of the digital economy affecting the international trade of the "Belt and Road" countries, and mainly discuss the possible paths of the development of the digital economy affecting the international trade of the "Belt and Road" countries from three angles: international trade cost, international trade product types and trade facilitation.

With the penetration of a new generation of information and communication technology in research and development, design, production and final consumption, the development of digital economy can effectively reduce the cost of international trade. Specifically, the first is the application of digital technology to digital tools and platforms. Secondly, optimize the trade process and improve efficiency. By simplifying the customs clearance and quarantine process: in cross-border electronic commerce, the constraints and arrangements of the traditional regulatory framework should be reasonably adjusted according to the actual situation, such as the adaptive adjustment and differential setting of customs clearance and quarantine, import access and export tax rebate for B2B, B2C and C2C modes, so as to reduce the institutional transaction costs. And one-stop financial services: in cross-border payment services, the intermediate links of collection and payment, such as collection, exchange, payment and financing, can all obtain one-stop financial services through the cross-border e-commerce payment platform, which improves payment efficiency and reduces transaction costs. Finally, improve user experience and reduce communication costs. By adopting virtual assistant and intelligent customer service: with the help of virtual assistant, online after-sales service platform and intelligent chat robot, we can provide consumers with more convenient and personalized pre-sales and after-sales experience. Based on this, the following hypothesis 5 is put forward: the development of digital economy promotes the development of international trade in "Belt and Road" countries by reducing trade costs.

Through its unique characteristics and advantages, the digital economy provides strong support for the increase of international trade products. First of all, the innovation and application of digital technology increase the variety of products in international trade. The rise of e-commerce platform: E-commerce platform has broken the time and space constraints, enabling more products to be traded across national boundaries. Secondly, promote innovation and intellectual property protection and increase the variety of products in international trade.

Encourage technological innovation: The digital economy has promoted the rapid development of technological innovation and spawned new business models and business concepts. This has provided a steady stream of power for the increase in the variety of products in international trade. Strengthening the protection of intellectual property rights: In the era of digital economy, the protection of intellectual property rights is particularly important. Governments and international organizations are strengthening cooperation to jointly deal with transnational intellectual property rights infringement and protect the innovative achievements of the digital economy. Based on this, the following hypothesis 6 is put forward: the development of digital economy promotes the development of international trade in "Belt and Road" countries by increasing the variety of trade products.

The digital economy has greatly promoted the facilitation of trade through a series of innovative methods and technical means [32, P.7]. First of all, the application of digital platform and digital technology makes trade more convenient. E-commerce platforms, such as Alibaba and Amazon, provide direct docking channels for buyers and sellers, simplifying the multi-layer intermediate links in traditional trade. Secondly, the electronic trade process makes trade more convenient. Electronic documents: generate, send, receive, store and process trade documents by electronic means, such as electronic invoices, electronic contracts, electronic bills of lading, etc., to reduce the use and circulation time of paper documents. Electronic payment: use electronic payment systems, such as Alipay, WeChat payment, PayPal, etc., to realize fast and safe payment of trade funds. Finally, trade supervision and service innovation make trade more convenient. Single window service: establish a "single window" platform for international trade, and integrate the business processes of customs, taxation, foreign exchange, inspection and quarantine

departments into one platform to realize one-stop handling. Intelligent supervision: Real-time monitoring and early warning of trade activities are carried out by using technologies such as the Internet of Things and artificial intelligence to improve the efficiency and accuracy of supervision. Based on this, the following hypothesis 7 is put forward: the development of digital economy promotes the development of international trade in "Belt and Road" countries through trade facilitation.Figure 2.6 is an analysis of the impact of the development of the digital economy on international trade in the Belt and Road countries and its paths.

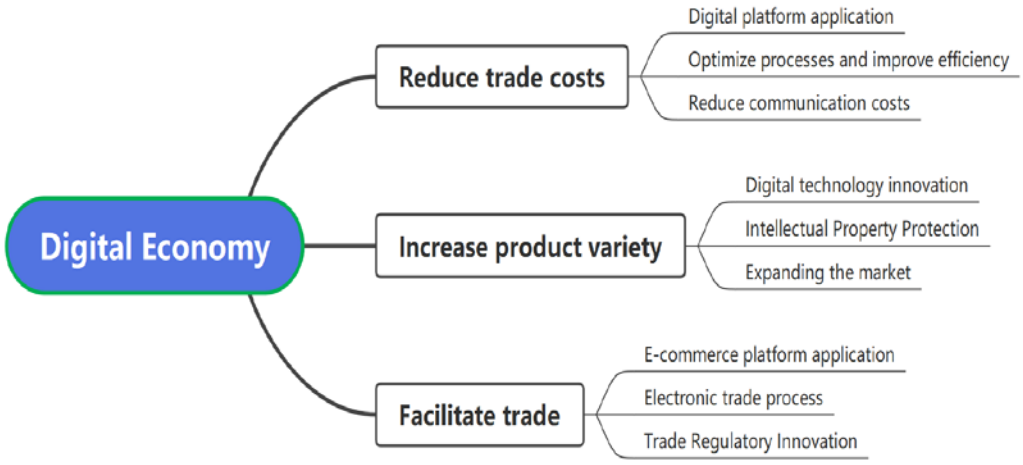

Figure 2.6 - The impact of the development of the digital economy on international trade in the Belt and Road countries and its paths

With the vigorous development of digital economy, governments and international organizations need to actively respond to challenges, seize opportunities and jointly promote the adjustment and innovation of international trade rules to meet the development needs of digital economy.

Chapter 3 Digitisation of International Trade along "Belt and Road" Route

3.1 China's e-commerce development with countries in a digital economy "Belt and Road" countries

Research significance. Theoretical significance. Firstly, most of the existing studies start from the perspective of the level of development of the digital economy in their countries. To study the impact of the development of the digital economy in their countries on their international trade; or to study the development of the digital economy in different countries. This paper takes the countries along the "Belt and Road" as the research object. This paper takes the countries along the "Belt and Road" as the object of research, and from a new perspective, we can make a new study on the level of development of the countries along the "Belt and Road". It is theoretical to explore the impact of the development of digital economy in trading partner countries on the development of international trade in China. Innovation significance. Second, existing research generally agrees that the spread of the Internet can lower the international market threshold and break the Traditional barriers to international trade, which in turn facilitates international trade, but there is a lack of clarity on how the digital economy works in the national context. There are fewer studies on international trade. In this paper, we will sort out the traditional international trade restrictions in terms of international trade costs. Two perspectives of international trade product categories to explore the specific path of the digital economy affecting international trade.

Relevance. According to World Bank statistics, the entire country has benefited from the Belt and Road Initiative. The average reduction in transit time for import and export goods on the globe is between 1.2 per cent and 2.5 per cent, and in the relevant economic corridors. 11.9 per cent reduction in transport time for trade in goods and a 10.2 per cent reduction in overall trade costs [4, P.107]. The Belt and Road Initiative was seen to have fuelled the growth of global trade. Data as a new factor of production. Dependent on the specific application of ICT [49, P.42]. "Countries along the Belt and Road have great potential for the development of the digital economy. At the same time, China's

direct investment in countries along the "Belt and Road" has been increasing year by year, and the study of the "Belt and Road" has been a major challenge. The impact of the construction of the digital economy on the development of international trade in China, on the one hand, provides our enterprises with local investment On the other hand, it can provide a good direction for China's economic co-operation in the process of implementing the "Belt and Road" policy. It will provide a reference for cooperation, technology exchange and industrial digital development, and help the development of the "Digital Silk Road".

Research methodology. Literature analysis method. Reviewing the relevant literature on digital economy and international trade, both at home and abroad. The literature was also collated and summarised to clarify the definition of the digital economy under existing research, the measurement of the digital economy and related analyses of the digital economy and international trade to lay a theoretical foundation for the research in this paper.

Theoretical Analysis Method. Sorting out international trade barriers in traditional trade patterns with implications for the digital economy. The mechanism of international trade is theoretically analysed to construct a theoretical framework for the empirical study of this paper.

Case analysis method. This article uses multiple cases to illustrate how the development of digital economy in countries along the Belt and Road and in China can promote the expansion of international trade.

Relevant innovations. Innovation in research perspective. This paper starts from the perspective of digital economy development of the countries along the "Belt and Road", and explores the impact of the development of digital economy of the countries along the "Belt and Road" on China's international trade. Based on a new research perspective, it is different from the international trade research conducted by previous scholars based on the level of Internet development in China's provinces and cities.

Shortcomings in the study. Although the development of the digital economy has weakened the traditional international trade barriers and promoted international trade to a certain extent, the formation of new digital barriers may be triggered by the unsoundness

of the digital trade rules, such as the data localization measures to limit the cross-border flow of data, and the disagreement between countries on the protection of intellectual property rights of data, data privacy, etc., and the existence of digital barriers will weaken the digital economy's promotion of international trade as described in this paper. The promotion effect of digital economy on international trade as described in this paper needs to be further researched. The shortcomings of this paper are also the direction of future research expansion. Future research focuses on how to build a bridge between the digital economy and trade in services, further improve the theoretical and empirical models between the digital economy and trade in services, and establish sound digital trade rules to guide international trade practice.

2025 is the 12th year of the "One Belt, One Road" initiative. In the past 12 years, the "One Belt, One Road" initiative has changed from concept to action, from vision to reality, and the digital economy of the "Belt and Road" countries has grown substantially. Since the first "One Belt, One Road" international cooperation summit forum in 2017 proposed the construction of the digital Silk Road, the digital economy has always been a hot spot for building the "Belt and Road". Through some cases and data, we can more intuitively feel the rapid development of the digital economy in the "Belt and Road" countries.

Southeast Asian countries have developed rapidly mainly in digital e-commerce and cross-border trade. Thailand connects China's cross-border trade through e-commerce platforms such as Lazada and Shopee [21].

Table 3.1 - Summary of China-Thailand trade volume and cross-border e-commerce transaction volume from 2019 to 2024（100 million yuan）[31]

year	2019	2020	2021	2022	2023	2024
Total trade volume between China and Thailand	6326.6	6832.8	8476.9	8994.2	8874.3	9533.4
Cross-border e-commerce transaction volume	432	576	720	864	1008	1152

Proportion	6.80%	8.40%	8.50%	9.60%	11.40%	12.10%

As shown in Table 3.1, the cross-border e-commerce trade volume between China and Thailand will continue to increase from 2019 to 2024. In 2023, the cross-border e-commerce transaction volume between China and Thailand will reach 100.8 billion yuans, accounting for 11.4% of the total trade volume between China and Thailand, breaking through 10% for the first time. In 2024, the bilateral trade volume between China and Thailand will reach 953.34 billion US dollars, a year-on-year increase of 6.9%.

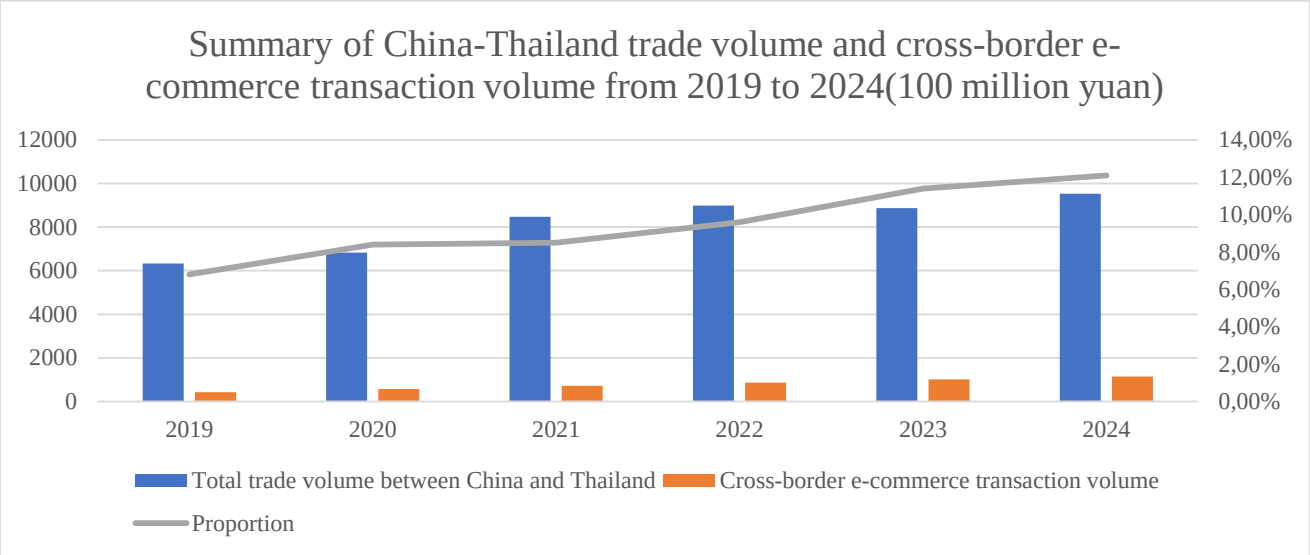

Figure 3.1 - China-Thailand trade trend chart from 2019 to 2024

As shown in Figure 3.1, we can more intuitively see that the trade volume between China and Thailand and its cross-border e-commerce transaction volume are on an upward trend. As time goes by, the proportion of cross-border e-commerce transaction volume in the total trade volume between China and Thailand continues to increase.

In addition, the overall size of Thailand's e-commerce market is also expanding. In 2024, the size of the e-commerce market will increase by 14% from the previous year to 1.1 trillion baht [11, P.1]. These data show that in 2024, the cross-border e-commerce transaction volume between China and Thailand will also show a significant growth trend, which is consistent with the growth trend of the overall trade volume.

According to the data of the General Administration of Customs, in 2024, the total import and export value of China's goods trade reached 43.85 trillion yuan, a record high, with a year-on-year increase of 5%. Among them, exports have maintained growth for eight consecutive years, and the scale exceeded 25 trillion yuan for the first time, reaching 25.45 trillion yuan, an increase of 7.1%; Imports reached 18.39 trillion yuan, up 2.3%. According to the data of the General Administration of Customs in the same period, in 2024, the total import and export value of China's goods trade reached 43.85 trillion yuan, a record high, with a year-on-year increase of 5%. Among them, exports have maintained growth for eight consecutive years, and the scale exceeded 25 trillion yuan for the first time, reaching 25.45 trillion yuan, an increase of 7.1%; Imports reached 18.39 trillion yuan, up 2.3%. ASEAN continues to maintain its position as China's largest trading partner. The total trade volume between China and ASEAN was 6.99 trillion yuan, up 9.0%, accounting for 15.9% of China's total foreign trade. Among them, exports to ASEAN were 4.17 trillion yuan, an increase of 13.4%; Imports from ASEAN reached 2.82 trillion yuan, an increase of 3.2%. According to the above cases, by 2024, the development of digital economy in Southeast Asia has a positive correlation with the growth rate of total trade between China and ASEAN.

In recent years, the Middle East countries mainly develop digital payment and energy trade. Huawei cooperates with UAE to build a 5G network and promote cross-border payment systems between China and Arab countries, such as Alipay. In 2023, the trade volume between China and Afghanistan exceeded 80 billion US dollars, of which the proportion of digital service trade increased to 12%. Saudi Arabia launched: Saudi Arabia's "Vision 2030" to promote digital infrastructure. China-Saudi Arabia energy trade will realize contract automation through blockchain technology, and the efficiency of energy trade will increase by 20% in 2022. The penetration rate of digital payment in the Middle East increased from 25% in 2019 to 45% in 2023, and China's exports to the Middle East increased by 34% in the same period. According to the above cases, by 2024, the development of digital economy in the Middle East has a positive correlation with the growth rate of total trade between China and the Middle East.

The report of the United Nations Conference on Trade and Development in 2023 pointed out that for every 1% increase in the development level of the digital economy, the trade volume between the Belt and Road countries and China will increase by 0.6%-0.8%. The World Bank pointed out in 2022 that the Internet penetration rate of the Belt and Road countries increased by 10%, and China's exports to them increased by 3.5%. In 2023, the General Administration of Customs of China pointed out that China's trade volume in the "Belt and Road" countries (such as Indonesian and Saudi Arabia) with digital infrastructure investment exceeding 10 billion US dollars increased by 12%, which was significantly higher than the average of 6%. Based on the above analysis, it can be verified that hypothesis 1 is established, that is, the development of digital economy along the Belt and Road can promote the scale of China's international trade.

Cross-border e-commerce platforms in China have developed rapidly, mainly including B2B and B2C. The formers are Alibaba International Station, TOOCLE3.0 (business treasure), China Manufacturing Network, Dalong Network, Dunhuang Network, etc. The latter includes AliExpress, eBay, Amazon, JD.com, Taobao, Lanting Jishi, Milan, Cross-border Communication, etc. These platforms have become intermediaries between China and global businesses, effectively promoting the global circulation of resources. Table 3.2 shows the distribution data of China’s e-commerce platform giants.

Table 3.2 - The distribution data of China’s e-commerce platform giants [35]

E-commerce platform	Alibaba	Amazon	Made-in-China.com	JD.com	Taobao	others
Proportion	40%	25%	10%	10%	8%	7%

Alibaba is the largest e-commerce platform with a share of about 40%. Amazon ranks second with a share of 25%. As shown in Figure 3.2, we can see the distribution of major e-commerce platforms more intuitively.

At the second Global cross-border electronic commerce Summit, Xing Yue, vice president of Alibaba Group, described the future of cross-border e-commerce in China and the world. She said that at present, the industrial ecology of cross-border e-commerce in

China has become an important support in the field of global trade. Platforms such as Alibaba International Station and Dunhuang Network provide supply and demand matching services for enterprises in the Belt and Road countries [56, P.1]. For example, Vietnamese SMEs connect with China buyers through Alibaba International Station. In 2022, the volume of Vietnamese e-commerce exports to China increased by 35%. In 2024, the e-commerce transaction volume of Vietnamese exports to China was US$ 144 billion, an increase of US$ 33.35 billion or 30.1% compared with 2023.

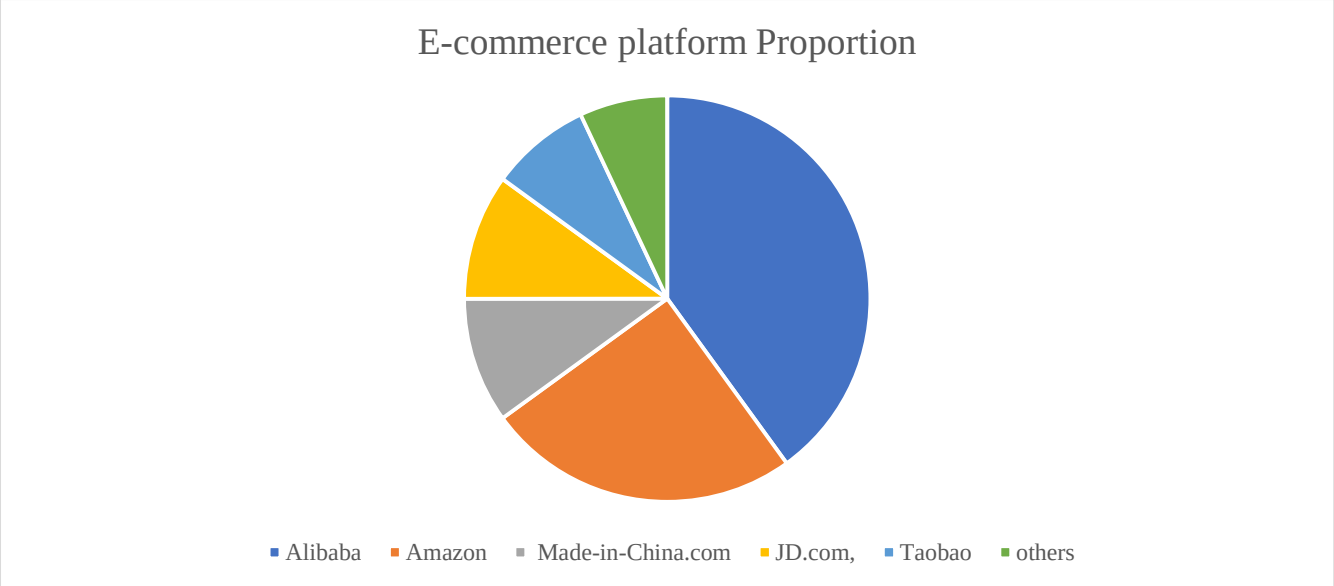

Figure 3.2 - E-commerce platform Proportion

In recent years, ITC, World Bank and other institutions have repeatedly pointed out that Southeast Asia (such as Indonesia, Vietnam and Thailand) accesses the global supply chain through platforms such as Lazada and Shopee, which significantly reduces information asymmetry and transaction friction. For example, ITC analyzed in "E-commerce in ASEAN: Opportunities for SMEs" ITC 2020, and the digital platform increased the export intention of SMEs by 35%, and the information cost decreased by 50%-60%. According to the above cases, it can be clearly seen that the development of digital economy in the "Belt and Road" countries can enhance the scale of China's international trade by reducing information costs.

Alipay+ of Ant Group has covered more than 10 countries in the Belt and Road Initiative (such as Malaysia and Thailand) and supported cross-border settlement of local

e-wallets. In 2022, the volume of cross-border electronic payment transactions between China and Malaysia increased by 48% year-on-year. In 2024, Alipay+, the cross-border payment service of Ant Group, will be introduced into the Indonesian market. Recently, Ant Group has reached a strategic partnership with the global payment platform 22p [25, P.1]. Alipay+ has expanded the payment methods supported by Ant Alipay+ solutions from the top 10 to hundreds at once [3, P.1]. As shown in Table 3.3, the China-Europe Express data summary shows that as time goes by, the number of trains will exceed 10,000 in 2020, and the transportation time will continue to shorten. The China-Europe Express has introduced a blockchain logistics tracking system, which will shorten the cargo transportation time from 45 days to 12-16 days, and even as fast as 7 days in 2024. In 2024, the number of China-Europe Express trains will exceed 19,000.

Table3.3 - China-Europe Express Statistics [61]

year	Quantity (columns)	Shipping time(day)
2019	8255	15-20
2020	12406	14-18
2021	15183	13-17
2022	16799	12-16
2023	17000	12-16
2024	19000	7days

According to the World Bank research, digital payment reduces the cross-border transaction cost of SMEs by 15%-20%. According to the data of China Customs, in 2023, the customs clearance time of goods declared through the intelligent logistics system was reduced to 1.5 hours, 80% faster than the traditional mode. The above cases and data show that the development of digital economy in countries along the "Belt and Road" can enhance the scale of China's international trade by reducing transaction costs.

On October 18th, 2023, President Xi Jinping gave a keynote speech on "Building an Open, Inclusive, Interconnected and Common Development World" at the Third Belt and

Road International Cooperation Summit Forum, and pointed out that the "Belt and Road" cooperation has expanded from hard connectivity to soft connectivity. At the forum, China and 26 countries jointly launched the Beijing Initiative for Deepening Interconnection and Cooperation. In 2023, the number of certificates issued exceeded 1 million, and the customs clearance time of enterprises was reduced by 70%.

China-Kazakhstan Horgos International Border Cooperation Center implements "one-stop" customs clearance. In 2022, the import and export freight volume at the port will increase by 22%, and the institutional cost will decrease by 25%. UNCTAD estimates that the synergy of digital trade rules will improve the customs clearance efficiency of the "Belt and Road" countries by 40% and reduce the system cost by 18%. According to the data of China General Administration of Customs, in 2023, the coverage rate of "single window" exceeded 95%, and the repeated entry of enterprise declaration data decreased by 90%. These cases show that the development of digital economy in countries along the Belt and Road Initiative can enhance the scale of China's international trade by reducing institutional costs.

Based on the above analysis, it can be verified that hypothesis 2 holds, that is, the development of digital economy along the "Belt and Road" will enhance the scale of China's international trade by reducing trade costs.

Alibaba International Station includes 1688 and cross-border business, connecting China SMEs and global buyers through a digital platform. In 2022, the platform will add more than 5 million kinds of tradeable goods, covering more than 3 million kinds of goods. In 2023, the varieties of durian exported from Thailand to China through JD.COM expanded from Jinzhen to six new varieties such as Qingni and Jialun, and the SKU increased by 150%. In 2023, the export commodities of Malaysian SMEs will increase from 12,000 to 45,000, among which 50 categories, such as bird's nest and frozen Maoshanwang durian, will enter the China market for the first time. Malaysian Maoshanwang durian has been transported at full temperature, and the loss rate has been reduced from 30% to 8%, which has promoted high-end products with a unit price exceeding that of 200 yuan to enter the international market.

According to China Customs data, the cross-border e-commerce import of fresh agricultural products reached 120 billion yuan in 2023, up 45% year-on-year. According to the statistics of China Customs, the total import and export volume of cross-border e-commerce reached 2.38 trillion yuan in 2023, up 15.6% year-on-year, of which exports accounted for more than 70%. These cases show that the development of digital economy along the "Belt and Road" can enhance the scale of China's international trade by increasing tradable goods.

With the development of digital technology, e-commerce platforms, live selling, online payment, etc. have come out one after another, and the trade model is constantly innovating. Tiki, the largest e-commerce platform in Vietnam, introduced the function of "live broadcast+instant translation", so that China merchants can directly broadcast live in Chinese, and AI can be translated into Vietnamese in real time. In 2023, Indonesian small and medium-sized merchants will purchase 90% more goods from Yiwu, China, and the average order amount will drop to 300 dollars. China's export volume of wigs, Hanfu and other small categories to Indonesia increased by 270% year-on-year. The cases of Vietnam and Indonesia show that the development of digital economy along the "Belt and Road" has enhanced the scale of China's international trade through innovative trade models.

With the development of digital technology, the competition in the "Belt and Road" international market is becoming more and more fierce. Shenzhen electronic industry cluster goes to sea through digitalization. Electronic component enterprises in Shenzhen Huaqiang North directly connect with buyers from Belt and Road countries through platforms such as Amazon and AliExpress. In 2023, Shenzhen's exports of electronic products to Southeast Asia reached US$ 48 billion, of which the contribution of SMEs increased from 35% in 2018 to 55%. The intensification of market competition has accelerated the iterative speed of products, and the prices of some electronic components have dropped by 20%-30%. With the development of digital economy, the market competition in countries along the "Belt and Road" has intensified, which has enhanced the scale of China's international trade.

Based on the above analysis, it can be verified that hypothesis 3 holds, that is, the development of digital economy along the "Belt and Road" will enhance the scale of China's international trade by increasing the types of international trade products.

3.2 Southeast Asian Countries' E-commerce Development under "Belt and Road" Project

In recent years, the global digital economy has grown rapidly and the pace of digital globalization has accelerated. With the joint construction of the "Belt and Road" entering the stage of high-quality development, the international cooperation of the "Digital Silk Road" and the construction of "Silk Road E-commerce" have increasingly become the new highlights and engines of the "Belt and Road" international cooperation. This has also laid a solid foundation for the economic and trade development of the "Belt and Road" countries.

The 2024 Southeast Asia Digital Economy Report updates the data and trends of digital economy development in six areas of e-commerce, food delivery, transportation, online travel, online media and financial services in six Southeast Asian countries, including Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam. The report shows that the digital economy in Southeast Asia is growing strongly, driven by a solid macroeconomic foundation, growing consumer demand and technological progress. Table 3.4 is a summary of the GMV of Southeast Asia's digital economy from 2019 to 2024.

Table3.4 - Summary of the GMV of Southeast Asia's digital economy from 2019 to 2024 （100 million US dollars）[47]

year	total GMV	E-commerce GMV	E-commerce accounts for the total
2019	1000	380	38%
2020	1050	620	59%
2021	1740	1200	69%

2022	2000	1310	66%
2023	2180	1390	64%
2024	2630	1590	60.50%

According to Table 3.3, the total GMV of Southeast Asia's digital economy will exceed US$100 billion starting in 2021. E-commerce GMV accounts for a large proportion of the total GMV, exceeding 50% starting in 2020. In 2024, the total value of goods (GMV) of Southeast Asia's digital economy is expected to reach US$263 billion. Figure 3.3 shows the trend of GMV in Southeast Asia more intuitively.

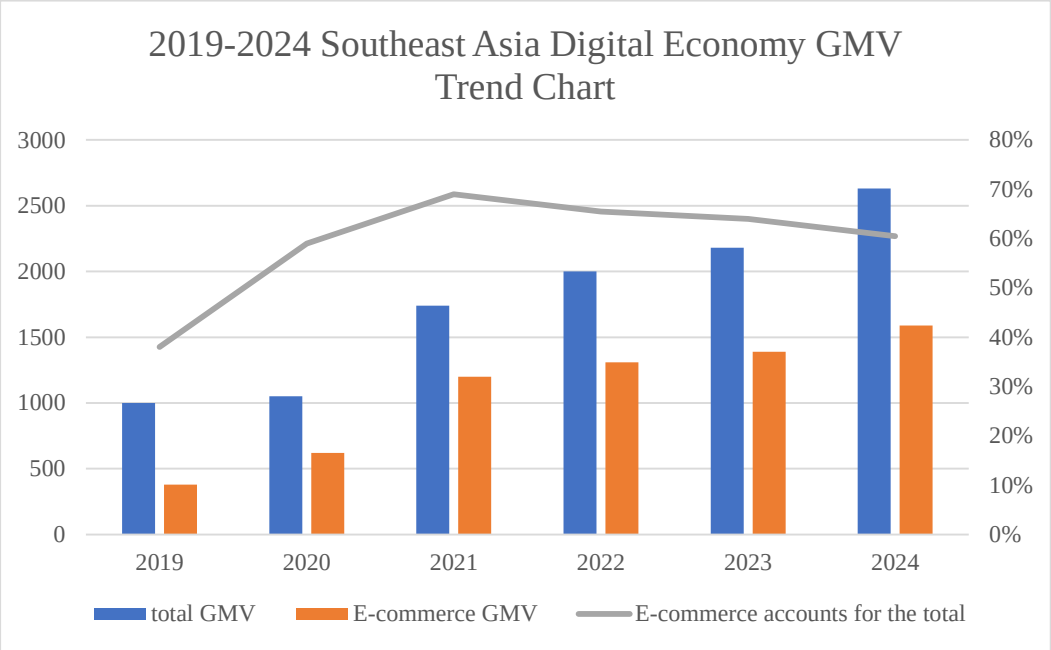

Figure 3.3 - 2019-2024 Southeast Asia Digital Economy GMV Trend Chart

It can be seen that the digital economy of Southeast Asian e-commerce has developed rapidly from 2019 to 2021, and the growth rate of its e-commerce GMV in the total GMV has increased sharply. In 2021-2024, the development of the e-commerce industry has stabilized. During the period of 2019-2024, the total GMV of the digital economy in Southeast Asia has been showing a steady growth trend. The countries that have made great contributions to the digital economy in Southeast Asia are mainly Singapore, Vietnam, Thailand, and Indonesia. Vietnam's digital economy maintained

double-digit growth in 2024, with a compound annual growth rate of 16%, and the total value of goods was 36 billion US dollars, mainly driven by e-commerce and online travel. The growth rate of online media industry in Vietnam is the fastest in Southeast Asia. In 2024, the total value of goods in this industry is expected to reach 6 billion US dollars, with a compound annual growth rate of 14%. It is estimated that the total value of goods will increase to 11 billion US dollars by 2030[12,p.1]. According to data from the Bank of Indonesia, in 2023, e-commerce transactions in Indonesia reached US$ 28.9 billion, and e-commerce transactions also increased significantly, reaching 3.71 billion. It is estimated that Indonesia's e-commerce transaction volume will increase by 7.2% in 2024. "Digitalization is the main engine of Indonesia's future economic growth," said Ellanga, Minister of Economic Coordination of Indonesia. It is estimated that by 2030, the scale of Indonesia's digital economy will exceed 210 billion US dollars. Thailand's e-commerce market is expected to increase to US$ 26 billion in 2024, a year-on-year increase of 19%. The Ministry of Digital Economy and Society of Thailand predicts that in 2024, the digital economy will contribute more than 4.3 trillion baht (1 US dollar is about 33.6 baht) to Thailand, accounting for 23.9% of GDP. According to the data of Singapore Information and Communication Media Development Bureau, the digital economy accounted for 17.7% of Singapore's GDP in 2023, which surpassed the financial and insurance industries and was equivalent to the manufacturing industry. According to Yuetong News Agency, in 2023, the contribution rate of digital economy to Vietnam's GDP exceeded 16%, and the overseas revenue of more than 1,500 digital enterprises increased by more than 7% year-on-year. The output value of e-commerce in Malaysia is expected to reach $25 billion by 2030. The development of digital economy has strongly promoted the economic growth and employment of Southeast Asian countries and improved the overall trade competitiveness of the region [39, P.1]. Based on the above analysis, it can be verified that hypothesis 4 is established, that is, the development of digital economy can promote the development of international trade in "Belt and Road" countries.

Indonesia is the second largest fishing country in the world, but there are some problems in the traditional fishery supply chain, such as information asymmetry and middlemen's price reduction. Efish is a B2B digital platform that connects fishermen,

processing plants and global buyers, and uses digital technology, big data and AI to optimize pricing and logistics. Apply digital technology to digital platform to increase fishermen's income. By directly docking with the international market, fishermen's income has increased by 30%. AI optimizes transportation routes and reduces the cost of cold chain logistics by 25%. In 2022, seafood exported through eFishery increased by 40%, mainly sold to China, Japan and the European Union. By 2023, eFishery has covered 200,000 fishermen in Indonesia, and the annual transaction volume has exceeded 500 million US dollars. It is estimated that by 2025, 50% of Indonesia's fishery exports will be completed through digital platforms[38]. Viet Nam Post launched Voso, a B2B e-commerce platform integrating payment, logistics and cross-border trade, to help SMEs connect with China Alibaba, Thailand Lazada and other markets. Reduce the cost of cross-border payment: cooperate with Alipay to reduce the cost of cross-border settlement. The export volume of an electronic parts supplier in Hanoi to China through Voso increased from 500,000 US dollars in 2021 to 675,000 US dollars in 2022. In 2022, Vietnamese SMEs' exports to China increased by 35% through Voso, and the main categories were agricultural products and electronic products [50, P.1]. According to the cases and data of digital technology applied to digital platforms in Indonesia and Vietnam, it can be seen that the development of digital economy is applied to digital platforms through digital technology, which promotes the development of international trade in countries along the Belt and Road.

Huawei has specially built intelligent side station products, pre-integrated computing, storage, network and security capabilities, and uniformly carried smart card ports, customs clearance systems and other services, helping ports to quickly build one-stop intelligent customs clearance capabilities, reducing deployment time by 60% on average, and reducing vehicle customs clearance time to seconds, greatly improving the intelligence level and customs clearance efficiency of ports. The "Smart Customs" system jointly built by Huawei and Kazakhstan has reduced the customs clearance time from 72 hours to 6 hours [24, P.1]. The development of digital economy improves efficiency by optimizing trade processes, and promotes the development of international trade in countries along the Belt and Road.

IFLYTEK Translation Machine belongs to Iflytek. In April 2018, Iflytek officially released iFLYTEK Translator 2.0. In July, 2024, the translation machine launched by Greater iFLYTEK can support online translation of over 80 kinds of voices. In 2022, the Chamber of Commerce and Industry of Uzbekistan announced that the use of iFLYTEK translation greatly reduced translation costs: enterprises saved $15,000 in manual translation costs every year. Astana International Financial Center pointed out in 2023 that 50% of large foreign trade enterprises in Kazakhstan use AI translation tools. The development of the digital economy promotes the development of international trade in the Belt and Road countries by improving the user experience, reducing the communication cost.

To sum up, hypothesis 5 can be verified, that is, the development of digital economy promotes the development of international trade in "Belt and Road" countries by reducing trade costs.

In Pakistan, the intelligent distribution center jointly built by rookie and Daraz has achieved a four-fold jump in sorting efficiency and a three-ten-thousandth error rate through self-developed sorting technology; In Thailand, the largest automated warehouse in Southeast Asia built by rookie for Flash Express adopts flexible technology, so that the storage capacity can be dynamically adjusted according to the demand [29, P.1]. At the same time, it supports the trade of fragile products such as fresh food and electronic products, and the innovation and application of rookie logistics digital technology greatly shortens the time and increases the variety of trade.

China and Kenya cooperated to establish a "digital medicine patent pool" to promote the localized production of generic drugs (such as antimalarial drugs) in Africa by sharing some patented technologies. According to the data of Kenyan Drug Administration, the types of imported drugs increased from 300 to 600 in 2020-2023, of which 30% were generic drugs authorized by enterprises in China. Table 3.5 shows the names of Chinese pharmaceutical companies involved in authorizing generic drugs and their participation methods.

Table 3.5 - The names of Chinese pharmaceutical companies involved in authorizing generic drugs and their participation methods [10]

Chinese companies	Participation Form
Hua Hai	Export
Ke Xing	direct export
Guo Yao	commercial sales
Yunnan Baiyao	localized licensed production

According to the Kenya National Bureau of Statistics, the country imported 37,079 tons of various products in 2023. The growth in imports highlights Kenya's increasing dependence on the international market. WIPO's Global Innovation Index 2023 mentioned that the digital transformation has increased the number of intellectual property applications in the Belt and Road countries by 12% annually, with trademarks and industrial designs accounting for the highest proportion. With the development of digital economy, the protection and sharing of intellectual property rights will expand the variety of trade products.

E-commerce platforms and social media have broken geographical restrictions and enabled niche brands to enter the global market, greatly expanding brand influence. The Indonesian Ministry of Trade announced in 2023 that the types of goods exported through e-commerce increased by 75% compared with 2020, among which the proportion of local brands increased from 30% to 50%. Polish and Hungarian minority brands (such as organic food and handicrafts) directly reach China consumers through platforms such as Alibaba International Station and Amazon. The development of digital economy can expand the market, enhance the brand influence and increase the variety of trade products.

To sum up, hypothesis 6 can be verified, that is, the development of digital economy promotes the development of international trade of "Belt and Road" countries by increasing the types of traded products.

Alibaba Research Institute released the report "Building the 21st Century Digital Silk Road-Practice of Alibaba's Economy", and the total merchandise sales of Tmall International in countries along the Belt and Road increased by 120% compared with 2018;

In 2016, Alibaba controlled Lazada, a cross-border e-commerce platform, for US$ 1 billion. As of March 2019, Lazada has grown into the largest e-commerce platform in Southeast Asia, with branches in Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam. At present, Lazada has more than 400,000 sellers, thousands of brand partners and more than 100 logistics partners. Alibaba helped Lazada to further sort out its business model, and also created a new logistics and technical capability system for it, which enabled Lazada to improve its platform computing power, marketing innovation and logistics support, and its platform traffic, turnover and sales exceeded all aspects [2, P.1]. In 2023, the cross-border e-commerce market in Southeast Asia reached US$ 23 billion, of which 35% came from China. Thai consumers' orders for China goods through Lazada increased by 120% annually. The wide application of e-commerce platform makes trade more convenient and promotes the development of international trade in "Belt and Road" countries.

In July, 2023, China Merchants Steamship, China Merchants Haitong's China Merchants Automobile Trade, Sinotrans's Middle East Company and Taicang Shipping Agency completed the ocean transportation and delivery of a number of domestic new energy vehicles through China Merchants Steamship's "Silk Road Cloud Chain" bill of lading platform. The pilot uses the "Silk Road Cloud Chain" bill of lading platform, which realizes the digital and electronic circulation of the whole life cycle of the bill of lading, such as online drafting, review, issuance, circulation and delivery of documents. Specifically, through online circulation of electronic bills of lading, the mail circulation time of paper bills of lading in the past 5-10 days is greatly shortened to 1-2 days or even several hours [13, P.1], which is far more efficient than traditional paper bills of lading and can effectively avoid the risk of loss and tampering of paper bills of lading. China Merchants Steamship will provide customers with safe, efficient and low-cost blockchain electronic bill of lading service, which will make shipping operations more convenient and international trade more efficient. China and Kazakhstan cooperated to pilot blockchain electronic bills of lading to replace traditional paper documents [55, P.1]. The two sides spoke highly of the record-high bilateral trade volume in 2023 and the efforts made by the two governments to enhance the bilateral trade volume. The development of digital

economy promotes the national trade development of the "Belt and Road" countries through the electronization of trade processes.

China and ASEAN countries (such as Malaysia, Thailand, Vietnam) realize the customs "single window" data docking, and enterprises submit trade data through a unified platform, which is shared in real time by national regulatory authorities. Customs clearance time for Malaysian-China cross-border goods has been reduced from 72 hours to 8 hours. In 2022, China and Kazakhstan signed the Memorandum of Cross-border Paperless Customs Clearance. China and Kazakstan have implemented "Smart Customs" at the border crossings of Banlie in Central Europe (such as Horgos), and the goods are automatically inspected and released through AI image recognition and Internet of Things equipment. The accuracy of AI identification of container numbers is 99.9%, and the need for manual review is reduced by 70%. Electronic trade supervision and service innovation make trade more convenient, and at the same time, trade costs are reduced. Electronic supervision reduces the cross-border trade cost of "Belt and Road" countries by 15%-25% on average, making the trade process more convenient [53, P.1].

According to the above cases and data, hypothesis 7 can be verified, that is, the development of digital economy promotes the development of international trade of "Belt and Road" countries through trade facilitation.

According to the above research, the following suggestions are put forward.

Strengthen cooperation with countries that jointly build the "Belt and Road" in digital infrastructure and digital standards. To help countries along the Belt and Road, we can start from three aspects [6, P.287]: strengthening the construction of digital infrastructure, improving the use level of digital technology and enhancing the level of digital skills. China can introduce relevant assistance policies and strengthen political and economic cooperation with countries along the route. The state will provide credit financing guarantee for information-based enterprises to "go global", encourage enterprises to build digital infrastructure in countries along the route, cultivate high-skilled applied talents, improve the local digital application level, thus narrowing the digital divide along the route and helping bilateral trade between China and countries along the route [45, P.1]. Through financial subsidies, tax relief and other means, China enterprises

are encouraged to participate in the construction of digital infrastructure such as 5G bases and data centers in the "Belt and Road" countries, so as to enhance the level of digital development [44, P.30-32]. At the same time, strengthen policy communication and coordination to provide a good external environment for the two sides to jointly build and share digital platforms. Cooperate with countries that jointly build the "Belt and Road" in terms of rules docking and standards compatibility, promote the international integration of digital technology rules, and form a unified digital technology rules system.

Deepen and co-build the cooperation in talent training in the "Belt and Road" countries. Adhere to the parallel introduction and export of talents, promote the joint running of universities in China and jointly build national universities, and build a talent exchange link.

Actively promote the digital transformation of China's industry. Promoting the digital transformation of traditional industries can improve the operational efficiency of enterprises and provide opportunities for further broadening the international market across the threshold of international trade [18, P.83]. Traditional trade rules are no longer applicable to trade circulation in the digital era[58,P.88-90], and formulate reasonable regulatory measures for cross-border flow of data to maximize the effectiveness of data elements without harming national interests; Actively participate in international negotiations, promote the improvement of digital trade rules under the WTO framework, and strive to reduce the restrictions on cross-border data flow, data privacy protection and intellectual property rights. International trade barriers caused by protection and other issues.

Strengthen cooperation in data security with countries that jointly build the Belt and Road Initiative. With the help of the "Belt and Road Initiative" and the "BRICS Organization", we will discuss and sign a data security statement with the co-construction countries to standardize data collection, circulation and use. Improving the legal system of cross-border data circulation security, and provide legal support for data security protection of cross-border trade.

Increase the depth and breadth of digital technology cooperation with and jointly build the "Belt and Road" countries. Give full play to the leading role of policies, and

deepen and jointly build the cooperation of the "Belt and Road" countries in digital technologies such as artificial intelligence, big data, cloud computing and blockchain.

Conclusions

This paper studies the influence of the development of digital economy on the international trade of "Belt and Road" countries from three parts.

The first is about the research on the development status of digital economy between China and countries along the Belt and Road. At present, the development level of China's digital economy is increasing year by year. Although it is slightly higher than the international average, there is still a certain gap compared with developed countries. In terms of scale, China's digital economy is growing rapidly, and industrial digitalization has become a powerful driving force for China's economic and social development. From the perspective of infrastructure construction, China has actively promoted the construction of digital infrastructure, and achieved rapid improvement in the number of base stations, ports and Internet penetration rate, providing a good facility environment for the development of China's digital economy. The development level of digital economy in countries along the Belt and Road also shows a steady improvement trend, but there are obvious differences among regions.

Secondly, it studies the related theories and mechanisms of digital economy affecting international trade. The first part first analyzes the influence of digital economy on international trade subjects, then combs the restrictive conditions of traditional international trade, then explains the factors that digital economy affects international trade, and then discusses the role of digital economy in improving international trade on the basis of the above analysis. The second part analyzes the influence path of the development of digital economy in "Belt and Road" countries on China's trade, and puts forward assumptions from the aspects of international trade costs and international trade products. The third part studies the influence of digital economy on international trade of Belt and Road countries, and puts forward assumptions from three aspects: trade cost, product types and trade facilitation.

Finally, a case study is made. From the impact of the development of digital economy in the Belt and Road countries on China's trade, the research cases show that the development of digital economy in Southeast Asia, the Middle East and Eastern Europe is

positively correlated with the growth rate of total trade between China and Eastern Europe. The report of the United Nations Conference on Trade and Development in 2023 pointed out that for every 1% increase in the development level of digital economy, the trade volume between Belt and Road countries and China will increase by 0.6%-0.8%, which can verify the establishment of hypothesis 1, that is, the development of digital economy along the Belt and Road can promote the scale of international trade in China; China's cross-border e-commerce platform has developed rapidly, and Southeast Asia has reduced information costs through this platform. Southeast Asia and Central and Eastern Europe reduce transaction costs through ant electronic payment and Central European trains. China, ASEAN and China-Kazakhstan Horgos International Border signed a policy agreement, which reduced the system cost and increased the export of enterprises from the Belt and Road countries to China. It can be verified that Hypothesis 2 holds, that is, the development of digital economy along the Belt and Road will enhance the scale of international trade in China by reducing trade costs. Southeast Asia and the Middle East have increased their trade products and innovated their trade patterns, while Shenzhen Huaqiang North has expanded its exports by intensifying market competition. It can be verified that hypothesis 3 holds, that is, the development of digital economy along the Belt and Road will enhance the scale of international trade in China by increasing the variety of international trade products. From the case analysis of the impact of the development of digital economy on the international trade of other countries in the Belt and Road Initiative, it can be seen that the total GMV of the digital economy in Southeast Asia has been growing steadily from 2019 to 2024, and the development of digital economy in various countries has effectively promoted the economic growth and employment of Southeast Asian countries and improved the overall trade competitiveness of the region. Based on the above analysis, it can be verified that hypothesis 4 is true, that is, the development of digital economy can promote the development of international trade in "Belt and Road" countries. Indonesia and Viet Nam apply digital technology to B2B platform, and the "Smart Customs" system jointly established by Huawei and Kazakhstan improves the efficiency of trade flow, while Iflytek translation technology reduces the communication cost. It has promoted the development of international trade in "Belt and Road" countries.

Hypothesis 5 can be verified, that is, the development of digital economy has promoted the development of international trade in "Belt and Road" countries by reducing trade costs. In Pakistan, the intelligent distribution center jointly built by rookie and Daraz has increased the number of tradable goods. China and Kenya cooperated to establish a "patent pool for digital medicine" to protect intellectual property rights and expand the variety of products traded. Polish and Hungarian minority brands directly contact China consumers through platforms such as Alibaba International Station and Amazon, expanding the market, enhancing brand influence and increasing the variety of trade products. Hypothesis 6 can be verified, that is, the development of digital economy promotes the development of international trade in "Belt and Road" countries by increasing the variety of trade products. Thai consumers' orders for China goods through Lazada increase by 120% every year. The wide application of e-commerce platform makes trade more convenient. "Silk Road Cloud Chain" bill of lading platform and China-Kazakhstan cooperation pilot blockchain electronic bill of lading make the trade process electronic. The implementation of "Smart Customs" in China, ASEAN countries and Kazakstan makes the trade process more convenient. According to the above cases and data, hypothesis 7 can be verified, that is, the development of digital economy has promoted the development of international trade in the countries along the Belt and Road through trade facilitation. On the one hand, it can enrich the theoretical research of digital economy in China, on the other hand, it has certain reference significance to promote the construction of "Digital Silk Road".

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